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(54) **METHOD FOR CONTROLLING DISH WASHING MACHINE**

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(51) **Int. Cl.**
B08B 9/20 (2006.01)

(52) **U.S. Cl.** **134/18**; 134/25.2; 134/34; 134/26

(58) **Field of Classification Search** ..... None
See application file for complete search history.

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(57) **ABSTRACT**

A method for controlling a dish washing machine is disclosed. The disclosed method includes turning off a heater of a steam generator when a water level sensor for the steam generator indicates a minimum water level, supplying water to the steam generator for a first time, to remove air bubbles around the water level sensor, and counting the number of repetition times of the water supplying step when the water level sensor still indicates the minimum water level after the execution of the water supplying step, and again executing the water supplying step, based on the counted value.

7 Claims, 4 Drawing Sheets

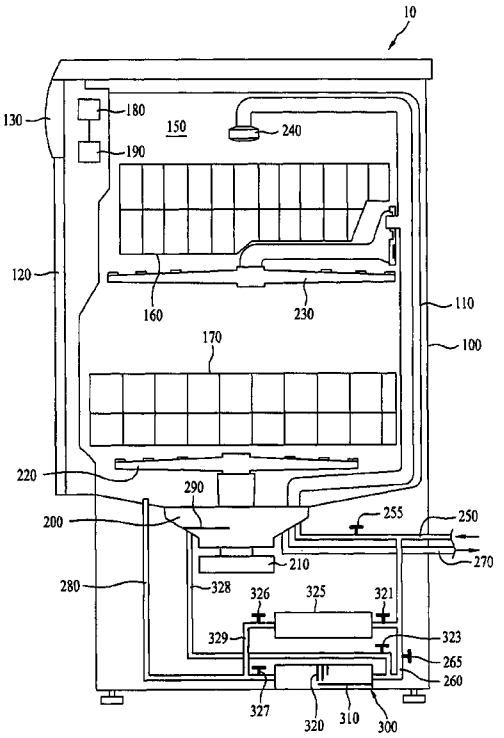


FIG. 1

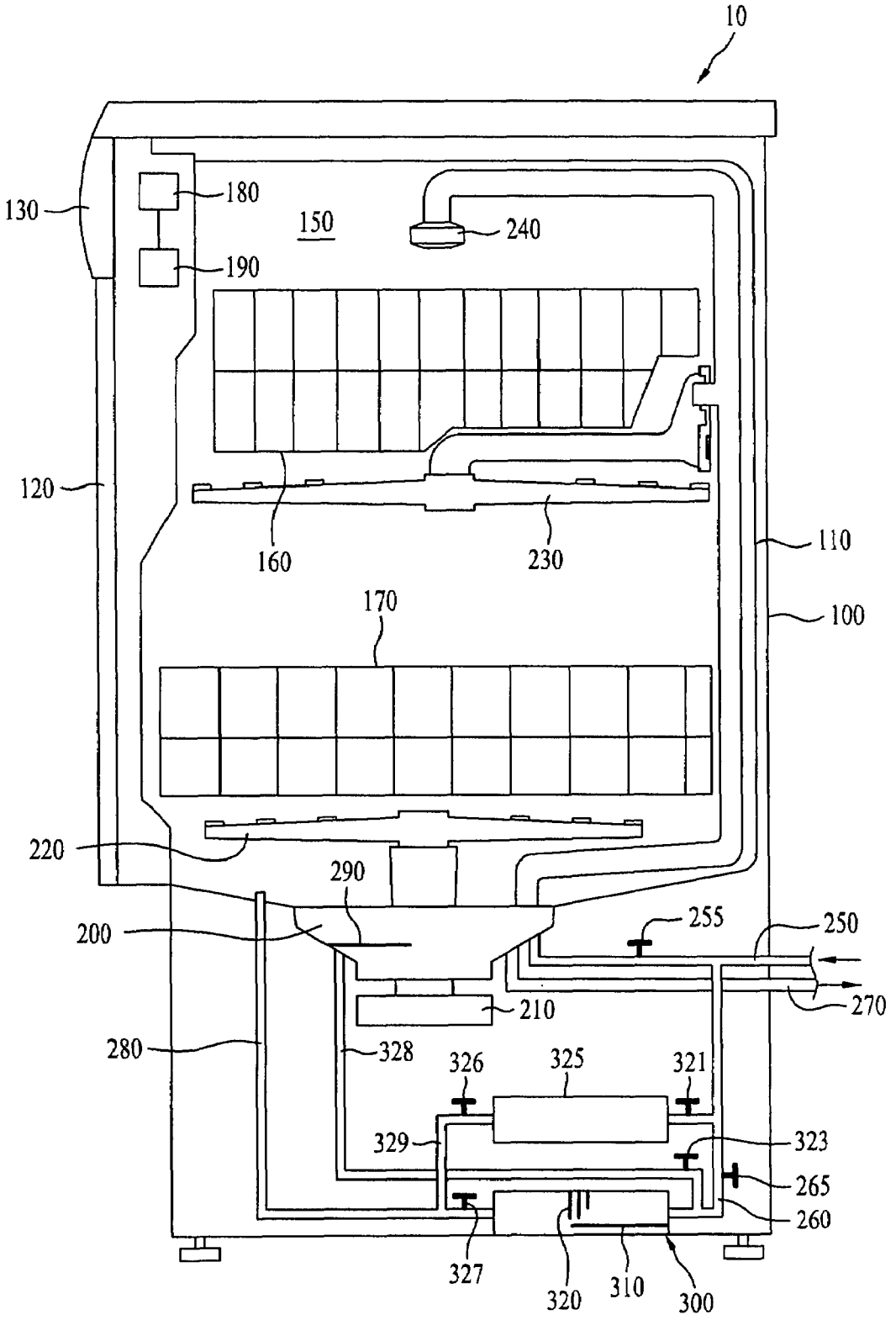

10
130
180
150
240
190
120
160
230
110
170
100
220
290
200
255
250
270
210
280
328
326
325
321
329
323
265
260
327
320
310
300

