ASSEMBLY FOR THE DESALINATION OF WATER FOR A WATER SUPPLY SYSTEM

Field of application

The present invention regards an assembly for the desalination of water for a water supply system, according to the preamble of the main independent claim.

The assembly in question is mainly intended to be used in the household environment for softening the mains water distributed through the water supply system.

In such household environment there usually arises the need of using oligomineral water, i.e. water with low salt contents, for nutrition and above all drinking purposes and softened water for specific applications such as washing appliances and in particular dishwashers and washing machines. Thus, drinking water is usually purchased in bottles while the water for specific applications is often softened by means of special devices inside or outside the household appliances.

Furthermore, extremely hard water produces limescale on taps, in the bathroom facilities, in the showers etc hence requiring periodical cleaning and maintenance operations.

Considering its marked compactness characteristics, practicability and considering the substantial lack of maintenance demand, the assembly subject of the present invention may be usefully used for all applications in the household environment (both for drinking and for the operation of household appliances) given that it is adapted to provide softened water for any type of appliance such as for example kitchens within the household environment or

kitchens in professional environment, such as for example bar, restaurant, canteen kitchens or even for supplying artisan laboratories such as for example bakeries pastry-makers etc.

Thus, the abovementioned apparatus is advantageously included in the household and professional water treatment apparatus production industrial sector.

State of the art

As known, in the market there are various apparatus referred to as “decalcifiers” or “softeners” or, more generally, “purifiers” which have the main purpose of reducing the degree of water hardness or substantially reducing the amount of calcium and magnesium dissolved in water.

Such apparatus are often associated to washing appliances such as washing machines and dishwashers and they are generally provided with a hermetically closed container intercepted by the water system and containing cation resins capable of withholding the positively charged calcium and magnesium ions thus reducing the degree of water hardness.

More in detail, the calcium and magnesium ions, present dissolved in the water at an wanted amount in form of Ca++ and Mg++ cations, are exchanged with the sodium ions Na+ present in the cation resins contained in the water softener.

The abovementioned cation resins after a predefined amount of treated water lose the desalination capacities thereof and require regeneration.

Currently, the regeneration of cation resins of the softeners is carried out automatically or through an operator for starting the regeneration cycle, passing a concentrated solution of water and sodium chloride (NaCl)

commonly referred to as saline solution through the resins. The ions deposited on the resin, mainly calcium and magnesium ions as mentioned previously, are replaced by sodium ions regenerating the ions so that they can resume the desalination function thereof.

Thus, the abovementioned water desalination apparatus also require a tank for containing the salts to be periodically replenished by the user due to the consumption caused by the cyclic resin regeneration processes.

Furthermore, the resins require to be periodically replaced by new ones for an ideal operation of the apparatus.

The water desalination apparatus that use cation resins practically revealed drawbacks.

The main drawback of these known apparatus lies in the considerable and periodical maintenance they require to remain perfectly operative.

It is actually the need of performing frequent maintenance operations that hinders the diffusion of such apparatus in the market.

Furthermore, the presence of a salt tank to be refilled frequently and the presence of a container for the resins also to be replaced periodically, make the apparatus hygienically poorly safe to a point of preferably requiring the use of means for reducing bacteria to guarantee the healthiness of the water, usually obtained using UV lamps arranged on the delivery of the apparatus.

Furthermore, there are known water desalination apparatus that apply the technical principle of reverse osmosis and, for the purpose, they force the water to pass through the semi-permeable membrane, made of micropores measuring a few microns (typically in the order of 0.0001 microns). The membrane separates a solute with the calcium and magnesium ions

concentrated by a substantially pure solvent arranged on the other part of the membrane. These apparatus use a considerable amount of energy and require arranging – upstream – osmotic membranes, filters, usually of the carbon type, which require to be periodically replaced with new ones.

A further drawback of these apparatus lies in the low capacity of producing softened water unless using extremely bulky and expensive plants.

Presentation of the invention

In this situation, the problem on which the present invention is based is that of overcoming the abovementioned drawbacks of the prior art, by providing an assembly for the desalination of water for a water supply system, requiring an extremely low amount of maintenance.

Another object of the present invention is that of providing an assembly for the desalination of water for a water supply system that is operatively entirely safe and reliable.

Another object of the present invention is to provide an assembly for the desalination of water for the water supply system that is inexpensive to manufacture.

