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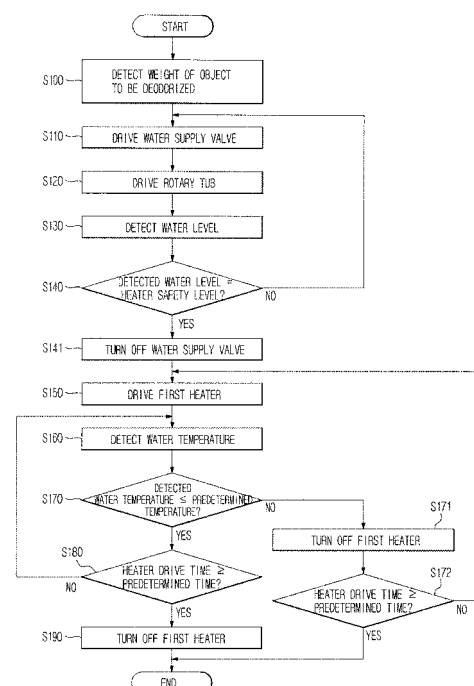
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(54) **Washing machine and control method thereof**

(57) Disclosed herein are a washing machine and a control method thereof that are capable of improving the deodorization efficiency without the provision of an additional unit. The washing machine includes a water supply unit (40), a rotary tub (30), a water tub (20), a first heater (15) mounted in the water tub to generate steam necessary to humidify an object to be deodorized, and a blowing unit (60) to suction air from the outside of the water tub and supply the suctioned air into the rotary tub. Consequently, it is possible to humidify the object using the first heater, located at the bottom of the water tub, whereby the manufacturing costs of the washing machine are reduced. Also, air, introduced from the outside of the water tub, is supplied to the object, whereby the deodorization efficiency is improved.

FIG. 4



Description

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] The present invention relates to a washing machine and a control method thereof, and, more particularly, to a washing machine and a control method thereof that are capable of removing a smell from an object to be deodorized.

2. Description of the Related Art

[0002] Generally, a washing machine (normally, a drum type washing machine) is a machine that washes laundry by lifting and dropping the laundry during the rotation of a cylindrical rotary tub. The drum type washing machine has advantages in that the damage to laundry and the water consumption are small, although the drum type washing machine has a long washing time, as compared with a conventional pulsator type washing machine, and therefore, the demand for the drum type washing machine has increased.

[0003] The washing machine performs a washing operation, including washing, rinsing, and spin-drying processes, through a water supply action to supply water for washing and rinsing into a water tub and a drainage action to drain water from the water tub after the washing and rinsing.

[0004] The conventional washing machine normally performs washing, rinsing, spin-drying, and drying functions; however, the washing machine does not include a deodorizing unit. For this reason, it is necessary for clothes to be rewashed if a smell has not been fully removed from the clothes. As a result, power and water consumption is excessively increased.

[0005] In order to solve the problem, Korean Patent Application Publication No. 10-2005-114106 discloses a washing machine and a deodorizing method thereof that is capable of removing a smell from laundry, without performing a washing operation, including washing, rinsing, and spin-drying processes, when the washing machine is used only for the purpose of deodorization.

[0006] The disclosed washing machine includes a rotary tub, in which an object to be deodorized is put, a duct communicating with the rotary tub to allow air, containing smell particles separated from the object in the rotary tub, to pass therethrough, and a deodorant spray unit to spray deodorant to remove the contaminated smell particles from the air passing through the duct. The deodorizing method of the washing machine includes putting an object to be deodorized in the rotary tub, separating smell particles from the object by rotating the rotary tub, supplying hot air to the object, or supplying a small amount of water to the object through a water supply unit, and circulating air in the rotary tub through the duct using a blowing fan such that the smell particles do not permeate

into the object.

[0007] At this time, a deodorant nozzle is operated to spray deodorant into the deodorizing duct. As a result, the smell particles in the air passing through the deodorizing duct dissolve in the deodorant, and therefore the smell particles are removed from the air. The air, from which the smell particles are removed, is resupplied into the rotary tub such that the air is used for a deodorizing process.

