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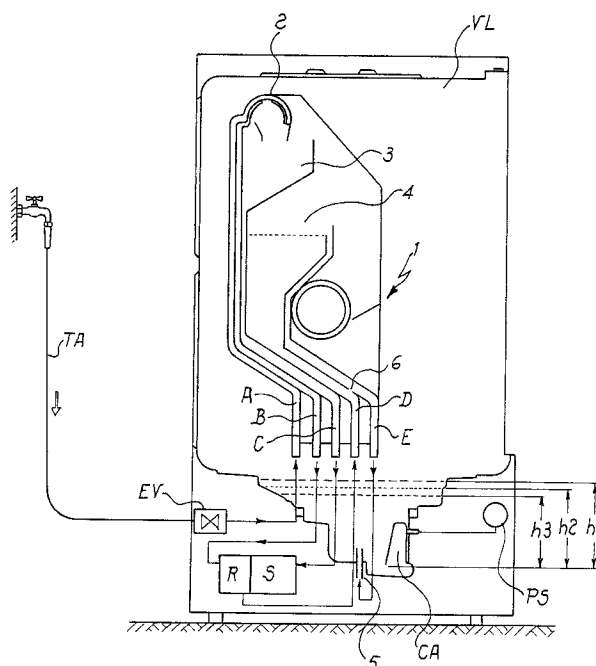
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(54) **Device for controlling and restoring the water level in a dishwashing machine**

(57) A device for controlling and restoring the water level in a dishwasher includes an electric valve (EV) for intercepting the water entering the machine, a pressure switch (PS) for controlling the water level in the tank by commanding the opening and closure of the electric valve (EV) according to the detected water level, and water ducts between the electric valve (EV) and the tank which include a compensation chamber (4) in perma-

nent communication with the washing tank through a small emptying hole (6). The water contained in the chamber (4) flows into the tank through the small hole (6) even after the closure of the electric valve (EV), whereby the decrease in the level caused by the pump which stops cavitating and starts to operate again at full flow is compensated by said additional amount of water so that the pressure switch does not intervene again.

Fig.1

Description

[0001] The present invention relates to dishwashing machines, and in particular to a device suitable to control the water level in the washing tank and possibly restore it in case of a decrease thereof.

[0002] It is known that in modern dishwashers there is a tendency to minimizing the water consumption by introducing into the tank the minimum amount of water required for a correct operation of the machine. Exactly due to the fact that the machine operates at the limit, it easily occurs during the washing step that the water level decreases below the minimum value required for a correct operation of the pump and/or of the heating element. This may occur, for example, due to the overturning of a container which becomes filled with water subtracted to the washing cycle, or due to the formation of foam and so on.

[0003] The controlling and restoring of the water level in the tank are carried out by means of a pressure switch or a float switch which open and close the water inflow electric valve. In practice, the electric valve is opened when the level decreases below the minimum sustenance value, and is closed just before the water reaches again the normal operating level. The anticipated closure takes into account a certain "inertia" of the system whereby the water continues to enter for some moments after the pressure switch or float switch has issued the command for closing the electric valve.

[0004] The drawback of this type of control is that repeated activations and deactivations of the system around the intervention value often occur. This is due to the fact that when the pump starts again to operate at full running, and therefore with its normal flow rate, the water level in the tank decreases again below the intervention level. As a consequence several activations occur, each one with its own final "inertia" period, which globally imply an amount of water inflow greater than necessary and therefore an increase in the consumption.

[0005] Therefore the object of the present invention is to provide a device suitable to overcome the above-mentioned drawback.

[0006] This object is achieved by means of a device which in the water supply path includes a "compensation" chamber suitable to provide, even after the closure of the electric valve, a precise and sufficient amount for restoring the level.

[0007] The fundamental advantage of this device is that of minimizing the increase in the water consumption in case it is necessary to restore the operating level.

[0008] A second advantage of this device is that of reducing the number of interventions by the system, thus extending its operating life.

[0009] These and other advantages and characteristics of the device according to the present invention will be clear to those skilled in the art from the following detailed description of an embodiment thereof, with refer-

ence to the only drawing annexed as fig. 1, wherein there is shown a diagrammatic side view of the device arranged in a dishwasher.

[0010] With reference to said figure, there is seen that the dishwasher is connected to the hydraulic network through a tube TA, the water flow which enters the machine being intercepted by an electric valve EV. After having gone through the electric valve EV, the water enters the main member of the device, generally referred to as 1 and located between the washing tank VL and the outer casing of the dishwasher.

[0011] This member 1 has five bottom ducts A, B, C, D, E for the passage of water, the flow direction in each of them being indicated by the respective arrow. The water enters through duct A and, after going through the open air passage 2, exits through duct B and enters the decalcification resin container R. The portion of water fallen from the open air passage 2 accumulates in a storage chamber 3 and is used at the end of the cycle for the regeneration of the resins. This takes place by letting out the water through duct C upon opening of the connection valve between the salt container S and the resin container R.

[0012] The decalcified water goes back to the member 1 through duct D and fills a compensation chamber 4 until it overflows into the adjacent duct E. The water leaves the member 1 through duct E and enters the tank through an inlet 5 formed in a central position on the bottom thereof. A small hole 6 for the emptying of chamber 4 is formed in the wall between ducts D and E just above the point where they separate.

[0013] In the illustrated embodiment, the device includes a pressure switch PS which controls the water level through an air-chamber CA. Clearly, a float switch or another equivalent mechanism could be used instead of the pressure switch.

[0014] The simple and effective operation of the present device is clear from the description above. When the pressure switch PS detects that the water level in the tank has decreased below a minimum level h3, it commands the opening of the electric valve EV. The inflowing water fills the compensation chamber 4 until it overflows into duct E and from here into the tank. When the water level reaches a value h2 slightly below the operating level h1, the pressure switch PS commands the closure of the electric valve EV. The water contained in chamber 4 still flows into the tank through the small hole 6 even after the closure of the electric valve EV. As a consequence, the decrease in the level caused by the pump which stops cavitating and starts to operate again at full flow is compensated by said additional amount of water so that the pressure switch does not intervene again.

[0015] It should be noted that the capacity of the compensation chamber is set according to the operating parameters of the machine, such as the pump flow, the difference between the levels h1 and h2, and so on. Therefore it is possible to achieve a precise restoring of

the operating level with a preset and constant amount of water at each intervention of the device. Values of capacity of the chamber 4 between 0.4 and 0.8 liters have proven adequate in most cases.

[0016] It is clear that the above-described and illustrated embodiment of the device according to the invention is just an example susceptible of various modifications. In particular, the relative arrangement of the various elements can be somewhat changed, for example by changing the order of the ducts A, B, C, D, E or by replacing the electric valve EV with another equivalent means.

Claims

1. A device for controlling and restoring the water level in a dishwasher, including a means for intercepting the water entering the dishwasher, means for conveying the water from said intercepting means to the washing tank, and a means for controlling the water level in the tank which is suitable to command the opening and closure of the intercepting means according to the detected water level, characterized in that said conveying means include a compensation chamber (4) in permanent communication with the washing tank through a small emptying hole (6).
2. A device according to claim 1, characterized in that the compensation chamber (4) has a capacity between 0.4 and 0.8 liters.
3. A device according to claim 1 or 2, characterized in that the intercepting means is an electric valve (EV).
4. A device according to one or more of the preceding claims, characterized in that the means for controlling the water level is a pressure switch (PS).
5. A device according to one or more of claims 1 to 3, characterized in that the means for controlling the water level is a float switch.

Fig. 1