FIG. 2

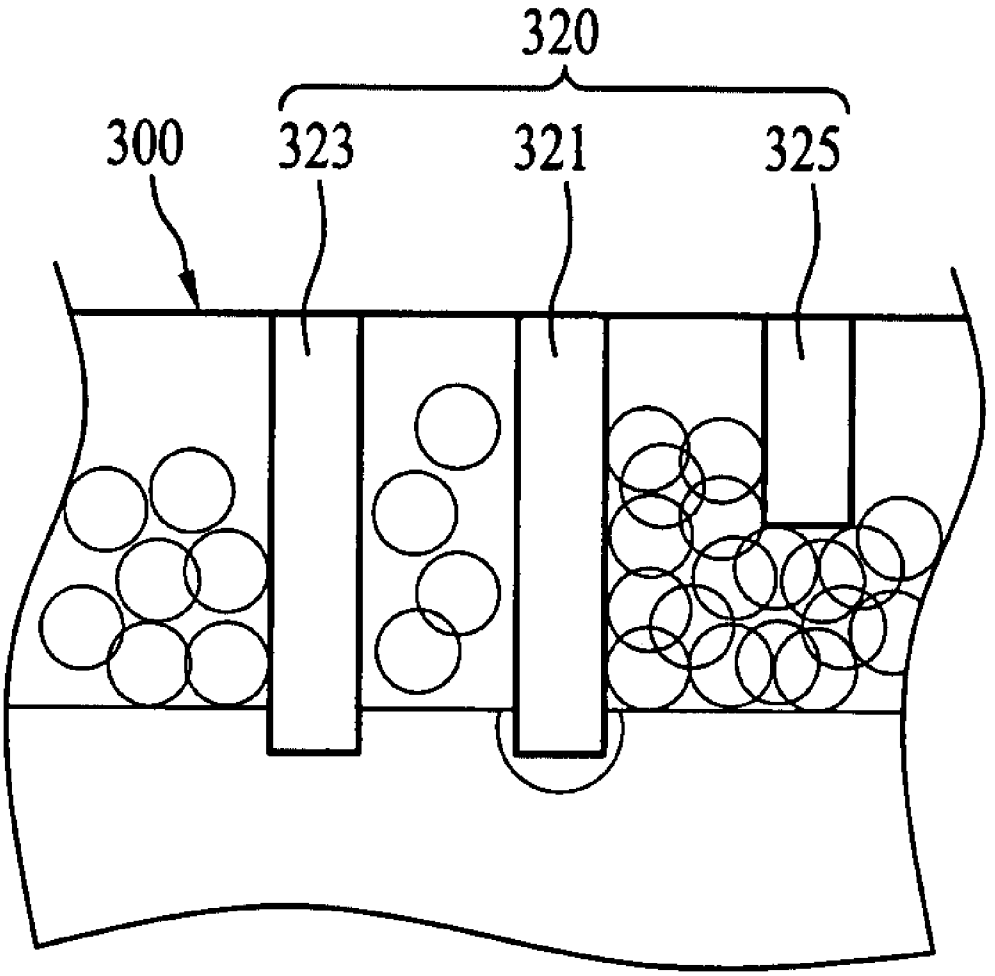


FIG. 3

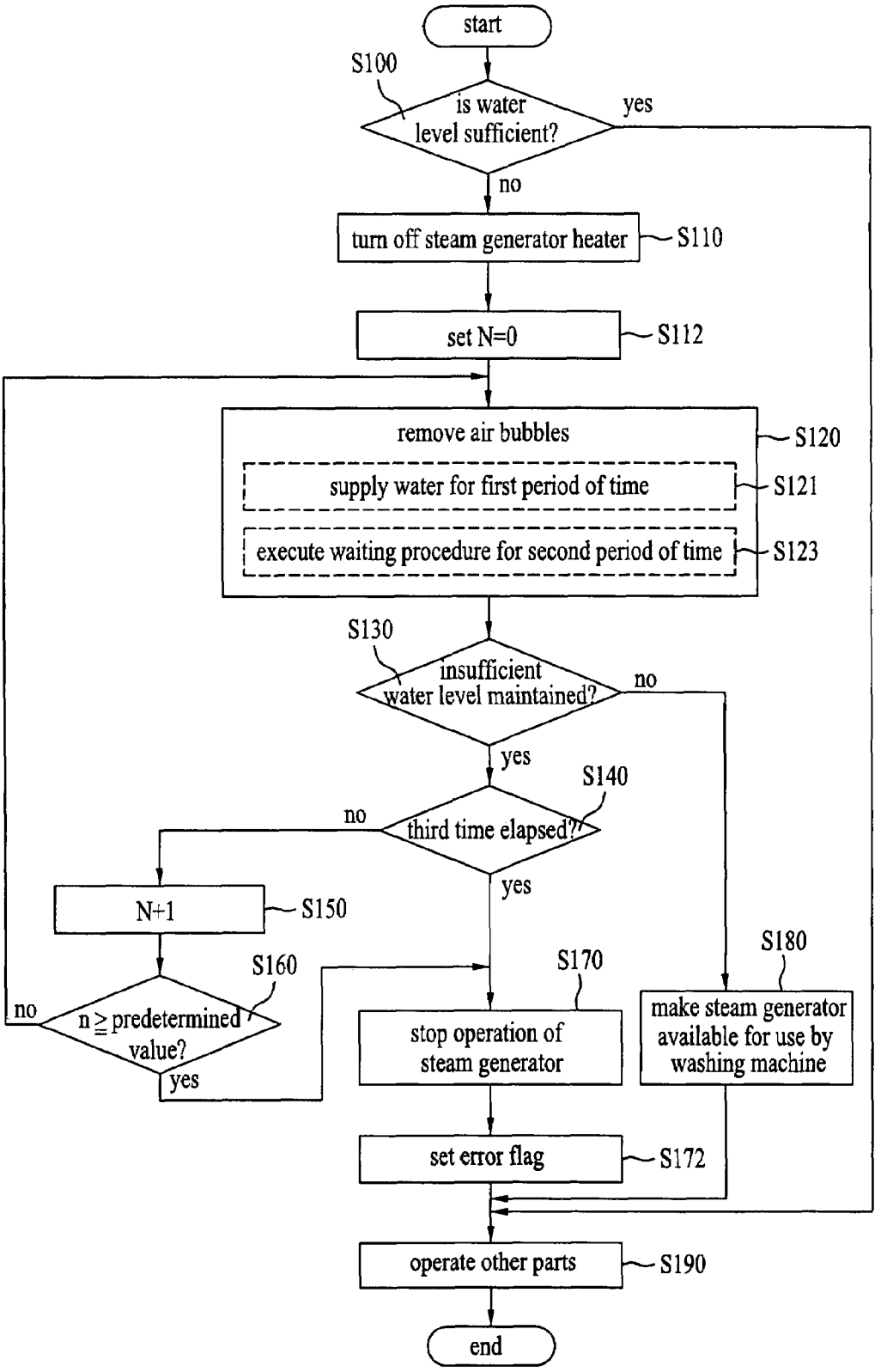
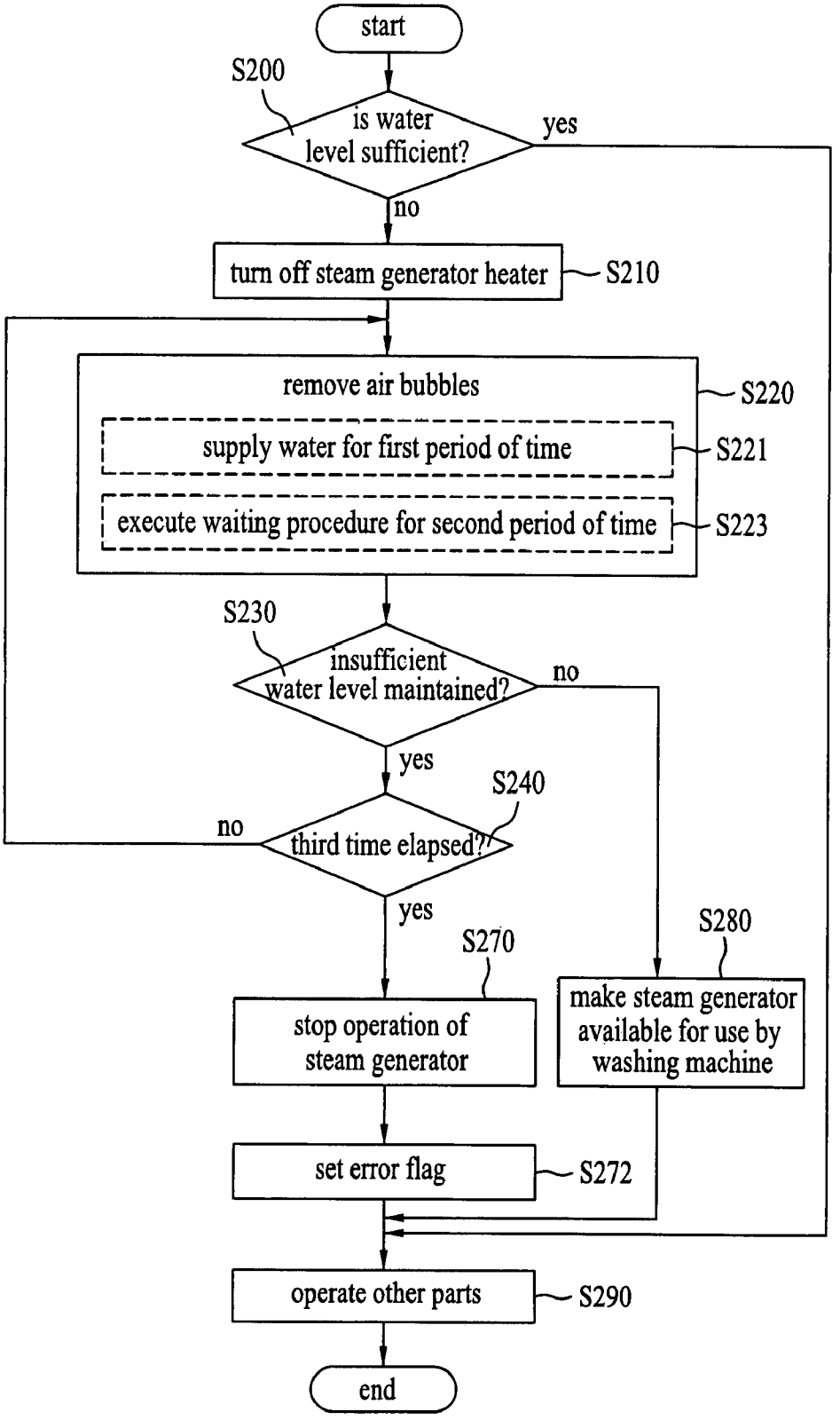

start
S100
is water level sufficient?
yes
no
turn off steam generator heater
S110
set N=0
S112
remove air bubbles
S120
supply water for first period of time
S121
execute waiting procedure for second period of time
S123
S130
insufficient water level maintained?
no
yes
S140
third time elapsed?
no
yes
N+1
S150
S160
n ≧ predetermined value?
no
yes
S170
stop operation of steam generator
S180
make steam generator available for use by washing machine
set error flag
S172
operate other parts
S190
end

