



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
09.11.2022 Bulletin 2022/45

(51) International Patent Classification (IPC):
E03B 7/07 ^(2006.01) **E03B 7/08** ^(2006.01)
F24D 17/00 ^(2022.01)

(21) Application number: **22169032.4**

(52) Cooperative Patent Classification (CPC):
E03B 7/08; E03B 7/078; F24D 17/0078

(22) Date of filing: **20.04.2022**

(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

(71) Applicant: **ACQUA BREVETTI S.R.L.**
35035 Mestrino (PD) (IT)

(72) Inventor: **BARBIERI, Graziano**
35035 MESTRINO PD (IT)

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

(30) Priority: **06.05.2021 IT 202100011555**

(54) **FILTERING DEVICE FOR A PLUMBING SYSTEM AND METHOD OF DISINFECTION OF A PLUMBING SYSTEM WITH SUCH FILTERING**

(57) A filtering device (100) for a plumbing system (1) which comprises:

- a filter (F),
- a first valve (C) for draining the filter (F),
- a dosage pump (P) for dosing one or more disinfectant substances (S) upstream of the filter (F) and integrated therewith,

- a liquid flow rate meter (W), interposed between the dosage pump (P) and the filter (F) and integrated therewith,
- an electronic board (D) for the management and control of the device (100),
- wireless communication means (M) with a user interface (A).

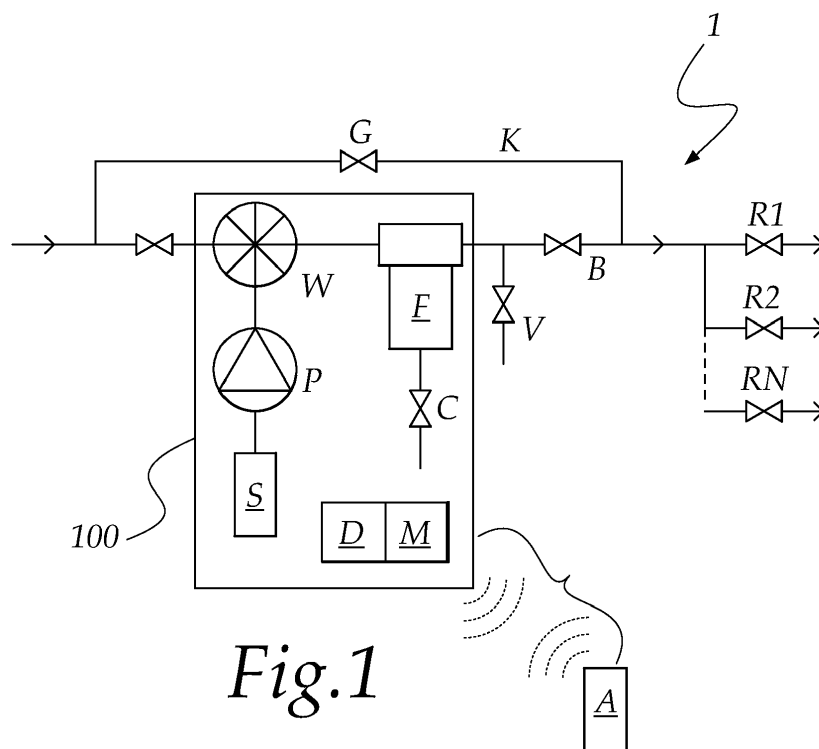


Fig.1

Description

[0001] The present invention relates to a filtering device for a plumbing system and a method for the disinfection of a plumbing system with such a device and/or of a filter of such a plumbing system.

[0002] In the present description the terms "disinfection" or "sanitization" will be used with the same meaning.

[0003] Nowadays plumbing systems for heating and supplying sanitary water are subject to the hazard of encrustations and corrosion owing to the presence of calcium and magnesium salts.

[0004] For this reason it is usual to introduce substances into plumbing circuits that are adapted to obtain the suspension of the calcium and magnesium salts, preventing their precipitation over time, and the use is increasingly widespread of filters adapted to retain/collect such particles and other impurities.

[0005] However, plumbing systems can also be habitats for bacteria, including legionella which is harmful to humans, which can lurk especially at or near individual user devices, such as for example faucets or showers, but also in the filters mentioned above.

[0006] For this reason it is important to sanitize both the system and any filter that may be present.

[0007] Nowadays, in order to be able to execute such operations, depending on the user devices to be sanitized, it is necessary to modify manually intervening on the filter and/or stopping the normal flow of the system by intervening on one or more valves and/or faucets thereof and introducing a specific and dosed quantity of disinfectant into the system, or into the portion of system of interest.

[0008] Such conventional techniques have the drawback that such procedures must be carried out manually and usually the procedures of such operations are known only to trained persons, therefore the intervention of a specialist operator is always required.

[0009] Furthermore, since systems are not all the same, it is necessary even for a specialist operator, before intervening, to study/comprehend the extension of the system in order to understand where to get to work.

[0010] The aim of the present invention is to provide a filtering device for a plumbing system and a method for the disinfection of a plumbing system with such a device and/or of a filter of such a plumbing system that are capable of improving the known art in one or more of the above mentioned aspects.

