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(71) Applicant: **Vestel Beyaz Esya Sanayi Ve Ticaret A.S.**
45030 Manisa (TR)

(72) Inventors:
- **Eldem, Mehmet**
  c/o Vestel Beyaz Esya Sanayi ve Ticaret A.S.
  45030 Manisa (TR)
- **Eeroglu, Erkan**
  c/o Vestel Beyaz Esya Sanayi ve Ticaret A.S.
  45030 Manisa (TR)
- **Haspolat, Erdal**
  c/o Vestel Beyaz Esya Sanayi ve Ticaret A.S.
  45030 Manisa (TR)

(74) Representative: **Cayli, Hülya**
Paragon Consultancy Inc.
Koza Sokak No: 60/6
GOP
06700 Ankara (TR)

(54) Salty water removal method for dishwashers

(57) Salty water accumulated inside the dishwasher (1) during the salt addition to the water softener (2) located in the dishwasher (1) is discharged according to the salt cleaning program of the invention. After the salt addition to the water softener of the dishwasher is detected, the dishwasher (1) starts to operate according to a program specified during the manufacture and firstly salty water is discharged and then it continues to normal washing program to provide washing of dishes.

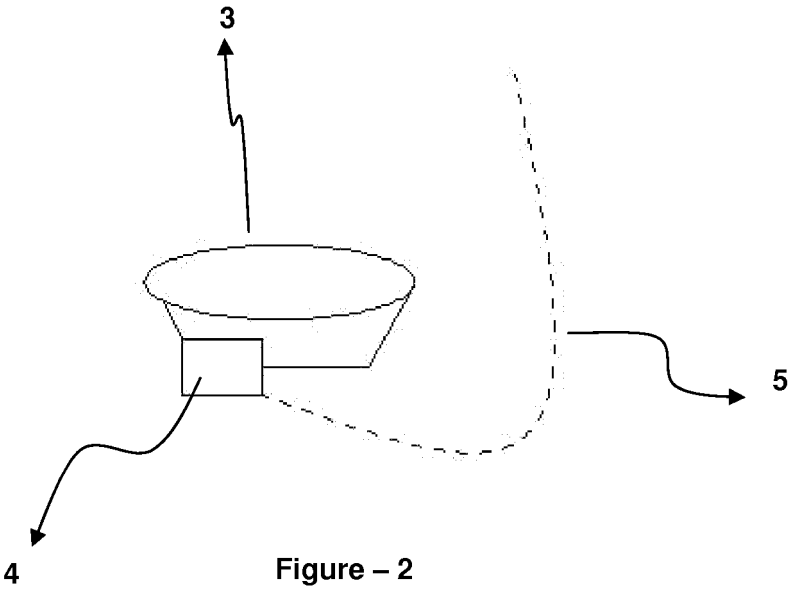

Figure – 2

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Description

Technical Field

[0001] This invention relates to automatically discharge of salty water flooded during process for salt addition into water softener located in the dishwashers.

Prior Art

[0002] The dishwashers warn users after it is detected that the salt is consumed in the water softener located in the dishwasher. When the user opens the cover of the water softener to add salt therein, salty water floods because of the pressure in the water softener. Moreover, water keeps flooding until the salt addition of the user finishes and some amount of salty water accumulates inside the machine. When the machine is operated after salt addition process, some evident stains on the washed dishes remain. Accordingly, before the user operates the machine on any program, said user should operate the dishwasher on pre-wash program while it is empty after each salt addition process. In the case the user forgets to operate the machine on pre-wash program after the salt addition process, washing performance of the machine decreases and stains on dishes are formed. Also, since the pre-wash program is achieved by delivering water to water jets, it could not be used when the machine is loaded, so machine must be certainly empty.

[0003] In the system described in published patent application EP 0405086, pre-wash program is used to make resin to implement reverse washing without expanding the washing time. Resin is renewed by implementing reverse washing on this program that is used to clean the remained water residue on renewed resin. In this system, there is no cleaning program for cleaning the water flooded from the water softener located in the machine when the machine is empty.