FIG. 4


start
S200
is water level sufficient?
yes
no
turn off steam generator heater
S210
remove air bubbles
S220
supply water for first period of time
S221
execute waiting procedure for second period of time
S223
S230
insufficient water level maintained?
no
yes
S240
third time elapsed?
no
yes
S270
S280
stop operation of steam generator
make steam generator available for use by washing machine
set error flag
S272
operate other parts
S290
end

METHOD FOR CONTROLLING DISH WASHING MACHINE

This application claims the benefit of Korean Patent Application No. 10-2007-0032116, filed on Mar. 31, 2007, which is hereby incorporated by reference as if fully set forth herein.

BACKGROUND

1. Field of the Disclosure

The disclosure relates to a method for controlling a home appliance, and more particularly to a method for controlling a dish washing machine, which enables the dish washing machine to more efficiently wash dishes.

2. Discussion of the Related Art

Generally, dish washing machines are known as an apparatus for automatically washing dishes disposed in a washing compartment by spraying wash water toward the dishes under high pressure, and thus, removing foreign matter such as food residues attached to the surfaces of the dishes.

One of the important factors associated with such a dish washing machine is washability for cleanly removing food residues attached to the surfaces of dishes. In order to achieve an enhancement in washability, it is necessary to increase the force required to remove foreign matter from the surfaces of dishes, namely, the spray pressure of wash water. However, when the spray pressure of the wash water is excessively high, the dishes may be damaged or may easily be broken. Furthermore, when the washing of dishes is carried out at an increased spray pressure, the amount of wash water required in this washing operation is increased.

In addition, when wash water of an increased spray pressure is used, it is necessary to increase the power consumption of a pump used to supply the wash water.

SUMMARY

Accordingly, a dish washing machine that substantially obviates one or more problems due to limitations and disadvantages of the related art is highly desirable.

In order to achieve an enhancement in the washability of a dish washing machine without the damage of dishes, the use of steam is introduced into the dish washing machine as described herein in accordance with embodiments of the invention. The steam functions to soak foreign matter attached to dishes in water, and thus achieves an enhancement in washability even when wash water is sprayed onto the dishes at a more or less low pressure.

In order to supply steam, a steam generator equipped with a heater may be mounted to the dish washing machine. Water may be supplied to the steam generator several times because a supply of steam from the steam generator may be required several times for generally predetermined periods of time during operation of the dish washing machine.

Accordingly, a method for controlling a dish washing machine, which efficiently supplies water to the steam generator of the dish washing machine, is highly desirable.

Advantages and features will be set forth in part in the description that follows and in part will become apparent to those having ordinary skill in the art upon examination of the following or may be learned from practice of the invention. The aforementioned advantages and features may be realized and attained by the exemplary structures and/or methods particularly pointed out in the written description, claims, and the appended drawings.

The advantages may be achieved by a method for controlling a dish washing machine having a steam generator that

comprises: turning off a heater of a steam generator when a water level sensor for the steam generator indicates a minimum water level; supplying water to the steam generator for a predetermined first time period, to remove air bubbles around the water level sensor; and counting a number of repetitions of the water supplying step that occurred following the turning off of the heater if the water level sensor still indicates the minimum water level after the execution of the water supplying step, and repeating the water supplying step, based on the determined number of repetitions.

The method may further comprise executing a waiting step for a second time period, following the water-supplying step.

The method may further comprise disabling operation of the steam generator if the number of repetitions is greater than or equal to a predetermined value.

The method may further comprise stopping the supply of water to the steam generator if the number of repetitions is greater than or equal to a predetermined value.

The method may further comprise disabling operation of the steam generator if a total water supply time is greater than or equal to a third time period, wherein the total water supply time is the time which water is supplied to remove the air bubbles, corresponds to a third time.

The method may further comprise disabling operation of the steam generator when a third time period elapses after the supply of water to the steam generator begins, following the turning-off of the heater.

When the water level sensor indicates both the minimum water level and a maximum water level, it may be determined that the minimum water level is maintained.

The advantages may also be achieved by a method for controlling a dish washing machine having a steam generator that comprises: turning off a heater of the steam generator when a water level sensor for the steam generator indicates a minimum water level; sensing a water level of the steam generator while supplying water to the steam generator for a predetermined time period; and stopping the supply of water and stopping an operation of the steam generator, when it is indicated that the water level sensor indicates a minimum water level after the predetermined time has elapsed.

When the water level sensor indicates both the minimum water level and a maximum water level, it may be determined that the minimum water level is maintained.

The method may further comprise enabling operation of the steam generator as carried out before the turning-off of the heater, when the water level sensor indicates that the water level of the steam generator higher than the minimum water level.