[0011] Within this aim, an object of the invention is to provide a filtering device for a plumbing system and a method for the disinfection of a plumbing system with such a device and/or of a filter of such a plumbing system which enable not only specialist operators, but also any user, to carry out the disinfection.

[0012] Another object of the invention is to provide a filtering device for a plumbing system and a method for the disinfection of a plumbing system with such a device and/or of a filter of such a plumbing system that enables

the disinfection thereof without the need for an advance study of the extension of the system in order to understand where to intervene.

[0013] A further object of the present invention is to overcome the drawbacks of the background art in a manner that is alternative to any existing solutions.

[0014] Another object of the invention is to provide a filtering device for a plumbing system and a method for the disinfection of a plumbing system with such a device and/or of a filter of such a plumbing system that are highly reliable, easy to implement and at low cost.

[0015] This aim and these and other objects which will become better apparent hereinafter are achieved by a filtering device for a plumbing system which is characterized in that it comprises:

- a filter,
- a first valve for draining said filter,
- a dosage pump for dosing one or more disinfectant substances upstream of said filter and integrated therewith,
- a liquid flow rate meter, interposed between said dosage pump and said filter and integrated therewith,
- an electronic board for the management and control of said device,
- wireless communication means with a user interface.

[0016] This aim and these and other objects which will become better apparent hereinafter are achieved by a method for the disinfection of a plumbing system and/or of a filter of said plumbing system, said plumbing system comprising:

- one or more user devices, each one provided with a shut-off valve,
- a filtering device comprising said filter, as illustrated above, upstream of said one or more user devices,
- a duct for bypassing said filtering device, provided with a second shut-off valve,
- a third valve, for locking out said one or more user devices, which is interposed between said filter and said one or more user devices,
- a fourth valve, for drawing from said filter, which is interposed between said filter and said third valve,

said method being characterized in that it comprises:

- at least one first phase of recording data in a dedicated software program, said data being related to the number of said one or more user devices and/or filter in said system and deployments of said user devices and/or filter in said system,
- at least one second phase of recording in said dedicated software program the dosage of said one or more disinfectant substances and of the action time of said dosage,

- at least one third phase of disinfection of said plumbing system and/or of said filter for a plumbing system guided by said dedicated software program.

[0017] Further characteristics and advantages of the invention will become better apparent from the detailed description that follows of a preferred, but not exclusive, embodiment of a filtering device and a method for the sanitization of a plumbing system with such a device and/or of a filter of such a device, according to the invention, which is illustrated by way of non-limiting example in the accompanying drawings wherein:

- Figure 1 is a diagram of a generic plumbing system with a filtering device according to the invention;
- Figure 2 is a block diagram of a method for the disinfection of a plumbing system and/or of a filter of a plumbing system, according to the invention, applied to the plumbing system of Figure 1;
- Figure 3 is a block diagram of the phase of disinfection of the method of Figure 2;
- Figure 4 shows some use applications of a filtering device according to the invention.

[0018] With reference to the figures, a filtering device according to the invention is generally designated by the reference numeral 100.

[0019] The device 100 comprises:

- a filter F,
- a first valve C for draining the filter F,
- a dosage pump P for dosing a disinfectant substance S upstream of the filter F and integrated therewith,
- a flow rate meter W of the liquid circulating in the system, interposed between the dosage pump P and the filter F, such meter W being, for example, a pulse-emitting electronic meter connected electrically to the dosage pump P, and integrated with the filter F,
- an electronic board D for the management and control of the device 100,
- wireless communication means M, with a user interface A, which is constituted, for example, by a smartphone/tablet computer.

[0020] Such filter F, dosage pump P and meter W are, for example, of the type described in Italian patent application no. 102020000025381 by this same applicant.

[0021] In the present description, the term "integrated" means that:

- the dosage pump P and the meter W are integral with and connected to the filter F,
- and the dosage pump P, the meter W and the filter F are contained inside a same containment shell that defines the external shell of the filtering device 100.

[0022] With reference to Figure 4, such communication means M comprise a Bluetooth and/or NFC (Near Field

Communication) antenna for communication with a smartphone and/or a wireless LAN antenna for communication with a router X connected to a telephone and/or data network, in turn connected over a wireless LAN/telephone network with a smartphone/tablet computer and/or with a cloud Y, the latter connected in turn with a smartphone/tablet computer A over a data/telephone network, for example 4G.

[0023] The method for the disinfection of a plumbing system and/or of a filter of a plumbing system, according to the invention, is generally designated by the reference numeral 10, in Figure 2.

[0024] The method 10 is applied to a plumbing system 1, shown schematically in Figure 1.

[0025] The plumbing system 1, shown purely for the purposes of example in Figure 1, comprises:

- a series of user devices: R1, R2, ... RN, representing for example showers and/or faucets for sanitary water, each one of which is provided with a shut-off valve,
- the filtering device 100,
- a duct K for bypassing the filtering device 100, provided with a second shut-off valve G.

[0026] The system 1 also comprises:

- a third valve B, for locking out the user devices R1-RN, which is interposed between the filter F and the user devices R1-RN,
- a fourth valve V, for drawing from the filter F, which is interposed between the filter F and the third valve B.