Another object of the present invention is to provide an assembly for the desalination of water for a water supply system that is small in terms of dimensions and that can be easily recessed into a cabinet.

Brief description of the drawings

The technical characteristics of the invention, according to the abovementioned objects, can be clearly observed from the content of the claims that follow and the advantages thereof shall be more apparent in the detailed description that follows, provided with reference to the attached drawings,

representing an embodiment provided purely by way of non-limiting example, wherein:

- figure 1 shows an operating diagram of the assembly for the desalination of water for the water supply system according to the present invention;

- figure 2 shows a perspective schematic view of an embodiment of the assembly for water desalination subject of the present invention with some parts removed for showing others better;

- figure 3 shows a further perspective view of the assembly according to the invention with the upper wall of the support structure partly transparent and with some parts removed for showing others better.

Detailed description of a preferred embodiment

With reference to the attached drawings an example of assembly for water desalination, subject of the present invention is indicated in its entirety with 1.

The assembly 1, according to the invention, is suitable to be used within the household environment in houses as well as well as in work or professional environments to soften the water of the water supply system thus allowing an ideal use thereof in all possible applications.

The term “degree of hardness” is substantially used to indicate a value that expresses the ion content, mainly calcium and magnesium, due to the presence of the soluble salts thereof dissolved in the water.

The assembly 1 subject of the present invention is intended to reduce the degree of hardness of the water as well as eliminate or strongly reduce many other substances such as for example nitrates, chlorides, sulphates and ammonia. The apparatus 1, according to the invention, is also suitable to be used for purifying water from ionized particles present therein susceptible to be

affected by the presence of the electrical field, such as for example ions in solution and in particular calcium and magnesium which are the ions most responsible for the hardness of water and formation of limestone.

Hereinafter, explicit reference shall be made to the most common case of removal of ions. Such an expression is generally used to indicate any ionized particle or a contaminant dissolved in water capable of being attracted by an electrostatic field, such as in particular the dissolved calcium and magnesium ions. The assembly 1 subject of the present invention comprises a support structure 100 advantageously of the box-shaped type, substantially parallelepiped-shaped, obtained with opposite walls among which at least one lower 101, one upper 102, two side 103, one front 104 and one bottom 105.

A storage tank 3 for the storage of softened water is mechanically fixed on the support structure 100.

The assembly 1 may independently form a cabinet with finishing typical of a domestic appliance or it may be recessed into a cabinet such as for example a kitchen cabinet.

According to a preferred but non-limiting example of the present invention the support structure 100 comprises a support deck 150, substantially horizontal, which delimits a containment compartment 106 at the lower part intended to house different parts of the assembly 1 as specified hereinafter and the storage tank 3 or a chamber in which there is arranged the storage tank 3 at the upper part.

In order to prevent the softened water form exchanging heat with the external environment, for example reaching an excessively high temperature, the outer walls of the support structure 100 are insulated with an insulator layer 160, for

at least the part involving the storage tank 3.

Obviously, without departing from the scope of protection of the present invention, the support structure 100 though maintaining the distinctive characteristic of assembling all the parts of the invention in one box-shaped body, may also have configurations different from the one represented, for example, it may be provided with a storage tank 3 not beneath but beside the containment compartment 106 so as to limit the height of the support structure 100. The assembly 1 according to the present invention further comprises at least one through-flow condenser 2 (two according to the example of the attached figures), which is fixed to the support structure 100 and is preferably housed in the containment compartment 106 above the support deck 150. The through-flow condenser 2 is capable, in a per se known manner, of capturing the ions, in particular calcium and magnesium ions Ca++ and Mg++ present in the water and generate a flow of softened water intended to supply the storage tank 3.

An example of a through-flow condenser 2 is described in detail in the international patent application PCT/IB2011/000405, in particolar from page 9 line 14 to page 13 line 3 and at page 15 from line 2 to line 19.

The abovementioned through-flow condenser 2 comprises a plurality of electrodes connected electrically, by means of special collectors, to a DC power supplier 20. The latter charges the contiguous electrodes with different polarities so as to define a plurality of pairs of counterfaced electrodes which form plates of an equivalent number of condensers in series between which electrical fields are formed.

The electrodes are obtained with superimposed and counterfaced layers of

conductor material, separated from each other by separator layers within which there flows the flow of water to be treated containing the ions intended to be removed at least partly.