The method may further comprise executing, as scheduled, operations of the dish washing machine other than operation of the steam generator, which were operated simultaneously or alternately with the steam generator before the turning-off of the heater, even when the operation of the steam generator is stopped. In one embodiment, a dish washing machine, may include a tub defining a washing compartment, a sump to hold water, the sump coupled to the tub, a water supply tube coupled to the tub, a steam generator having an output coupled to the washing compartment and an input coupled to the water supply tube via an electrically controlled valve, an electrically controlled heater to convert water to steam, a water level sensor coupled to the steam generator to indicate a water level within the steam generator, a controller in communication with the valve, the heater, and the water level sensor, and a memory. The memory may include a set of instructions to cause the controller to turn off the heater of the steam generator when the water level sensor of the steam generator indicates a minimum water level, open the valve to

supply water to the steam generator and close the valve after a predetermined first time period, determine a number of repetitions of opening and closing the valve that occurred following the turning off of the heater if the water level sensor indicates the minimum water level, and repeat the opening and closing of the valve, based on the determined number of repetitions.

In an embodiment, the heater of the dish washing machine may be within the steam generator.

In an embodiment, a dish washing machine having a steam generator, may include a tub defining a washing compartment, a sump to hold water, the sump coupled to the tub, a steam generator to supply steam to the washing compartment, means for determining a water level within the steam generator, and means for supplying water to the steam generator for a predetermined time period.

The dish washing machine may further include means for determining whether the water level within the steam generator is sufficient to generate steam.

The dish washing machine may further include means for stopping a supply of water and disabling operation of the steam generator if the water level within the steam generator is insufficient to generate steam.

The steam generator of the dish washing machine may include a heater in the sump.

The steam generator of the dish washing machine may be external to the tub.

It is to be understood that both the foregoing general description and the following detailed description are exemplary and explanatory and should not be construed as limiting the scope of any claim.

BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings, which are included to provide a further understanding of the embodiments described herein are incorporated in and constitute a part of this application, illustrate embodiment(s) of the invention and together with the description serve to explain the principle of the invention. In the drawings:

FIG. **1** is a schematic view illustrating a dish washing machine according to an embodiment of the present invention;

FIG. **2** is a schematic view illustrating the influence on a water level sensor caused by air bubbles generated in a stem generator;

FIG. **3** is a flow chart illustrating a method for controlling the dish washing machine in accordance with a first embodiment of the present invention; and

FIG. **4** is a flow chart illustrating a method for controlling the dish washing machine in accordance with a second embodiment of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

Reference will now be made in detail to the preferred embodiments, examples of which are illustrated in the accompanying drawings. Wherever possible, the same reference numbers will be used throughout the drawings to refer to the same or like parts.

The configuration of a dish washing machine, to which a control method according to an exemplary embodiment of the present invention is applied, will be described with reference to FIG. **1**.

The dish washing machine **10** according to the illustrated embodiment of the present invention may include a case **100** defining the appearance of the dish washing machine, a door **120** for opening or closing the case **100**, and a control panel **130** mounted to the case **100** or door **120**, to enable the user to manipulate the dish washing machine.

A tub **110** may be arranged in the case **100**, to define a washing compartment **150** in the case **100**, as a space in which dishes are received and washed. A sump **200** for storing wash water may be arranged beneath the tub **110**.

Arranged in the sump **200** may be a pump **210** for pumping the wash water stored in the sump **200** and a filter (not shown) for filtering contaminated wash water. A first heater **290** may also be arranged in the sump **200**, to heat the wash water stored in the sump **200**.

A first water supply tube **250** may be coupled to the sump **200**, to supply fresh water from an external water supply source to the sump **200**. A water discharge tube **270** is also connected to the sump **200**, to externally discharge the wash water from the sump **200**. A first water supply valve **255** for controlling the supply of water to the sump **200** may be arranged in series with the water supply tube **250**.

At least one rack may be arranged in the interior of the tub **110**, namely, the washing compartment **150**. At least one spray arm may also be arranged in the washing compartment **150**, to spray the water pumped by the pump **210** toward the at least one rack.

For reference, FIG. **1** illustrates an example in which an upper rack **160** and a lower rack **170** are arranged at upper and lower portions of the washing compartment **150**, respectively, and an upper spray arm **230** and a lower spray arm **220** are arranged such that they spray water pumped by the pump **210** toward the upper rack **160** and lower rack **170**, respectively.

In addition, a top nozzle **240** may be arranged at a top portion of the washing compartment **150**. The top nozzle **240** functions to downwardly spray water pumped by the pump **210** from the top portion of the washing compartment **150**.

The dish washing machine **10** according to one illustrated embodiment of the present invention may be configured to not only spray wash water into the washing compartment **150** by the pump **210** and spray arms **220** and **230**, but also to spray or supply steam to the washing compartment **150**. To this end, the dish washing machine includes a steam generator **300** which operates independently of the first heater **290** arranged in the sump **200**.

As shown in FIG. **1**, the steam generator **300** may communicate with the first water supply tube **250** via a second water supply tube **260**. The steam generator **300** may also communicate with the washing compartment **150** of the tub **110** via a steam supply tube **280**. A second water supply valve **265** for controlling the supply of water to the steam generator **300** may be arranged in series with the second water supply tube **260**.

The steam generator **300** may include a second heater **310** for heating water supplied to the steam generator **300**, and a water level sensor **320** for sensing the water level of the steam generator **300**. The water level sensor **320** may provide water level indication values in either a digital or analog format. The water level sensor **320** may indicate, for example, a minimum water level and a maximum water level.

The minimum water level may be set to protect the second heater **310** of the steam generator **300**. On the other hand, the maximum water level may be set to prevent the water supplied to the steam generator **300** from overflowing the steam generator **300**.