[0027] With reference to Figure 2, the method for the disinfection of a plumbing system 1 and/or of a filter F for a plumbing system 1 according to the invention comprises:

- at least one first phase 11, of recording data in a dedicated software program, relating to the number of user devices R1-RN and/or filters F in the system 1 and deployments of such user devices R1-RN and/or filters F in the system 1,
- at least one second phase 12 of recording in the dedicated software program parameters relating to the dosage of one or more disinfectant substances S and to the action time of such dosage,
- at least one third phase 13, of disinfection of the plumbing system 1 and/or of the filter F for the plumbing system 1 guided by the dedicated software program.

[0028] The first phase 11 can involve entering data relating to the distance between each individual user device R1-RN and the filtering device 100, if known to the user, so that the software program can calculate the adequate dosage for the disinfection of such user device, thus

avoiding waste of disinfectant.

[0029] If the user does not know the distance between the user device R1-RN and the filtering device 100, the software program takes a default, preset dosage value, which comprises a safety margin that ensures disinfection.

[0030] For example a default value, with an adequate safety margin, can correspond to a dosage for a distance of 300 m between the user device R1-RN and the filtering device 100.

[0031] Such dedicated software program is, for example, an app for a user interface A like a smartphone and/or a tablet computer.

[0032] In particular, such app for a smartphone/tablet computer graphically represents the diagram of the system 1 and the deployment of its elements: user devices R1-RN, filter F, valves B, V, C, G, etc.

[0033] Such first phase 11 comprises the recording in the software program of the type of the user devices R1, R2, RN of the system 1, indicating for each one of them whether it is, for example, a wash basin, a shower, a WC, etc. and optionally their deployment in the system 1.

[0034] Such first phase 11 and/or second phase 12 are normally executed only once:

- either by the maker of the filtering device 100, before its installation,
- or by an installation technician authorized by the maker of the filtering device 100, during the installation thereof.

[0035] Such first phase 11 and second phase 12 can also be repeated at a later time, for example in order to modify some parameters as a consequence of changes to the system 1 or of regulatory updates for the substances S, both by the maker of the dosage pump P and/or of the filter F and by an authorized installation/maintenance technician.

[0036] For example, the maker can make changes to the dosage values, by releasing an update of the app.

[0037] Such substance S is for example the substance known under the commercial name of "Ferrocid 5280-S" made by the company Kurita Europe GmbH.

[0038] For example, in order to obtain a concentration of free chlorine:

- in the order of 20 ppm, it is necessary to use 300 ppm of Ferrocid 5280-S, i.e. 0.3 g/L of Ferrocid 5280-S;
- in the order of 50 ppm, it is necessary to use 750 ppm of Ferrocid 5280-S, i.e. 0.75 g/L of Ferrocid 5280-S.

[0039] The action time of this substance is normally at least twenty minutes, for example for the disinfection of the filter F, or for the disinfection of a user device R1, R2, ... RN.

[0040] One of the peculiarities of the invention consists

in that the dedicated software program guides the user step by step in the disinfection of the plumbing system 1 and/or of the filter F, progressively asking the user for information and/or decisions to be taken and telling the user the actions to be performed on specific elements of the plumbing system 1.

[0041] With reference to Figure 3, the third phase 13 of disinfection of the plumbing system 1 and/or of the filter F for a plumbing system 1 comprises the following steps:

- a first step 101, corresponding to the start of the disinfection, in which the user starts the software program for disinfection,
- a second step 102, in which the software program asks the user to indicate whether the user intends to sanitize only the filter F or the filter F and one or more user devices R1-RN of the system 1, and the user provides confirmation to the software program, telling it whether the user intends to proceed with the sanitizing of only the filter F or of the filter F and one or more user devices R1-RN of the plumbing system 1.

[0042] At this point, if the user decides to sanitize only the filter F, the method continues in the branch of the diagram 3 indicated by the arrow YES.

[0043] For the sanitization of only the filter F, the third phase 13 presents the process 400 which comprises:

- a third step 103, in which the software program tells the user to close the third valve B, for locking out the user devices R1-RN, the user closes it and provides confirmation to the software program once the operation has been performed,
- a fourth step 104, in which the software program tells the user to open the second valve G of the bypass duct K, the user performs this operation and provides confirmation to the software program after performing the operation,
- a fifth step 105, in which the device 100 automatically drains the filter F, by opening the third valve C, for draining the filter F, and washes it,
- a sixth step 106, in which the software program tells the user to open the fourth valve V (for drawing from the filter F) until a preset flow rate is reached, detected by the meter W, and the user performs the operation,
- a seventh step 107, in which, once the preset flow rate has been reached, the filtering device 100 automatically actuates the dosage pump P for a preset time, introducing the disinfectant substance S into the system,
- an eighth step 108, in which the software program tells the user to close the fourth valve V, the user performs this operation and provides confirmation to the software program after performing the operation,

- a ninth step 109, in which the dosage pump P is stopped,
- a tenth step 110, in which the software program tells the user to wait for a given preset time interval which corresponds to the action time of the substance S, for example via the graphic reproduction of a count-down on the screen of the smartphone,
- an eleventh step 111, in which a rinsing of the filter F is automatically performed,
- a twelfth step 112, in which the software program tells the user to close the second valve G of the bypass duct K, the user performs the operation and provides confirmation to the software program after performing the operation,
- a thirteenth step 113 in which the software program tells the user to open the third valve B, downstream of the filtering device 100, the user performs the operation and provides confirmation to the software program after performing the operation, bringing the filter F and the entire plumbing system 1 into operation, as indicated with the letter E in Figure 3.