The conductor layers which form the electrodes are made of a conductor material with porous structure i.e. with a formation of surface pores which offer a great surface for exchange with the liquid such as for example spongy active carbon. According to a preferred embodiment of the present invention the electrodes comprise a layer of superimpermeable material which may be variously associated to the layer of conductor material.

The separator layers may in turn for example be constituted by highly porous non-conductive materials, capable of isolating the electrodes allowing the passage of the fluid flow, such as for example a porous synthetic material or other non-conductive spacer material such as glass fibre or nylon fabric.

The flow condenser 2 is connected upstream to the water supply system by means of a supply conduit 5 intercepted by a first solenoid valve 6, to receive a flow of water to be treated.

Preferably, the supply conduit 5 is intercepted by a self-cleaning filter 170, in particular of the mechanical micronet type, arranged to intercept the supply conduit 5 to remove possible particles and contaminants present in the water.

Such pre-filter 170 optionally does not require any maintenance and it has a mesh net preferably comprised between 25-50 microns.

The water flow which traverses the condenser 2 is conveyed to an extraction conduit 7, which is divided into a service branch 8, suitable to transport to the storage tank 3 a first flow of softened water (with low concentration of ions, in particular calcium and magnesium) treated by the condenser 2, and into an

evacuation branch 9, suitable to transport a washing flow having a high concentration of ions, in particular calcium and magnesium ions, up to the discharge conduit 17 of the water supply system.

The two branches 8 and 9 of the extraction conduit 7 are traversed by the flow passage according to the modes of operation of the condenser 2 well known to a man skilled in the art and better specified hereinafter.

With reference to the embodiment illustrated by way of example in figure 1, the service branch 8 is intercepted by a second solenoid valve 10 while the evacuation branch 9 is intercepted by a third solenoid valve 11.

The through-flow condenser 2 is supplied by a direct current power supplier 20 provided with a control card having integrated circuits 12, which controls - in the various operative steps of the operating cycle of the condenser 2 typically by means of semiconductor switches - the voltage applied to the electrodes by means of special connection collectors.

Such cycle may for example provide for, in a per se known manner, entirely conventional and well known to a man skilled in the art: a charging step, in which the power supplier 20 charges the contiguous electrodes with different polarity to take them to a constant operating voltage and, for example, equivalent to 1.6 V; and a service step, in which with the charged electrodes, the fluid flow to be treated is forced to pass through the condenser 2, through the supply conduit 5 and the extraction conduit 7.

During the service step the water is purified of the ions, in particular calcium and magnesium, due to the fact that the latter are attracted by the electrode with opposite polarity and on which they accumulate progressively. In this step, the service branch 8 of the extraction conduit 7 supplies the storage tank 3.

Upon reaching the programmed saturation of the electrodes with the ions present in the water, there is provided for the regeneration step, in which with the electrodes deactivated, a flow of washing fluid is forced to pass into the condenser 2 with ensuing removal of the ions accumulated on the electrodes in the previous service step and thus in the evacuation branch 9 of the extraction conduit 7.

During this step, the solenoid valve 10 of the service branch 8 opens and the third solenoid valve 11 of the evacuation branch 9 closes. The flow which passes in the evacuation branch 9 should be considered as a by-product and it is thus sent to the normal discharge 17 provided for in the water plant.

The term “deactivated”, used above with reference to the electrodes, is used to indicate all possible conditions of voltage the electrodes may have in the regeneration phase: the condition of short-circuited electrodes, the condition of electrodes charged with reversed polarity, the condition of electrodes not connected to the power supplier.

All the abovementioned charge and discharge steps are controlled by the card 12 of the power supplier 20 in a per se known manner.

A cpu master logic control unit 13 actuates the different operative steps of the apparatus 1. Advantageously, the cpu 13 is connected to a conductivity sensor 15 arranged to intercept the extraction conduit 7 to verify the conductivity of the water treated by the flow condenser 2, and to a flow meter 16, arranged to intercept the supply conduit 5, to verify the flow rate of the water flowing into the flow condenser 2.

Due to the acquired flow rate and conductivity values, the cpu 13 may vary the operation thereof in a programmable manner for example providing for

operating steps more or less long with respect to the regeneration steps.

The assembly 1 further comprises a membrane tank 107, which is mounted on the support structure 100 advantageously over the support deck 150.

The abovementioned membrane tank 107 is connected to the storage tank 3 through a connection conduit 108 intercepted by a booster pump 109, advantageously of the immersion type inserted within the storage tank 3 and provided with inverters for adjusting the speed depending on the required load.