[0008] In the deodorizing method disclosed in the above publication, however, the smell particle separation efficiency is low when the smell particles are separated from the object. Especially, low-temperature misty water is directly supplied to the object using the water supply unit, with the result that it is difficult to maximize humidification, and the smell particle separation efficiency is lowered. Furthermore, it is necessary to install an additional mist spray unit to the water supply unit, and therefore, the manufacturing costs are increased.

[0009] In addition, air circulates through the rotary tub and the duct. Consequently, air containing smell particles is deodorized by the deodorant spray unit, and is then introduced into the rotary tub. However, the introduction of the smell particles completely removed by the deodorant spray unit into the rotary tub is not prevented, whereby the deodorization efficiency is lowered.

SUMMARY OF THE INVENTION

[0010] Therefore, it is an aspect of the invention to provide a washing machine and a control method thereof that are capable of improving the deodorization efficiency without the provision of an additional unit.

[0011] In accordance with one aspect, the present invention provides a washing machine including a water supply unit, a rotary tub, a water tub, a first heater mounted in the water tub to generate steam necessary to humidify an object to be deodorized, and a blowing unit to suction air from the outside of the water tub and supply the suctioned air into the rotary tub.

[0012] Preferably, the washing machine further includes a control unit to control the water supply unit, the rotary tub, and the first heater.

[0013] Preferably, the control unit rotates the rotary tub when the water supply unit is driven.

[0014] Preferably, the washing machine further includes an exhaust unit to exhaust air, containing smell particles separated from the object, to the outside.

[0015] Preferably, the water supply unit includes a water supply pipe and a water supply nozzle, the water supply nozzle being located adjacent to the first heater.

[0016] Preferably, the blowing unit includes a second heater to heat air.

[0017] Preferably, the control unit drives the first heater, and, after the lapse of a predetermined time, drives the blowing unit.

[0018] In accordance with another aspect, the present invention provides a control method of a washing ma-

chine, including a water tub and a rotary tub mounted in the water tub, to remove a smell from an object to be deodorized, the control method including humidifying the object by supplying steam to the object and deodorizing the humidified object by separating smell particles from the object.

[0019] Preferably, the humidifying the object includes supplying water into the water tub, and the supplying water into the water tub includes rotating the rotary tub to prevent the water from being supplied to the object in the rotary tub.

[0020] Preferably, the humidifying the object includes heating the water received in the water tub, and the object is humidified using steam generated by heating the water received in the water tub.

[0021] Preferably, the humidifying the object includes rotating the rotary tub to uniformly humidify the object.

[0022] Preferably, the deodorizing the humidified object includes draining water from the water tub.

[0023] Preferably, the deodorizing the humidified object includes supplying hot air to the object.

[0024] Preferably, the supplying hot air to the object includes rotating the rotary tub in alternating directions.

[0025] Preferably, the deodorizing the humidified object includes supplying air, introduced from the outside of the water tub, to the object.

[0026] Preferably, the deodorizing the humidified object includes draining the smell particles, separated from the object, to the outside.

[0027] Additional aspects and/or advantages of the invention will be set forth in part in the description which follows and, in part, will be obvious from the description, or may be learned by practice of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0028] These and/or other aspects and advantages of the invention will become apparent and more readily appreciated from the following description of the embodiments, taken in conjunction with the accompanying drawings, of which:

FIG. 1 is a sectional view schematically illustrating a washing machine according to a first embodiment of the present invention;

FIG. 2 is a sectional view illustrating a water tub and a rotary tub of the washing machine according to the first embodiment of the present invention;

FIG. 3 is a control block diagram of the washing machine according to the present invention;

FIG. 4 is a flow chart illustrating a humidification step performed by the washing machine according to the first embodiment of the present invention;

FIG. 5 is a flow chart illustrating a deodorization step performed by the washing machine according to the first embodiment of the present invention;

FIG. 6 is a sectional view schematically illustrating a washing machine according to a second embodi-

ment of the present invention; and

FIG. 7 is a flow chart illustrating a water supply step performed by the washing machine according to the second embodiment of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0029] Reference will now be made in detail to the embodiment of the present invention, examples of which are illustrated in the accompanying drawings, wherein like reference numerals refer to like elements throughout. The embodiment is described below to explain the present invention by referring to the figures.