[0044] If on the other hand the user decides to also sanitize one or more user devices R1-RN of the plumbing system 1, in addition to the filter F, the method continues in the branch of the diagram 3 indicated by the arrow NO.

[0045] In such case, first of all the sanitization is carried out of the filter F using the process 400 described above.

[0046] Then, for the sanitization of one or more user devices R1-RN of the plumbing system 1, the third phase 13 comprises:

- a third step 203, in which the software program asks the user for the number of user devices R1-RN to be sanitized, and the user provides input to the software program,
- a fourth step 204, in which the software program asks the user for the type of each individual user device R1-RN to be sanitized, and the user provides input to the software program specifying, for example, that the individual user device R1, R2, RN, is a shower or a wash basin or a WC, etc.,
- a fifth step 205, in which the software program tells the user to open the shut-off valve of a first user device R1 to be sanitized until a preset flow rate is reached, detected by the meter W, and the user performs the operation,
- a sixth step 206, in which, once the preset flow rate has been reached, the filtering device 100 actuates the dosage pump P for a preset time, introducing the disinfectant substance S into the system,
- a seventh step 207, in which the software program tells the user to close the valve of the first user device R1 to be sanitized, the user performs the operation and provides confirmation to the software program after performing the operation,
- an eighth step 208, in which the dosage pump P is stopped,

- a ninth step 209, in which the software program verifies whether all of the preset user devices R1-RN have been sanitized.

[0047] At this point, if not all of the preset user devices R1-RN have been sanitized, the third phase 13 comprises another fifth step 205' performed on the subsequent user device R2, RN, and the repetition, on such user device R2, RN, of the sixth 206, seventh 207, eighth 208 and ninth 209 steps, up to the last preset user device R1, R2, RN to be sanitized.

[0048] If and/or when the software program finds that there are no other user devices R1, R2, RN to be sanitized, the third phase 13 comprises:

- a tenth step 210, in which the software program tells the user to wait for a given preset time interval which corresponds to the action time of the substance S, for example via the graphic reproduction of a count-down on the screen of the smartphone,
- an eleventh step 211, in which the software program tells the user to perform a rinsing of the user device R1 for a preset time by opening its valve, the user performs the operation and provides confirmation to the software program after performing the operation,
- a twelfth step 212, in which the software program verifies whether all of the preset user devices R1-RN have been rinsed.

[0049] At this point, if not all the preset user devices R1-RN have been rinsed, the third phase 13 comprises another eleventh step 211' performed on each one of the subsequent user devices R2, RN, up to the last preset user device R1, R2, RN to be rinsed.

[0050] If and/or when the software program finds that there are no other user devices R1, R2, RN to be rinsed, the entire plumbing system 1 returns to operation, as indicated with the letter E in Figure 3.

[0051] In particular, the fifth step 205, 205', and/or the eleventh step 211, 211' comprise a first stage of drawing cold water, at a temperature equal to ambient temperature, in the order of 20°C, and a second stage of drawing hot water, at a temperature equal to that set in the boiler, in the order of 60°C.

[0052] During the stages of drawing cold water and hot water, the app can simulate, on the screen of the smartphone/tablet computer A, a countdown of the necessary liters, coordinated with the meter W.

[0053] Such withdrawals last, for example, in the order of five minutes and/or a volume of water in the order of 30 L.

[0054] The duration and the volume of water of such withdrawals can also be calculated automatically by the dedicated software program based on the distance between each individual user device R1-RN and the filtering device 100, entered during the first phase 11.

[0055] If the plumbing system 1 is shared, for example by several dwellings, and/or the filter F is shared, the

disinfection can be performed only by an operator of a service center.

[0056] In such case, the third phase 13 of the method according to the invention, in the first step 101, comprises:

- an auxiliary first step 301 in which the software program asks the user whether the user wishes to contact a service center and/or whether the user is an operator of an authorized service center.

[0057] At this point, if the user is an operator of an authorized service center, the third phase 13 comprises an auxiliary second step 302, in which the operator enters a unique code associated with the service center to which the operator belongs in order to make the software program advance to the second step 102.

[0058] If the user is not an operator of an authorized service center, the third phase 13 comprises an auxiliary second step 303, in which the software program loads a menu to search for an authorized service center located nearby, providing the user with the details for contacting an operator of this service center for the purpose of starting the disinfection.

[0059] In practice it has been found that the invention fully achieves the intended aim and objects by providing a filtering device for a plumbing system and a method for the disinfection of a plumbing system with such a device and/or of a filter of such a plumbing system which enable not only specialist operators, but also any user, to carry out the disinfection.

[0060] The invention provides a filtering device for a plumbing system and a method for the disinfection of a plumbing system with such a device and/or of a filter of such a plumbing system that enables the disinfection thereof without the need for an advance study of the extension of the system in order to understand where to intervene.

[0061] The invention thus conceived is susceptible of numerous modifications and variations, all of which are within the scope of the appended claims. Moreover, all the details may be substituted by other, technically equivalent elements.

[0062] In practice the materials employed, provided they are compatible with the specific use, and the contingent dimensions and shapes, may be any according to requirements and to the state of the art.