When a special pressure regulator (not illustrated) associated to the membrane tank 107 detects that the water pressure in the membrane tank 107 has dropped below a preset value, it controls the actuation of the pump 109 so that the latter sends to the membrane tank 107 a second flow of softened water restoring within the latter tank, a preset pressure corresponding to a predetermined water reserve. Concretely, the membrane tank 107 prevents the pump 109 from being activated upon every request of the appliance.

The membrane tank 107 is connected to an appliance through a delivery conduit 110 to supply it with a third flow of required softened water.

More in detail, the membrane tank 107 comprises in a per se known manner, an air reservoir, which due to the water pressure is compressed so that upon switching OFF the pump 109 the water is maintained pressurised. The pressure regulator starts the pump when the pressure drops below a minimum limit and switches it off upon reaching the maximum preset value. Thus the reservoir serves as a pressure accumulator and allows the pump 109 to extend the period of operation over a longer period of time, thus preventing a continuous succession of switching ON and OFF due to small amounts of water by the appliance.

The apparatus 1 further comprises a solubilising product tank 18 and introduction means 19, hydraulically connected to the tank 18, suitable to introduce, with the flow of the supply conduit 5 interrupted by the first solenoid valve 6, a dose of solubilising product received by the tank 18, in a section 21 of the supply conduit 5 arranged upstream of the condenser 2. Upon introduction of the abovementioned dose of solubilising product into the section 21 of the supply conduit 5, the logic control unit 13 controls the reopening of the first solenoid valve 6 and the advancement of a flow rate of transport fluid through the section 21, such flow rate being determined in the amount thereof by means of a timer and/or by means of the flow meter 16, for transporting the dose of solubilising product within the condenser 2 and take it to the and at contact with the electrodes.

The advancement, substantially laminar, of the flow of fluid into the supply conduit 5 determines a low dilution of the dose of solubilising product up to the inlet of the condenser 2, thus allowing saving the amount of solubilising product to be used and hence allows to provide an automatic operation of the apparatus 1 over extremely long periods of time even using a very small solubilising product tank 18.

Upon the passage of the abovementioned flow rate of transport fluid, the unit 13 stops the fluid flow of the supply conduit 5 once again, controlling the closure of the valve 6 once again.

At this point, the apparatus 1 remains OFF, or in stand-by, for a waiting period of time at least 5 minutes and preferably of 10-30 minutes, in which the ions spread at least partly into the dose of solubilising product which is held in the condenser 2, starting from the interstitial pores present in the layers of

conductor material of the electrodes.

According to the preferred embodiment of the present invention illustrated in the diagram of figure 1, the injection means 19 are obtained with a volumetric syringe 22, which suctions a concentrated solubilising product from the tank 18 and conveys it through a delivery conduit 23, intercepted by a first check-valve 30, to the section 21 of the supply conduit 5.

Advantageously, the abovementioned volumetric syringe 22 has a chamber for loading the product separated using a plunger from a pressurized chamber, which is connected, by means of a branching conduit 40 intercepted by a fourth valve 24, to the supply conduit 5 arranged upstream of the first valve 6 and connected, by means of an outlet conduit 25, intercepted by a fifth valve 26, to the discharge 17 at environmental pressure.

Functionally, with the first valve 6 closed, the cpu 13 controls the opening of the fourth 24 which takes pressure to the syringe chamber 22 moving the plunger by overcoming the reaction force of elastically yieldable means (such as for example a spring 27), so as to emit the dose of solubilising product outside the chamber for loading the product making it to traverse the delivery conduit 23 up to introducing it into the section 21 of the supply conduit 5.

At this point, the cpu 13 closes the fourth valve 24 and opens the fifth valve 26 allowing the plunger of the syringe 22 to recede under the action of the spring causing a depression which draws a new dose of product from the tank 18 through a connection conduit 28 intercepted by a second check valve 29.

The term “solubilising product” is used to indicate any product, advantageously in particular available in a solution for easy introduction into the condenser 2, suitable to increase the solubility of the ions, in particular calcium and

magnesium ions, with which it is intended to interact, increasing the precipitation threshold thereof. Thus, it shall for example be constituted by a solution containing a counterion capable of inhibiting, within given limits, the precipitation of the ions, in particular calcium and magnesium ions, contained in the fluid to be treated and thus for example it may be constituted by an acid solution such as advantageously a citric acid solution.