[0030] FIG. 1 is a sectional view schematically illustrating a washing machine according to a first embodiment of the present invention, and FIG. 2 is a sectional view illustrating a water tub and a rotary tub of the washing machine according to the first embodiment of the present invention.

[0031] The washing machine according to the present invention is capable of performing washing, spin-drying, and rinsing operations as well as a deodorizing operation; however, only the deodorizing operation of the washing machine will be hereinafter described.

[0032] As shown in FIGS. 1 and 2, the washing machine includes a machine body 10 forming the external appearance of the washing machine, a drum type water tub 20 mounted in the machine body 10 to receive wash water, a rotary tub 30 rotatably mounted in the water tub 20 to receive an object to be deodorized, a first heater 15 mounted in the water tub 20 to humidify the object during a deodorizing operation, a blowing unit 60 to separate smell particles from the object, and an exhaust unit 50 to exhaust the smell particles separated from the object.

[0033] The fronts of the water tub 20 and the rotary tub 30 are open, such that an object to be deodorized is put in the rotary tub 30, and a deodorized object is taken out of the rotary tub 30. To the front of the machine body 10 is hingedly mounted a door 11 to open and close the open fronts of the water tub 20 and the rotary tub 30.

[0034] In the circumference of the rotary tub 30 are formed a plurality of through-holes 31. To the inner circumferential surface of the rotary tub 30 are mounted a plurality of lifters 32 to lift the object such that the lifters 32 are arranged at predetermined intervals. Consequently, when the rotary tub 30 is rotated, the lifters 32 lift the object to a predetermined height and drop the object such that a smell is smoothly separated from the object.

[0035] At the rear of the water tub 20 is mounted a drive unit, i.e., a drive motor 13, to rotate a rotary shaft 12 connected to the rotary tub 30. The drive motor 13 includes a stator 13a fixed to the rear of the water tub 20, a rotator 13b rotatably disposed around the stator 13a, and a rotary plate 13c connected between the rotator 13b and the rotary shaft 12.

[0036] Above the water tub 20 are mounted a deter-

gent supply unit 14 to supply detergent and a water supply unit 40 to supply wash water. Below the water tub 20 is mounted a drainage unit 50 to drain water from the water tub 20.

[0037] The detergent supply unit 14 is partitioned into several spaces. The detergent supply unit 14 is mounted at the upper part of the front of the machine body 10 such that a user easily puts detergent and softener in the respective spaces.

[0038] The water supply unit 40 includes a first water supply pipe 41 to supply water to the detergent supply unit 14, a water supply valve 42 mounted on the first water supply pipe 41 to open and close a flow channel of the first water supply pipe 41, thereby controlling the supply of water, a second water supply pipe 43 mounted between the detergent supply unit 14 and the water tub 20 to supply water, having passed through the detergent supply unit 14, to the water tub 20, and a water supply nozzle 44 mounted to one end of the second water supply pipe 43.

[0039] The water supply nozzle 44 fixedly extends through the outer circumference of the water tub 20 to supply water to a first heater 15, mounted at the bottom of the water tub, during a deodorizing operation.

[0040] At this time, the rotary tub 30 is rotated, as shown in FIG. 2, such that the water, introduced through the water supply nozzle 44, is not directly supplied to an object to be deodorized in the rotary tub 30. Specifically, when the water supply valve 42 is driven such that water is introduced through the water supply nozzle 44, a control unit 75, which will be described below, controls the drive motor 13 to rotate the rotary tub 30 such that a centrifugal force is generated by the rotation of the rotary tub 30. As a result, the water is not introduced into the rotary tub 30 but flows into a space defined between the inner surface of the water tub 20 and the outer surface of the rotary tub 30 and then to the first heater 15. Consequently, the direct supply of the water to the object in the rotary tub 30 is prevented.