[0004] Salt cleaning program of the invention could be used to clean the salty water flooded during the salt addition in dishwashers even if the machine is loaded. In this system, after the salt addition to the water softener of the dishwasher is detected, the machine starts to operate according to a program specified during the manufacture and firstly salty water is discharged and then it continues to normal washing program to provide washing of dishes. Therefore, dishes are washed as stain free without the need for a user to choose an option and by eliminating the possibility for the user to forget to choose the pre-wash program.

Object of the Invention

[0005] The object of this invention is to discharge water flooded from the water softener located in the dishwasher during salt addition process and the pressure change of water softener without the need for a user to make any operation and to wash inside of the sump.

[0006] Also, it is aimed by this invention to prevent dishes from remaining with stains after being washed following the salt addition process.

[0007] Another object of the invention is to accomplish salty water discharge even if the machine is loaded.
In one object of the invention, dishwasher starts cleaning program and implements pre-wash program even if it is loaded by intake of water into the sump and than to drying pump instead of spray arms.

Description of Figures

[0008] Salt cleaning program of the invention is illustrated in appended graphics and figures, in which:

Graphic 1 is a graphic of water amount in the machine - time showing changes in accumulated water and water amount during discharge over the time.
Figure 1 is a rear perspective view of the dishwasher.
Figure 2 is a view of the sump group.

Corresponding meanings of references shown in graphic and figures are given below:

Water accumulated in the machine (A)
Amount of water intake to the machine (B)
Dishwasher (1)
Water softener (2)
Sump (3)
Drain Pump (4)
Waste water discharge channel (5)
Water inlet valve (6)
Air breaker (7)
Water inlet tap (8)
Ion exchanger (9)
Ion exchanger connection hose (10)
Hose (11)
Electrovalve (12)

Description of Invention

[0009] In an exemplary dishwasher (1) shown in Figure 1 as a rear perspective view, as it is known, it comprises a water inlet tap (8); a water inlet valve (6) which controls incoming of water into the machine (1) from water inlet tap (8); an air breaker (7) where the intake water coming into the machine (1) is firstly directed and air bubbles contained therein are separated; a water softener (2) in the machine having salt-water mixture in one section and ion exchanger (9) in other section; an ion exchanger connection hose (10) which provides delivering of water exits from air breaker (7) where the air bubbles are separated to ion exchanger (9); an electrovalve (12) which is located between the section in which the salt-water mixture is contained and the section belonging to ion exchanger (9) and operates at time intervals predetermined by the manufacturer according to the water hardness; a hose (11) providing a connection between air breaker (7) and the

section in which the salt-water mixture is contained; a sump (3) where the water flooded from the water softener (2) accumulates as a result of the pressure formed in the water softener (2) when the cover of the water softener (2) is opened to add salt; a drain pump (4) (figure 2) used to discharge the water accumulated in the sump (3) through the waste water discharge channel (5) (figure 2). Besides, there is a control panel (not shown in figure) comprising of displays and/or indicators, electronic cards for the purpose of controlling and programming in dishwashers (1). As it is known, before the washing program starts in dishwasher (1), air bubbles in the water taken inside to the machine (1) are separated in the air breaker (7) and from here water is directed to the ion exchanger (9) in the water softener (2) by means of the ion exchanger connection hose (10). Also, inhibition of ion exchange between exchanger (9) and the water upon accumulation of these bubbles around the exchanger (9) is prevented by separation of air bubbles in the water, before it reaches to water softener (2). In addition, by removing of air bubbles, extra pressure that they may lead in the water softener (2) is also prevented.

[0010] When the water separated from air bubbles reaches to ion exchanger (9) in the water softener (2), calcium and magnesium ions contained that cause the water hardness are retained on the exchanger (9), conditioned and sent to the machine (1). When the water hardness exceeds the limit determined by the manufacturer, salt-water mixture is delivered to the ion exchanger (9) by the electrovalve (12) opened with a signal coming from the electronic card before the water is sent to the machine (1) and ions accumulated on the ion exchanger (9) are cleaned off. For this cleaning process, water exiting from the air breaker (7) reaches this section by passing through the hose (11) located between the air breaker (7) and the section where the salt-water mixture is contained. Water passed through the ion exchanger (9) reaches to the sump (3) and is discharged from here by the drain pump (4). Ion exchanger cleaning process is generally made process in many machines.