Given the low consumption of the solubilising product contained in the tank 18, the refilling operations may be deferred even for extremely long periods of time and advantageously exceeding one year. In order to access the abovementioned tank 18 there may be provided a cap 180 in particular arranged on a wall accessible from outside the support structure 100. Advantageously, the access to the tank 18 or to the cap 180 may be provided through a door 181 pivoted at an easily accessible position on the support structure 100.

According to the preferred embodiment illustrated in the attached figures 2 and 3 the through-flow condenser 2, the membrane tank 107, the solubilising product tank 28 and the logic control unit 13 are housed in the containment compartment 106 on the support deck 150. Preferably, also the direct current power supplier 20 is mounted on the same support deck 150.

Advantageously, the assembly further comprises a head sensor 111 connected to the logic control unit 13 and adapted to detect the liquid level within the storage tank 3.

The sensor may for example be of the ultrasonic electronic type with 4-20 mA outputs, proportional to the detected liquid head.

Operatively, the logic control unit 13 acquires by means of the head sensor 111 three liquid levels in the storage tank 3 among which: - a maximum level, at

which the logic control unit 13 determines the switching OFF of the flow condenser 2; - a minimum level, at which the logic control unit 13 determines the switching ON of the flow condenser 2; - an alarm level, at which the logic control unit 13 determines the bypassing of the flow condenser 2 with the supply system water being directly conveyed into the storage tank 3.

For such purpose, from the supply conduit 5 there departs, immediately upstream of the self-cleaning filter 170, a by-pass branch 5' intercepted by a sixth valve 112. Closing the first valve 6 and opening the sixth valve 112 allows bypassing the condenser and directly power supplying the storage tank 3.

During the normal operation of the assembly 1, when the water level in the storage tank 3 drops below the minimum preset value, the flow condenser 2 starts operating and introducing its first flow of softened water to the tank 3 up to obtaining the preset maximum level which determines the switching OFF of the condenser 2.

Should, for any reason whatsoever, even after switching ON of the condenser 2, the water level in the tank 3 drop below the minimum level reaching an alarm level, then – so as not to leave the appliance without water supply – the logic control unit 13 bypasses the condenser 2 and, as mentioned, introduces the supply system water directly into the storage tank 3. Such event may occur for example due to the failure of a pipe or more water is drawn from the appliance for an extremely long period of time (for example a tap is left running) than the amount the condenser 2 is capable of introducing into the tank 3, so that, once all the water is consumed from the latter, it is necessary to bypass the condenser 2 to quickly restore the minimum level in the storage tank

3.

Lastly there may be provided for an overflow conduit 113 connected on one side to the discharge 17 and on the other side to the storage tank 3, preferably at the top part thereof, to ensure that the water does not overflow from the assembly 1 even in case of failure.

The abovementioned valves for the operating cycle of the flow condenser 2 (or more than one condenser 2 like in the illustrated example) as well as for the actuation of the introduction means of the solubilising product are advantageously organised in a panel 190 mounted on the support structure 100 or preferably on the deck 150.

Hence, the invention thus conceived attains the preset objects.

Obviously, in the practical embodiment thereof, it may also have shapes and configurations different from those illustrated above without departing from the scope of protection of the present invention. Furthermore all details may be replaced by technically equivalent elements and the dimensions, shapes and materials used may vary according to the requirements.

CLAIMS

1. Assembly for the desalination of water for a water supply system, which comprises:

– a support structure;

– a storage tank, mechanically connected to said support structure, adapted to store a reserve of softened water;

– at least one through-flow condenser having a plurality of superimposed electrodes, fixed to said support structure for producing softened water, connected upstream to a supply conduit, which is intercepted by a first solenoid valve and is connected to the water supply system to receive from the latter a flow of water to be treated, and downstream to an extraction conduit, which transports the water flow which has traversed said condenser and is divided into at least one service branch, intercepted by a second solenoid valve, connected to said storage tank and suitable to convey thereinto a first flow of softened water treated by said condenser and into at least one evacuation branch, intercepted by at least one third solenoid valve, connected to the discharge of said water supply system and suitable to transport to said discharge a flow for washing said condenser;

- a membrane tank, which is mounted on said support structure and is connected:

  - to said storage tank through a connection conduit to receive from said storage tank a second flow of softened water by means of a pump also mounted on said support structure,

  - to an appliance through a delivery conduit to provide to the appliance a third flow of softened water;

- a solubilising product tank;

- introduction means hydraulically connected to said tank, suitable to introduce with interrupted flow of said supply conduit in particular by means of said first solenoid valve, a dose of solubilising product received by said solubilising product tank, at a section of said supply conduit arranged upstream of said condenser;

- a programmable logic control unit, which is electrically connected to said solenoid valve and controls the advancement - through said section - of a measured fluid transport flow rate for transporting said dose of solubilising product within said condenser at said electrodes.