[0041] As the object in the rotary tub 30 is prevented from directly absorbing the water as described above, the water supply level satisfies a heater safety level (a predetermined water level at which the first heater 15 is soaked; when the water supply level is the heater safety level, the first heater 15 is prevented from contacting air, whereby the damage to the first heater 15 due to the overheating of the first heater 15 is prevented), even when the amount of the water supplied is small. In addition, the nonuniform humidification of the object is prevented, and therefore, the smell separation efficiency is improved, and the deodorizing operation is prevented from being performed for a long period of time when the object is excessively wetted.

[0042] The drainage unit 50 includes a drainage pipe 51 having one end connected to a drainage port 21 formed at the bottom of the water tub and the other end extending outside, and a drainage valve 52 mounted on the drainage pipe 51 to open and closed the drainage

pipe 51. When the drainage valve 52 is opened, the water is naturally drained from the water tub 20. The drainage unit 50 may include a pump instead of the drainage valve.

[0043] The first heater 15, mounted at the bottom of the water tub 20, is constructed in a serpentine fashion to achieve the maximum heat emission efficiency in a predetermined space. At the bottom of the water tub 20 is formed a location part 22 bent downward such that the first heater 15 is located in the location part 22.

[0044] Consequently, the first heater 15 is located in the location part 22, preferably adjacent to the bottom of the location part 22, with the result that the supply of water to the heater safety level is possible even with a small amount of water, and therefore, steam is rapidly generated when the first heater 15 is driven.

[0045] The blowing unit 60 includes a blowing duct 63 having a suction port 64 to suction external air and a discharge port 65 to supply the suctioned air into the rotary tub 30, a blowing fan 61 mounted in the blowing duct 63 to generate a blowing force necessary to forcibly introduce air into the blowing duct 63, and a second heater 62 to heat the air introduced into the blowing duct 63 by the blowing fan 61.

[0046] Consequently, the blowing unit 60 suctions air from the outside of the water tub 20 through the suction port 64, heats the suctioned air, and supplies the heated air, i.e., hot air, to the object in the rotary tub 30 through the discharge port 65.

[0047] The blowing unit 60 may include only the blowing fan 61 such that smell particles are separated from the object using room-temperature air. According to the first embodiment of the present invention, however, the blowing unit 60 also includes the second heater 62, such that the second heater 62 is driven to generate hot air, and the blowing fan 61 is driven to supply the hot air to the object in the rotary tub 30, thereby more smoothly accomplishing the separation of smell particles from the object, and therefore, improving the deodorization efficiency.

[0048] Specifically, the hot air is applied to the object, which is humidified by the high-temperature steam such that smell particles can be easily separated from the object, to accelerate the activity of the smell particles such that the smell particles are separated from the object or the smell particles are chemically changed into another composition having no smell.

[0049] The exhaust unit 50 serves to exhaust the smell particles, separated from the object in the rotary tub 30 by the hot air supplied to the object from the blowing unit 60, to the outside. The exhaust unit 50 may be separately mounted in the washing machine; however, the drainage unit preferably functions as the exhaust unit as in the first embodiment of the present invention.

[0050] The drainage unit and the exhaust unit are the same component. Accordingly, the drainage unit and the exhaust unit will be indicated hereinafter by the same reference numeral, and the drainage unit and the exhaust unit will be selectively used if necessary.

[0051] The exhaust unit 50 serves to exhaust air, containing the smell particles separated from the object, to the outside. The water received in the water tub 20 is heated to increase the humidity in the water tub 20 such that the smell particles are easily separated from the object, and then hot air is supplied to the object. As a result, the smell particles are separated from the object.

[0052] The air, containing the smell particles separated from the object, is exhausted out of the washing machine through the drainage pipe 51, mounted below the water tub 20. Consequently, the air is prevented from being introduced into the rotary tub through duct, and therefore, the deodorization efficiency is improved.

[0053] FIG. 3 is a control block diagram of the washing machine according to the present invention. In addition to the components shown in FIG. 1, the washing machine further includes a signal input unit 71, a water level detection unit 72, a temperature detection unit 73, a weight detection unit 74, a control unit 75, and a drive unit 76.

[0054] The signal input unit 71 allows a user to input operation information, such as a deodorizing course selected depending upon a material of the object, to the control unit 75.