In order to supply steam from the steam generator **300** at a desired time, a steam supply valve **327** for controlling opening or closing of the steam supply tube **280** may be installed in the steam generator **300**.

The steam generator **300** may be connected to the sump **200** via an auxiliary water supply tube **328**. In detail, the steam generator **300** may generate steam by heating wash water received via the sump **200**. Of course, an auxiliary valve **323** may be arranged in series with the auxiliary water supply tube, in order to control the supply of water between the sump **200** and the steam generator **300**.

A controller **180** may be provided to control the dish washing machine **10**. As known in the art, the controller **180** may be in communication with a memory **190** that may store instructions used by the controller **180** to execute the steps of the methods in accordance with embodiments of the invention. The controller **180** may be electrically coupled to electrically-operated elements, for example, the control panel **130**, the pump **210**, and the steam generator **300**, to control the operation of the dish washing machine **10**. These operational couplings are not illustrated in FIG. **1**, to avoid clutter in the figure.

In order to measure and indicate both the minimum and maximum water levels, the water level sensor **320** of the steam generator **300** may include a plurality of sensors, such as the electrode sensors shown in FIG. **2**. For example, the water level sensor **320** may include a common electrode **321**, a first electrode **323** having a first length, and a second electrode **325** having a second length, smaller than the first length. The electrode sensors may be arranged to be spaced apart from one another and to extend downwardly from the top of the steam generator **300**.

In the exemplary embodiment, when the level of water in the steam generator **300** decreases below the lower ends of the common electrode **321** and first electrode **323**, the common electrode **321** and first electrode **323** are electrically disconnected. In this state, the controller **180** may determine if the water level of the steam generator **300** corresponds to the minimum water level.

On the other hand, when the water level of the steam generator **300** increases above the lower ends of the common electrode **321** and first electrode **323** from the above-described minimum water level, the lower ends of the common electrode **321** and first electrode **323** are submerged under water, so that the common electrode **321** and first electrode **323** are electrically connected. In this state, the controller **180** may determine that the water level of the steam generator **300** corresponds to a water level higher than the minimum water level, namely, a normal water level.

When the water level of the steam generator **300** further increases such that even the lower end of the second electrode **325** is submerged under water, the common electrode **321** and second electrode **325** are electrically connected. In this state, the controller **180** may determine that the water level of the steam generator **300** corresponds to the maximum water level.

Meanwhile, after the dish washing machine **10** is used for a prolonged period of time, lime components contained in water are deposited in the steam generator **300** and the second water supply tube **260** connected to the steam generator **300**. The deposited lime components generate air bubbles when water is supplied to the steam generator **300**, as shown in FIG. **2**. The generated air bubbles may prevent the water level sensor **320** from accurately measuring the water level, and thus cause a malfunction of the steam generator **300**.

This will be described in more detail. For example, although the water level of the steam generator **300** corresponds to the normal water level, the air bubbles may interfere with the electrical connection between the common electrode **321** and the first electrode **323**, thereby causing the water level sensor **320** to erroneously indicate that the water level of the steam generator **300** corresponds to the minimum water level. Also, although the water level of the steam generator **300** does not correspond to the maximum water level, the air bubbles may electrically connect the common electrode **321** and the second electrode **325**, thereby causing the water level sensor **320** to erroneously indicate that the water level of the steam generator **300** corresponds to the maximum water level.

When the water level sensor **320** erroneously indicate the water level of the steam generator **300** due to the air bubbles generated in the steam generator **300**, it may become difficult, or in some cases impossible, to efficiently supply an accurate amount of water to the steam generator **300** for efficient operation of the steam generator **300**.

For example, when the normal water level of the steam generator **300** is erroneously indicated to be the minimum water level, an excessive amount of water is supplied, so that the supplied water may overflow the steam generator **300**, or the time and energy taken to generate steam may be excessive. On the other hand, when the water level of the steam generator **300** does not correspond to the maximum water level, but is erroneously indicated to be the maximum water level, no supply of water is carried out even when the supply of water is required. In this case, the heater **310** may be exposed above the surface of the water, so that it may be overheated.

There is provided a method for solving the problems occurring due to the erroneous water level sensing of the water level sensor **320** caused by air bubbles. In FIGS. **3** and **4**, methods according to the present invention are illustrated. The illustrated methods will be described in more detail with reference to the figures.

A method for controlling the dish washing machine **10** in accordance with the present invention includes turning off the heater of the steam generator when the water level sensor of the steam generator measures and indicates the minimum water level, supplying water to the steam generator, re-measuring and re-indicating the level of water in the steam generator, and determining whether or not the operation of the steam generator is to be continued, based on the re-indicated water level.

When the water level indicated at the water level re-measuring and re-indicating step is the minimum water level, the water-supplying step and the water level re-measuring and re-indicating step are repeatedly executed. When the number of repetitions, following turning off the heater, of the water-supplying step and the water level re-measuring and re-indicating step corresponds to a predetermined value, the operation of the steam generator may be disabled. By way of example, in one embodiment, when the operation of the steam generator is disabled, the controller **180** will not execute code to supply water to the steam generator **300** and will not execute code to turn on the heater **310**.

Alternatively, when the water level indicated at the water level re-measuring and re-indicating step is the minimum water level, the heater may be turned off, and water may be supplied to the steam generator. In this case, after a predetermined time elapses from the supply of water, and the water level indicated remains at the minimum water level, the operation of the steam generator may be disabled.