[0011] The salt used to clean the exchanger (9) in the dishwashers (1) is put in the water softener (2) located in the machine (1) shown in figure 1. When the salt in the water softener (2) is over, absence of salt is detected by the machine (1) and the user is warned to add salt by signals such as a turned on indicator light located on the control panel of the dishwasher (1) or relevant warning seen on the display. When the user opens the cover of the water softener (2) to add salt, some amount of salty water floods into the sump (3) due to pressure inside the receptacle (2). Flooding of water continues during the salt addition process and some amount of water accumulates in the sump (3). After the salt addition process ended, cover of the water softener (2) is closed by the user.

[0012] In prior art, when washing is made after the salt addition, water taken into the machine (1) is mixed with the water of high salt concentration in the sump (3) and since the dishes are washed with this salty water mixture, stains are formed on the dishes after washing. In the method of the invention as shown in figure 2, salty water accumulated in the sump (3) is discharged before washing and dishes are prevented to remain as stained. To do so, when the indicator light located on the control panel is turned off after the salt is added to the machine (1), a signal goes to the electronic card on the control panel and stays at the memory of the card to make the machine (1) to operate salt cleaning program of the invention after it is firstly operated by the user following the salt addition process no matter which washing program is chosen by the user, primarily to discharge of salty water accumulated in the sump (3), then to continue to the washing program chosen by the user to obtain stain-free washing of dishes. Salt cleaning program is operated only once before normal washing program by first operation of the machine by means of the signal remained at the memory of the card and then this signal is deleted from the card memory. Afterwards, machine (1) operates in normal washing program until next salt addition to the machine (1). In order to use the salt cleaning program when the machine (1) is both empty and full, during the salt cleaning program of the invention, washing motor located inside the dishwashers is not operated and therefore water passes firstly through the air breaker (7) and then through the ion exchanger (9) in the water softener (2) and accumulates in the sump (3) without being delivered to the spray arms located inside the dishwashers.

[0013] In graphic 1, a graphic of water amount in the machine (1) - time showing changes in accumulated water in the sump (3) of the dishwasher (1) and water amount during discharge over the time is given. After the salt addition into the water softener (2) is detected, a signal sent to the electronic card is saved in the card memory and machine (1) sets the salt cleaning program before any program chosen by the user and electronic card starts this program by operating the drain pump (4). As can be seen from the graphic 1, as soon as the salt cleaning program starts, water (A) accumulated in the sump (3) of the machine (1) is completely discharged from the machine (1). At this stage, water inside the sump (3) is completely discharged. Then, water starts to fill the sump (3) by passing firstly through the air breaker (7) and then the exchanger (9) in the water softener (2) after electronic card opens the inlet valve (6). Water (B) is taken inside the machine (1) in just enough amounts to remove salty water residues in the sump (3). Amount of water is determined according the size of the sump (3). Since the washing motor is not operated during the water intake process, water is not sent to the spray arms but it is conditioned by passing through the air breaker (7) and then exchanger (9) in the water softener (2) and the sump (3) is filled with that water, therefore it is not important whether the machine (1) is empty or loaded. Then, the water taken inside is discharged by operating the drain pump (4) from a while and discharged water is expelled by delivering to the waste water discharge channel (5).

At this stage, water inside the machine (1) is again discharged completely. Therefore, salty water accumulated in the machine (1) is cleaned by taking water inside the machine (1) and discharging it. Water is taken inside machine (1) and then discharged one or more times. Therefore, the cleaning program of the invention is automatically operated without the need for the user to make any operation, unwanted salty water accumulated in the sump (3) is discharged and washing the dishes is continued according to the program chosen by the user.

[0014] It will be recognized that the above described invention may be embodied in other specific forms without departing from the spirit or essential characteristics of the disclosure. Thus, it is understood that the invention is not to be limited by the foregoing illustrative details, but rather is to be defined by the appended claims.