[0055] The water level detection unit 72 detects the water level of wash water supplied into the water tub 20, and the temperature detection unit 73 detects the temperature of wash water supplied into the water tub 20.

[0056] The weight detection unit 74 detects the weight of the object put in the rotary tub 30. The weight of the object may be detected using a current value sensed by torque generated during the rotation of the drive motor, a weight sensor, an optical sensor, or an infrared sensor.

[0057] The control unit 75 is a microprocessor to control the washing machine according to the operation information inputted from the signal input unit 71. At a water supply step, the control unit 75 controls the water supply valve 42 and the rotary tub 30 to be driven such that water supplied from the water supply nozzle 44 is not introduced into the rotary tub 30 but is supplied to the first heater 15 side at the bottom of the water tub 20.

[0058] Also, the control unit 75 detects the water supply level, and determines whether the detected water supply level is the heater safety level. When it is determined that the detected water supply level is the heater safety level, the control unit 75 ends the supply of water and drives the first heater 15 to heat water in the water tub 20 such that steam is generated.

[0059] Also, the control unit 75 detects the temperature of the water heated by the first heater 15, and determines whether the detected temperature of the water is less than a predetermined temperature (a temperature stored in the control unit 75 based on the kinds of objects to be deodorized). When it is determined that the detected temperature of the water is less than the predetermined temperature, the control unit 75 determines whether the drive time of the first heater 15 (time span from a point of time when the first heater 15 is initially driven) is greater than a predetermined time (time span until an appropriate hu-

midification amount based on the weight of an object to be deodorized is supplied to the object; data acquired through experiments is previously stored in the control unit 75; the appropriate humidification amount is approximately 2% to 5% of the weight of the object). When it is determined that the drive time of the first heater 15 is greater than the predetermined time, the control unit 75 controls the first heater 15 to be turned off and ends a humidification step.

[0060] After the object is appropriately humidified, at a deodorization step, the control unit 75 drives the drainage valve 52 to drain water from the water tub 20 and drives the blowing fan 61 and the second heater 62 to supply hot air to the object in the rotary tub 30. At this time, the drainage valve 52 remains open, and therefore, the hot air supplied into the rotary tub 30 is discharged to the outside, while the hot air contains smell particles, through the exhaust unit 50, whereby the deodorization efficiency is improved.

[0061] Also, the rotary tub 30 is rotated simultaneously with the supply of the hot air, and therefore, the smell separation efficiency is further improved.

[0062] The control unit 75 has a timer to count the drive time of the first heater 15. Also, data, such as a predetermined temperature (a temperature to heat the received water based on the kinds of objects to be deodorized) and a predetermined time (the drive time of the first heater 15 based on the amount of an object to be deodorized), is previously stored in the control unit in the form of a ROM table.

[0063] The drive unit 76 drives the water supply valve 42, the drainage valve 52, the drive motor 13, the first heater 15, and the blowing unit 60 according to the drive control signal of the control unit 75.

[0064] Hereinafter, the operation of the washing machine according to the present invention will be described.

[0065] FIG. 4 is a flow chart illustrating a humidification step performed by the washing machine according to the first embodiment of the present invention, and FIG. 5 is a flow chart illustrating a deodorization step performed by the washing machine according to the first embodiment of the present invention.

[0066] First, the humidification step will be described.

[0067] When a user puts an object to be deodorized in the rotary tub 30 and selects operation information, such as a deodorizing process, based on a material of the object, the operation information selected by the user is inputted to the control unit through the signal input unit 71. The control unit 75 sets a received water heating temperature to a predetermined time based on the material of the object selected by the user.

[0068] Also, the control unit 75 detects the weight of the object put in the rotary tub 30 through the weight detection unit 74 (S100) and compares the detected weight with stored data to set a drive time of the first heater 15 to a predetermined time.