[0063] The disclosures in Italian Patent Application No. 102021000011555 from which this application claims priority are incorporated herein by reference.

[0064] 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 filtering device (100) for a plumbing system (1), **characterized in that** it comprises:

- a filter (F),
- a first valve (C) for draining said filter (F),
- a dosage pump (P) for dosing one or more disinfectant substances (S) upstream of said filter (F) and integrated therewith,
- a liquid flow rate meter (W), interposed between said dosage pump (P) and said filter (F) and integrated therewith,
- an electronic board (D) for the management and control of said device (100),
- wireless communication means (M) with a user interface (A).

2. A method (10) for the disinfection of a plumbing system (1) and/or of a filter (F) for said plumbing system (1), said plumbing system (1) comprising:

- one or more user devices (R1, R2, RN), each one provided with a shut-off valve,
- a filtering device (100) according to claim 1, comprising said filter (F), upstream of said one or more user devices (R1, R2, RN),
- a duct (K) for bypassing said filtering device (100), provided with a second shut-off valve (G),
- a third valve (B), for locking out said one or more user devices (R1, R2, RN), which is interposed between said filter (F) and said one or more user devices (R1, R2, RN),
- a fourth valve (V), for drawing from said filter (F), which is interposed between said filter (F) and said third valve (B),

said method (10) being **characterized in that** it comprises:

- at least one first phase (11) of recording data in a dedicated software program, said data being related to the number of said one or more user devices (R1, R2, RN) and/or filter (F) in said system (1) and deployments of said user devices (R1, R2, RN) and/or filter (F) in said system (1),
- at least one second phase (12) of recording in said dedicated software program the dosage of said one or more disinfectant substances (S) and of the action time of said dosage,
- at least one third phase (13) of disinfection of said plumbing system (1) and/or of said filter (F) for a plumbing system (1) guided by said dedicated software program.

3. The method (10) according to claim 2, **characterized in that** said dedicated software program is an app for a smartphone/tablet computer (A).

4. The method (10) according to one or more of claims 2 and 3, **characterized in that** said dedicated software program guides the user step by step in the disinfection of said plumbing system (1) and/or of said filter (F), progressively asking the user for information and/or decisions to be taken and telling the user the actions to be performed on specific elements of said system (1). 5
5. The method (10) according to one or more of claims 2 to 4, **characterized in that** said third phase (13) comprises at least the following steps: 10
- a step (106, 205) of opening a valve (V) until a preset flow rate is reached, 15
 - a step (107, 206) of actuating said dosage pump (P) for a preset time,
 - a step (108, 207) of closing the valve (V) that was opened previously,
 - a step (109, 208) of stopping said dosage pump (P), 20
 - a step (110, 210) in which a preset time interval is allowed to elapse, which corresponds to the action time of said one or more substances (S),
 - a step (112, 211) in which rinsing is performed. 25
6. The method (10) according to one or more of claims 2 to 5, **characterized in that** said third phase (13) comprises the following steps: 30
- a first step (101), in which the user starts said software program for disinfection,
 - a second step (102), in which said software program asks said user to indicate whether the user intends to sanitize only said filter (F) or said filter (F) and one or more user devices (R1, R2, RN) of said system (1), and said user provides confirmation to said software program, telling it whether the user intends to proceed with the sanitizing of only the filter (F) or of said filter (F) and of one or more user devices (R1, R2, RN). 35 40
7. The method (10) according to one or more of claims 2 to 6, **characterized in that** said third phase (13) comprises a process (400) which comprises: 45
- a third step (103), in which said software program tells the user to close said third valve (B), the user closes it and provides confirmation to said software program once the operation has been performed, 50
 - a fourth step (104), in which said software program tells the user to open said second valve (G), the user performs this operation and provides confirmation to said software program after performing the operation, 55
 - a fifth step (105), in which said device (100) automatically drains said filter (F), by opening

said third valve (C), and washes it,

- a sixth step (106), in which said software program tells the user to open said fourth valve (V) until a preset flow rate is reached, and the user performs this operation,
- a seventh step (107), in which, once said preset flow rate has been reached, said filtering device (100) actuates said dosage pump (P) for a preset time, introducing said one or more disinfectant substances (S) into the system,
- an eighth step (108), in which said software program tells the user to close said fourth valve (V), the user performs this operation and provides confirmation to said software program after performing the operation,
- a ninth step (109), in which said dosage pump (P) is stopped,
- a tenth step (110), in which said software program tells the user to wait for a given preset time interval which corresponds to the action time of said one or more substances (S),
- an eleventh step (111), in which a rinsing of said filter (F) is performed,
- a twelfth step (112), in which said software program tells said user to close said second valve (G), the user performs this operation and provides confirmation to said software program after performing the operation,
- a thirteenth step (113), in which said software program tells the user to open said third valve (B), the user performs this operation and provides confirmation to said software program after performing the operation.