Claims

1. A salt cleaning method used in dishwashers comprising a water inlet valve (6) which controls incoming of water into the machine (1) from water inlet tap (8); an air breaker (7) where the intake water is firstly directed and air bubbles contained therein are separated; a water softener (2) in the machine having salt-water mixture in one section and ion exchanger (9) in other section and whereto water coming from the air breaker (7) is directed; an ion exchanger connection hose (10) which provides delivering of water exited from air breaker (7) where the air bubbles are separated, to the ion exchanger (9); an electrovalve (12) which is located between the section in which the salt-water mixture is contained and the section belonging to ion exchanger (9) and operates at time intervals predetermined by the manufacturer according to the water hardness; a hose (11) providing a connection between air breaker (7) and the section in which the salt-water mixture is contained; a sump (3) where the water flooded from the water softener (2) is accumulated as a result of the pressure formed in the water softener (2) when the cover of the water softener (2) is opened to add salt and the salt addition of the user; a drain pump (4) used to discharge the water accumulated in the sump (3) through the waste water discharge channel (5), to provide for discharging of salty water flooded from the water softener (2) located in the dishwasher (1) during salt addition process due to pressure inside the water softener (2) and the salt addition of the user without the need for the user to make any operation, for washing inside the sump and after salt addition process for preventing the dishes to be remained as stained; the method **characterized in that** it comprises following steps:

i. a signal sent to the electronic card after the detection of salt addition into the water softener (2) is saved in the card memory and machine (1) sets the salt cleaning program before any program chosen by the user;

ii. electronic card starts salt cleaning program by operating the drain pump (4);

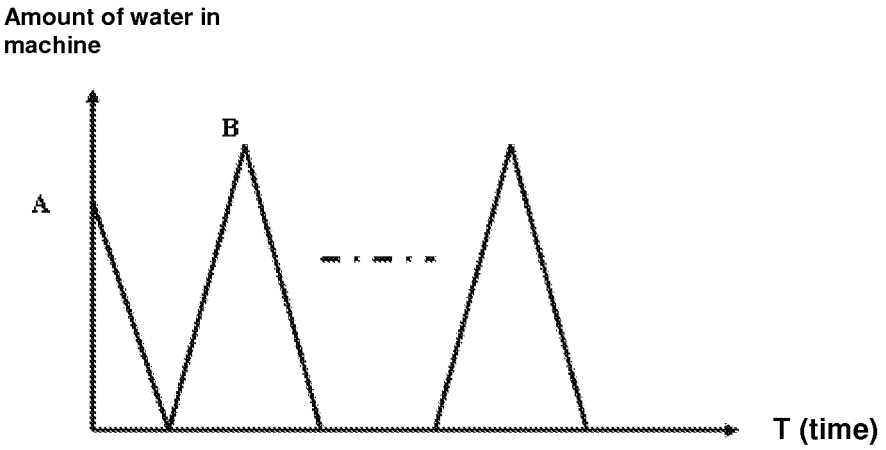
iii. as soon as the salt cleaning program starts, water (A) accumulated in the sump (3) of the machine (1) is completely discharged from the machine (1);

iv. water taken into the machine (1) starts to fill the sump (3) in the amount (B) enough to remove the salty water residues, without being sent to the spray arms since the washing motor is not operated, by passing firstly through the air breaker (7) and then the exchanger (9) in water softener (2) after electronic card opens the inlet valve (6);

v. the water filled the sump (3) is discharged from a while by operating the drain pump (4) and expelled by delivering into the waste water discharge channel (5) and again the water inside the machine (1) is completely discharged;

vi. providing operation of the machine (1) on normal washing programs until next salt addition to the machine by deleting the signal stored at the memory at first stage from the card memory.