2. Assembly for the desalination of water for a water supply system according to claim 1, characterised in that said pump is inserted within said storage tank and is of the immersion type.

3. Assembly for the desalination of water for a water supply system according to any one of the preceding claims, characterised in that said support structure is box-shaped, in particular it can be recessed into a cabinet, and delimits a containment compartment in which there are housed said through-flow condenser, said membrane tank, said solubilising product tank, said logic control unit.

4. Assembly for the desalination of water for a water supply system according to claim 3, characterised in that said support structure comprises a support deck, which delimits said containment compartment at the lower part and said storage tank at the upper part.

5. Assembly for the desalination of water for a water supply system according to any one of the preceding claims, characterised in that it comprises

a self-cleaning filter, in particular of the mechanical micronet type, arranged to intercept the supply conduit.

6. Assembly for the desalination of water for a water supply system according to any one of the preceding claims, characterised in that it comprises a head sensor connected to said logic control unit, suitable to detect the liquid level within said storage tank.

7. Assembly for the desalination of water for a water supply system according to claim 6, characterised in that said logic control unit acquires by means of said head sensor at least three liquid levels in said storage tank; among which:

- a maximum level, at which the logic control unit determines the switching OFF of the flow condenser;

- a minimum level, at which the logic control unit determines the switching ON of the flow condenser;

- an alarm level, at which the logic control unit determines the by-pass of the flow condenser with the supply system water which is conveyed directly to the storage tank.

8. Assembly for the desalination of water for a water supply system according to any one of the preceding claims, characterised in that it comprises a door or a cap for access to said solubilising product tank, in particular associated to a wall accessible from outside said support structure.

9. Assembly for the desalination of water for a water supply system according to any one of the preceding claims, characterised in that said support structure is substantially box-shaped with outer walls at least partly insulated.

10. Assembly for the desalination of water for a water supply system according

to claim 3, characterised in that said support structure comprises a support deck which delimits said containment compartment at the lower part and said storage tank at the upper part.

11. Assembly for the desalination of water for a water supply system according to any one of the preceding claims, characterised in that it comprises a direct current power supply mounted on said support structure, electrically connected to the electrodes of said flow condenser and suitable to charge them counterfaced with different polarity to create an electrical field therebetween.

12. Assembly for the desalination of water for a water supply system according to any one of the preceding claims, characterised in that it comprises an overflow conduit connected to the discharge of said water supply system and to said storage tank at the top part thereof.

13. Apparatus for purifying a fluid according to claim 1, characterised in that said injection means comprise a syringe connected to said section of said supply conduit.

14. Apparatus for purifying a fluid according to claim 1, characterised in that said control unit stops - within programmed times - the supply to said condenser for an interval of at least 5 minutes in which said ions spread at least partly into said dose of solubilising product from the interstitial pores of said layers of conductor material of said electrodes.

15. Apparatus for purifying a fluid according to claim 1, characterised in that said electrodes comprise a layer of superimpermeable material associated to the layer of conductor material adapted to selectively trap the ions that migrate towards the electrode with opposite polarity under the action of the field, and characterised in that said control unit stops - within programmed times - the

supply to said condenser for an interval of at least 5 minutes in which said ions spread at least partly into said dose of solubilising product from the interstitial pores of said layers of superimpermeable material and of said layers of conductor material of said electrodes.

ABSTRACT

Assembly for the desalination of water for a water supply system, which has mounted on a single support structure a softened water storage tank, a through-flow condenser for producing softened water and a membrane tank. The latter is connected on one side to the storage tank to receive the softened water through a connection conduit intercepted by a pump also mounted on the support structure, and on the other side to an appliance through a delivery conduit. Further provided for is a solubilising product tank associated to introduction means suitable to introduce a dose of solubilising product at a section of the supply conduit arranged upstream of the condenser. A programmable logic control unit electrically connected to the solenoid valve controls the advancement of a measured fluid transport flow rate for transporting the dose of solubilising product within the condenser at the electrodes thereof.