8. The method (10) according to one or more of claims 2 to 7, **characterized in that** said third phase (13) after said process (400) comprises:

- a third step (203), in which said software program asks the user for the number of user devices (R1, R2, RN) to be sanitized, and the user provides input to said software program,
- a fourth step (204), in which said software program asks the user for the type of each individual user device (R1, R2, RN) to be sanitized, and the user provides input to said software program,
- a fifth step (205), in which said software program tells the user to open the shut-off valve of a first user device (R1) to be sanitized until a preset flow rate is reached, and the user performs this operation,
- a sixth step (206), in which, once the preset flow rate has been reached, said device (100) actuates said dosage pump (P) for a preset time, introducing said one or more substances (S) into said system (1),
- a seventh step (207), in which said software

program tells the user to close said valve of said first user device (R1) to be sanitized, the user performs this operation and provides confirmation to said software program after performing the operation,

- an eighth step (208), in which said dosage pump (P) is stopped,
- a ninth step (209), in which said software program verifies whether all of the preset user devices (R1, R2, RN) have been sanitized.

9. The method (10) according to claim 8, **characterized in that** said third phase (13) comprises:

- the repetition, up to the last of said user devices (R1, R2, RN) to be sanitized, of said fifth step (205') performed progressively on a successive user device (R2, RN),
- the execution, on each successive user device (R2, RN), up to the last of said user devices (R1, R2, RN) to be sanitized, of said sixth step (206), seventh step (207), eighth step (208) and ninth step (209).

10. The method (10) according to claim 8 or 9, **characterized in that** said third phase (13) comprises:

- a tenth step (210), in which said software program tells the user to wait for a given preset time interval which corresponds to the action time of said one or more substances (S),
- an eleventh step (211), in which said software program tells the user to perform a rinsing of the user device (R1) for a preset time by opening its valve, the user performs this operation and provides confirmation to said software program after performing the operation,
- a twelfth step (212), in which said software program verifies whether all of the preset user devices (R1, R2, RN) have been rinsed.

11. The method (10) according to claim 10, **characterized in that** said third phase (13) comprises the repetition, up to the last of said user devices (R1, R2, RN), of said eleventh step (211'), performed progressively on a successive user device (R2, RN), up to the last of said preset user devices (R1, R2, RN).

12. The method (10) according to one or more of claims 2 to 11, **characterized in that** said third phase (13), at said first step (101), comprises an auxiliary first step (301) in which said software program asks the user whether the user wishes to contact an authorized service center and/or whether the user is an operator of an authorized service center.

13. The method (10) according to claim 12, **characterized in that** the third phase (13) comprises an aux-

iliary second step (302), in which said operator enters a unique code associated with said service center to which said operator belongs in order to make said software program advance to said second step (102).

14. The method (10) according to claim 12, **characterized in that** said third phase (13) comprises an auxiliary second step (303), in which said software program loads a menu to search for said authorized service center, providing the user with the details for contacting an operator thereof.