As shown in FIG. **3**, when the water level sensor **320** of the steam generator **300** indicates the low water level (S**100**) (i.e., the water level is insufficient), the controller **180** turns off the heater **310** (S**110**). This control operation is executed to protect the heater **310** when the level of water in the steam generator **300** actually corresponds to a level below the minimum level.

After the turn-off of the heater **310**, a procedure for removing air bubbles may be executed (S**120**). In this procedure, water is first supplied to the steam generator **300** for a first predetermined time, for example, 7 seconds (S**121**). The supply of water to the steam generator may cause waves of water within the steam generator **300**. As a result, air bubbles that may cause erroneous operation of the water level sensor **320** may be broken and thus removed, or are moved to other areas that do not interfere with the operation of the water level sensor **320**.

After completion of the supply of water for the first predetermined time, a waiting procedure may be executed for a second predetermined time, for example, 3 seconds (S**123**), in order to allow the air bubbles that may cause erroneous operation of the water level sensor **320** to be sufficiently removed.

After the air bubble removing procedure S**120** is executed for the predetermined time, for example, 10 seconds, the level of water in the steam generator **300** is checked using the water level sensor **320** (S**130**).

When it is indicated that the water level of the steam generator **300** is still maintained at the minimum water level, even after the second predetermined time elapses, namely, even after the air bubble removing procedure S**120** is completed, this means that the air bubbles causing erroneous operation of the water level sensor **320** have been insufficiently removed, or the water level of the steam generator **300** has not been recovered to the normal water level in spite of the supply of water carried out for the first predetermined time. There is no or little possibility that the latter phenomenon occurs, because this phenomenon mainly occurs due to failure of the second water supply valve **265** or suspension of water supply. Accordingly, there is a high possibility that the above-described sensing result was caused by the former phenomenon.

On the other hand, in accordance with an embodiment of the invention, when the water level sensor **320** indicates both the minimum water level and the maximum water level, in the water level checking procedure S**130**, the controller **180** may be programmed to consider this event as a determination that the water level of the steam generator **300** is maintained at the minimum water level. This determination means that air bubbles present in the steam generator **300** have influence on the water level sensor **320**, thereby causing the water level sensor **320** to operate erroneously. Thus, this determination is needed to additionally execute a required procedure for removing air bubbles.

When it is indicated that the water level of the steam generator **300** is still maintained at the minimum water level, even after the execution of the air bubble removing procedure S**120**, the number of execution times of the air bubble removing procedure S**120** is incremented (S**150**). Prior to beginning the procedure, a counter may be set to a value of zero to record the number of execution times. Thereafter, it is determined whether or not the counted value reaches a predetermined value (S**160**). When the counted value does not reach the predetermined value, the air bubble removing procedure S**120** including the water supplying procedure for the first predetermined time and optionally the waiting procedure for the second predetermined time may be repeated in accordance with a command from the controller **180**.

When the number of repetition times of the air bubble removing procedure, namely, the counted value (e.g., counter value of N in FIG. **3**), reaches the predetermined value, for example, 4, the supply of water to the steam generator **300** is stopped, and the operation of the steam generator **300** is disabled (S**170**), as shown in FIG. **3**. An error flag may be set (S**172**) to identify the malfunction of the steam generator **300**.

When the air bubble removing procedure S**120** has been repeated several times, this means that a considerably large amount of water have been supplied to the steam generator **300**. Accordingly, if it is indicated that the water level in the steam generator **300** is still maintained at the minimum water level, even after the repeated execution of the air bubble removing procedure S**120** for the predetermined repetition times, there is a high possibility that the sensing result was caused by the failure of the second water supply valve **265** or water level sensor **320**. Furthermore, when an excessive amount of water is supplied to the steam generator **300**, the supplied water may overflow the steam generator **300**. To this end, the repetition times of the air bubble removing procedure S**120** may be limited to a predetermined value, such as the one described above.

On the other hand, it may be possible to determine whether or not there is a malfunction in the steam generator **300**, while supplying water to the steam generator **300** after turning off the heater **310**, based on the time elapsed after the supply of water to the steam generator **300** begins, without being based on the counted number of repetition times of the air bubble removing procedure S**120**, as in the above-described case in which the air bubble removing procedure S**120** is repeated for predetermined repetition times.

In this case, a step of determining whether or not a third predetermined time has elapsed S**140**, after the execution of the air bubble removing procedure S**120** and water level checking procedure S**130** may be useful. For example, where the third predetermined time is set to 40 seconds, the controller **180** repeatedly executes the air bubble removing procedure S**120** for, for example, 4 times as described above, namely, for 40 seconds, if the steam generator **300** is not recovered to the normal water level within 40 seconds, the method may proceed to S**170**.

At S**170**, when it is indicated that the water level in the steam generator **300** is still maintained at the minimum water level, even after 40 seconds have elapsed, the controller **180** may stop the repetition of the air bubble removing procedure S**120**, and disable operation of the steam generator **300** (S**170**).

Step S**140** and steps S**150** and S**160** may be selectively applied in the method according to the present invention. Alternatively, both step S**140** and steps S**150** and S**160** may be applied, in order to provide measures for compensation of count errors. FIG. **3** illustrates a method, in accordance with an embodiment of the invention, wherein both step S**140** and steps S**150** and S**160** are applied. FIG. **4** illustrates a method, in accordance with an embodiment of the invention, wherein only step S**140** is applied; steps S**150** and S**160** are not applied.