2. A salt cleaning method according to claim 1 wherein fourth and the fifth stages are repeated at least once.



Graphic – 1

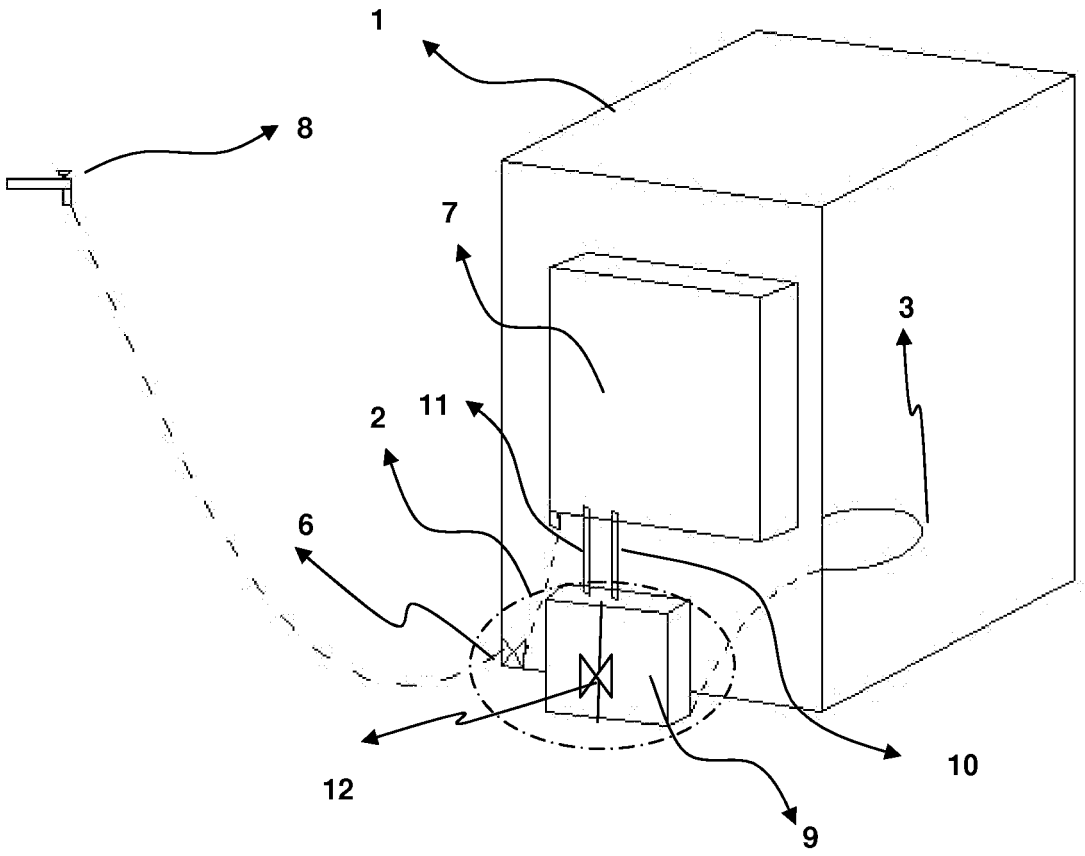


Figure – 1

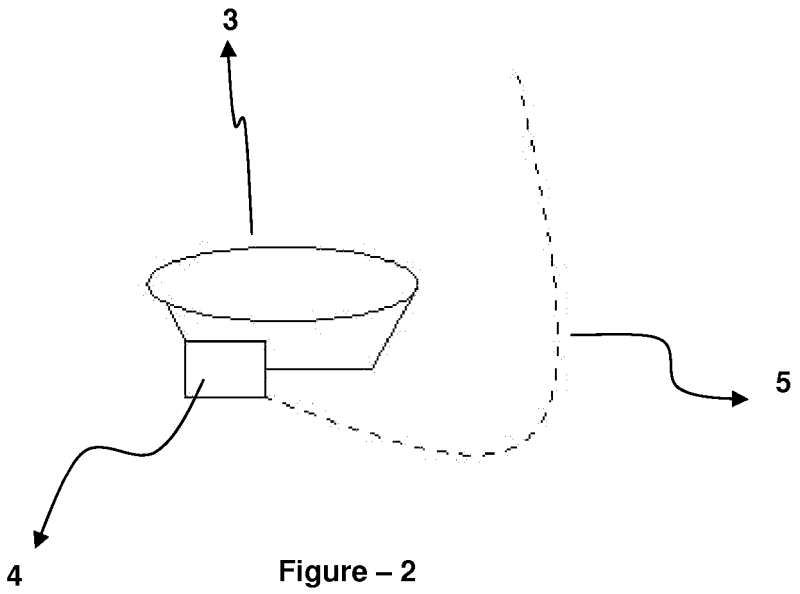


Figure – 2

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 06 11 2543

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	14 September 2006	PAPADIMITRIOU, S

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REFERENCES CITED IN THE DESCRIPTION

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