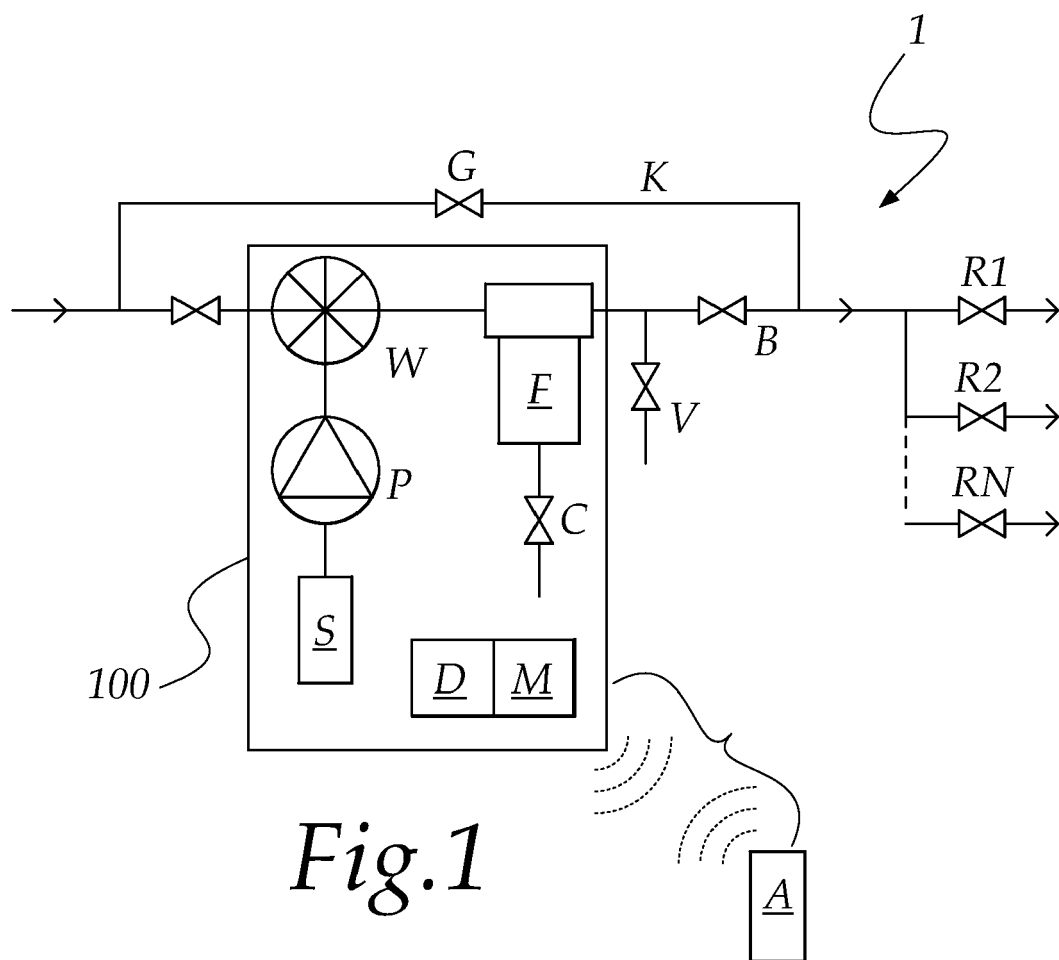


Fig. 1

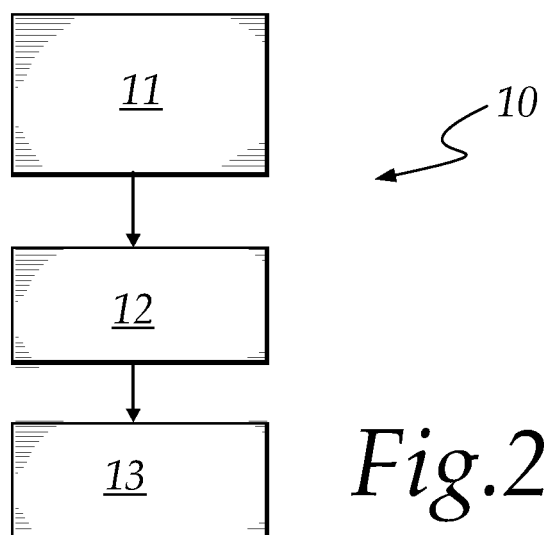


Fig. 2

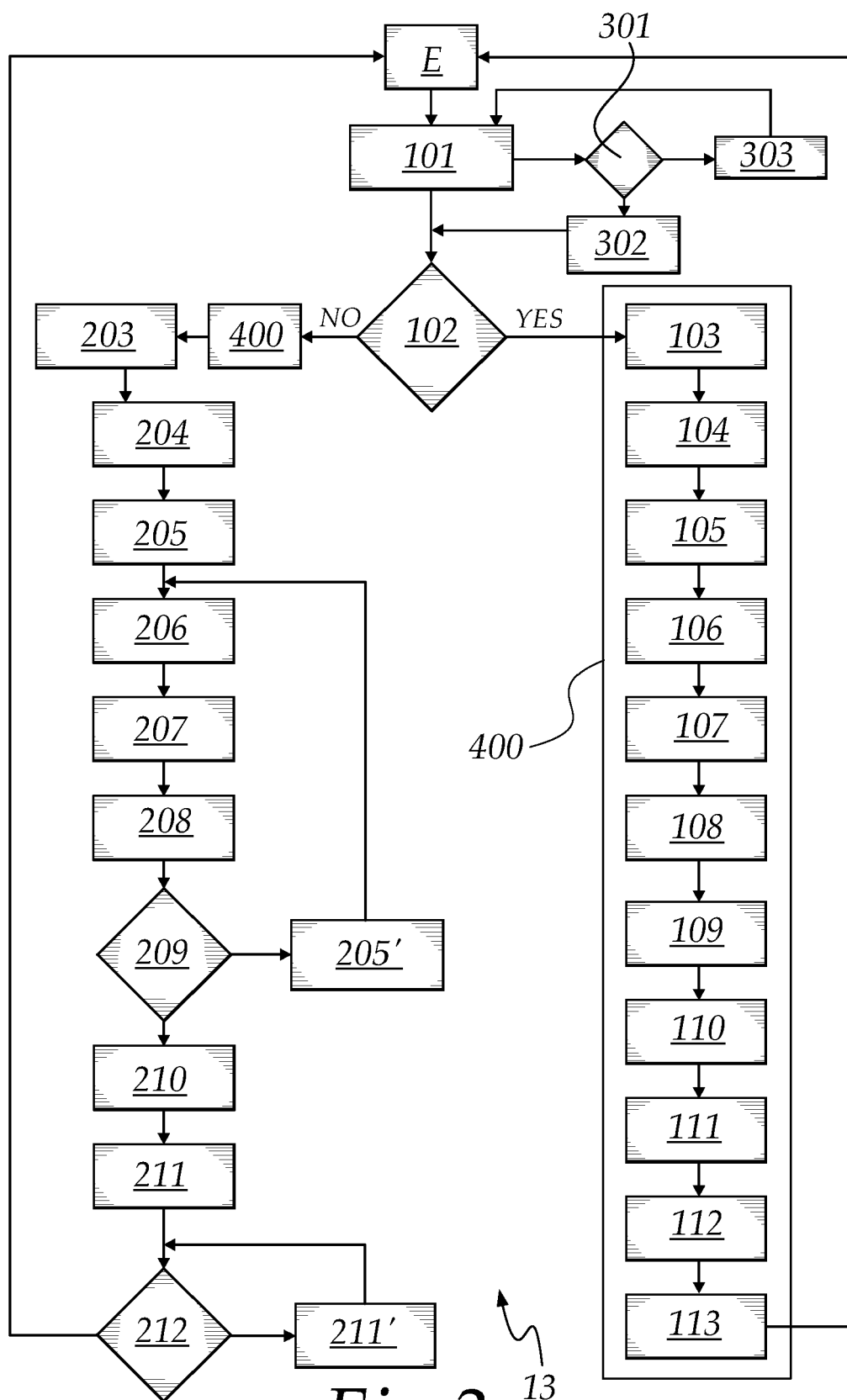


Fig.3

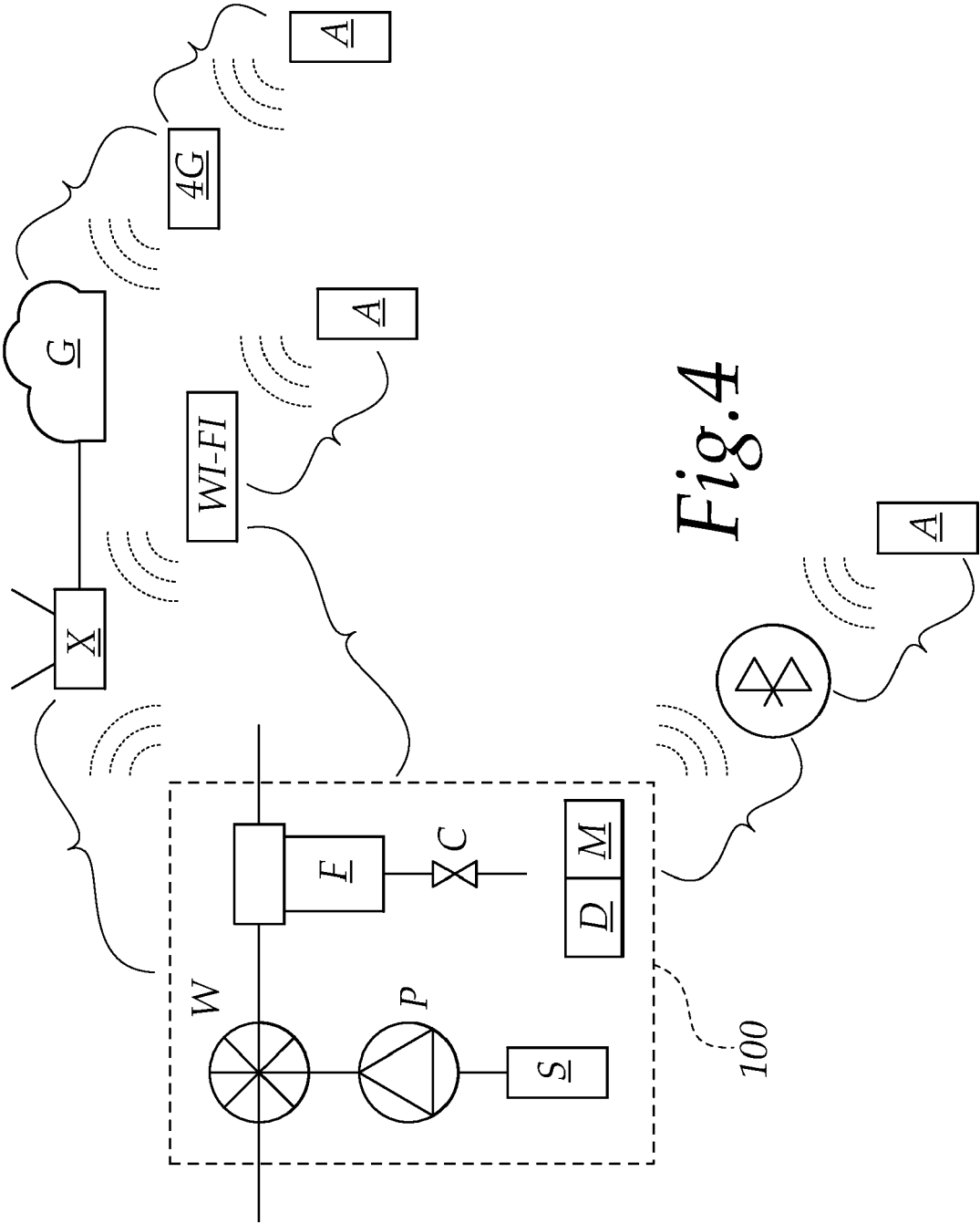


Fig. 4



EUROPEAN SEARCH REPORT

Application Number

EP 22 16 9032

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	DE 10 2007 010963 A1 (JUDO WASSERAUFBEREITUNG [DE]) 11 September 2008 (2008-09-11) * paragraph [0021]; figure 1 * -----	1-14	INV. E03B7/07 E03B7/08 F24D17/00
			TECHNICAL FIELDS SEARCHED (IPC)
			E03B F24H F24D
The present search report has been drawn up for all claims			

1

EPO FORM 1503 03.82 (P04C01)

Place of search Munich	Date of completion of the search 26 September 2022	Examiner Flygare, Esa
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		

ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.

EP 22 16 9032

5 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.

26-09-2022

10	Patent document cited in search report	Publication date	Patent family member(s)	Publication date
15	DE 102007010963 A1	11-09-2008	DE 102007010963 A1	11-09-2008
			EP 1967659 A2	10-09-2008
			ES 2551509 T3	19-11-2015
			PL 1967659 T3	29-01-2016
20	-----			
25				
30				
35				
40				
45				
50				
55				

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 102020000025381 [0020]
- IT 102021000011555 [0063]