For reference, steps S**200**, S**210**, S**230**, S**240**, S**270**, S**280**, and S**290** in FIG. **4** correspond to steps S**100**, S**110**, S**130**, S**140**, S**170**, S**180**, and S**190**, respectively. The air bubble removing procedure S**120** in the embodiment of FIG. **3** may be different from the air bubble removing procedure S**220** in the embodiment of FIG. **4**. Each of the air bubble removing procedures S**120** and S**220** may include a step S**121**, S**221** of supplying water for the first predetermined time and may also include a waiting step S**123**, S**223** executed for the second predetermined time.

On the other hand, it may be possible to indicate, at step S**140**, a phenomenon that the supply of water for removal of air bubbles is executed for the third predetermined time exceeding the first predetermined time, due to errors in the second water supply valve **265**, and to disable operation of the steam generator **300**, based on the sensing of the above phenomenon.

This means that the supply of water continued for an excessively long period and may have been caused by the abnormal closing of the second water supply valve **265**. In this case, accordingly, the operation of the steam generator **300** should be stopped. To this end, the controller **180** may execute code to perform a control operation to forcibly close the second water supply valve **265**. Alternatively, the controller **180** may execute code to operate a separate valve (not shown) prepared against the failure of the second water supply valve **265**, to cut off the supply of water to the steam generator **300**, and may also execute code to disable operation of the steam generator **300**.

The steam generator **300** may operate simultaneously or alternately with other parts of the dish washing machine **10** under the condition in which the heater **310** has not been turned off (i.e., normal operation). Even if, however, the operation of the steam generator **300** is forcibly stopped, due to, for example, the abnormal operation or inoperability of the steam generator **300**, the operations of the other parts of the dish washing machine **10** may be carried out as scheduled.

For example, the spraying of water according to the operation of the pump **210** can be carried out as scheduled, irrespective of the stopping of the operation of the steam generator **300**. The supply of steam is an auxiliary function to achieve an enhancement in washing performance. Accordingly, when there is a malfunction in the steam generator **300**, the operation of the steam generator **300** is disabled, but the water-spraying and washing operations are maintained and may continue, to complete the scheduled dish washing course.

Meanwhile, even when the erroneous sensing of the minimum water level at step S**100** was caused by air bubbles, the water level sensor **320** will subsequently indicate the water level of the steam generator **300** to be the normal water level, which is higher than the minimum water level, if the air bubbles have been sufficiently removed through the air bubble removing procedure S**120** carried out for the first and second predetermined times.

On the other hand, when the minimum water level indicated at step S**100** was correctly determined, the water level of the steam generator **300** will be recovered to the normal water level in accordance with the supply of water carried out for the first predetermined time. In this case, accordingly, the water level sensor **320** will subsequently indicate the water level of the steam generator **300** not to be the minimum water level, but to be a water level higher than the minimum water level, namely, the normal water level.

When it is indicated, after the air bubble removing procedure S**120**, that the water level of the steam generator **300** is a level higher than the minimum water level, the controller **180** turns on the heater **310**, and continues the operation of the steam generator **300** carried out before the turning-off of the heater **310** (S**180**). In this case, the heater **310** may be turned on after waiting for a predetermined time in accordance with a set algorism, even when the normal water level is indicated.

Because steam is used in the dish washing procedure in accordance with the present invention, it is possible to achieve an enhancement in washability.

In accordance with the present invention, it is possible to efficiently supply water to the steam generator of the dish washing machine **10**. Also, even when the water level sensor operates erroneously due to air bubbles generated during the supply of water to the steam generator, it is possible to normally operate the steam generator by use of the air bubble removing procedure. Accordingly, the reliability of the dish washing machine **10** is enhanced.

In accordance with the present invention, when there is a malfunction in the steam generator, this malfunction can be effectively identified, and the operation of the steam generator may be disabled in accordance with the sensing of the malfunction. Accordingly, it may be possible to avoid damage to the steam generator **300** caused by continued use of the malfunctioning steam generator.

In addition, in accordance with the present invention, even when the operation of the steam generator is stopped, a scheduled washing course can be completely achieved by maintaining the operations of other parts. Accordingly, even when the steam generator fails, the dish washing machine of the present invention can provide general dish washing services.

It will be apparent to those skilled in the art that various modifications and variations can be made from the embodiments described herein without departing from the spirit or scope of the invention. Thus, it is intended that the claims appended hereto cover the modifications and variations.

What is claimed is:

1. A method for controlling a dish washing machine having a steam generator, comprising:

turning off a heater of the steam generator when a water level sensor for the steam generator indicates a minimum water level;

removing air bubbles around the water level sensor by supplying water to the steam generator for a predetermined first time period;

counting a number of repetitions of the water supplying step that occurred following the turning off of the heater if the water level sensor indicates the minimum water level after the execution of the water supplying step; and

repeating the water supplying step, based on the determined number of repetitions.

2. The method according to claim **1**, further comprising:

executing a waiting step for a second time period, following the water supplying step.

3. The method according to claim **1**, further comprising:

disabling operation of the steam generator, if the number of repetitions is greater than or equal to a predetermined value.

4. The method according to claim **3**, further comprising:

stopping a supply of water to the steam generator if the number of repetitions is greater than or equal to a predetermined value.

5. The method according to claim **1**, further comprising:

disabling operation of the steam generator if a total water supply time is greater than or equal to a third time period, wherein the total water supply time is the time which water is supplied to the steam generator following the turning off of the heater.

6. The method according to claim **1**, further comprising:

disabling operation of the steam generator when a third time period elapses after the supply of water to the steam generator begins, following the turning-off of the heater.

7. The method according to claim **1**, wherein, when the water level sensor indicates both the minimum water level and a maximum water level, it is determined that the minimum water level is maintained.

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