[0069] Subsequently, the water supply valve 42 is driv-

en to supply water into the water tub 20 through the water supply nozzle 44 (S110). At this time, the control unit 75 drives the rotary tub 30 (S120) such that the water supplied into the water tub 20 is not introduced into the rotary tub 30 but flows into the space between the rotary tub 30 and the water tub 20 and is then supplied to the first heater 15 side at the bottom of the water tub 20, by a centrifugal force generated by the rotation of the rotary tub 30. At this time, the maximum level of the received water is controlled to be lower than the bottom height of the rotary tub 30 such that the water is not supplied to the object in the rotary tub 30.

[0070] Subsequently, the water level of the received water is detected (S130), it is determined whether the detected water level is the heater safety level (the water level at which the first heater is fully soaked in the water) (S140), and, when it is determined that the detected water level is the heater safety level, the water supply valve 42 is turned off to end a water supply step (S 141).

[0071] Subsequently, the first heater 15 is driven (S150) to heat the received water such that steam is generated. The object is humidified using the generated high-temperature steam. At this time, the rotary tub 30 remains driven to uniformly humidify the object.

[0072] Subsequently, the temperature of the heated water is detected (S160), and it is determined whether the detected temperature of the water is less than a predetermined temperature (S170). When it is determined that the detected temperature of the water is less than the predetermined temperature, it is determined whether the heater drive time is greater than a predetermined time (S180). When it is determined that the heater drive time is greater than the predetermined time, the first heater is turned off (S190) to end a humidification step.

[0073] When it is determined at Step S170 that the detected temperature of the water is greater than the predetermined temperature, the first heater 15 is turned off (S171), and it is determined whether the drive time of the first heater 15 is greater than the predetermined time (S172). When it is determined that the drive time of the first heater 15 is greater than the predetermined time, the humidification step is ended.

[0074] In this way, the temperature of the heated water and the drive time of the first heater 15 are changed depending upon the material and amount of the object, and therefore, it is possible to provide the humidification temperature and amount suitable for the object, thereby preventing the damage to the object and improving the deodorization efficiency.

[0075] After the humidification step is ended, the washing machine according to the present invention performs deodorization step. First, the drainage valve 52 is driven to drain the water in the water tub 20 to the outside (S200). Subsequently, the blowing unit 60 is driven to suction air from the outside of the water tub and heat the suctioned air such that hot air is supplied to the object in the rotary tub 30 (S210). The volume of the supplied hot air is decided by experiments. When the air volume is large, the

internal temperature is decreased, and the contact time between the object and the hot air is shortened. Consequently, the air volume is experimentally decided to improve the deodorization efficiency.

[0076] Although it is possible to separate smell particles from the object to some extent only with the supply of the hot air, according to this embodiment, the rotary tub 30 is driven (S220), such that the rotary tub 30 is rotated in alternating directions, simultaneously with the supply of the hot air, to further improve the smell particle separation efficiency due to the friction between the rotary tub 30 and the object, thereby improving the deodorization efficiency.

[0077] The air, containing the smell particles separated from the object, is drained to the outside through the drainage unit 50. As a result, the smell particles are completely separated from the object.

[0078] Hereinafter, a washing machine according to a second embodiment of the present invention will be described.

[0079] FIG. 6 is a sectional view schematically illustrating a washing machine according to a second embodiment of the present invention.

[0080] Components of the washing machine according to the second embodiment, which are identical to those of the washing machine according to the first embodiment, are denoted by the same reference numerals, and a description thereof will not be given.

[0081] As shown in FIG. 6, the washing machine according to the second embodiment includes the same components as the washing machine according to the first embodiment except for a water supply unit.

[0082] The water supply unit of the washing machine according to the second embodiment includes a first water supply pipe 81 to supply water to the detergent supply unit 14, a second water supply pipe 83 connected between the detergent supply unit 14 and the water tub 20 to supply the water, having passed through the detergent supply unit 14, to the water tub 20, a first water supply nozzle 84 mounted to one end of the second water supply pipe 83, a third water supply pipe 85 extending to directly supply water to the first heater 15 side at the bottom of the water tub 20, a second water supply nozzle 86 mounted at one end of the third water supply pipe 85, and a water supply valve 82 to open and close a flow channel of the first water supply pipe 81 and the third water supply pipe 85, thereby controlling the supply of water.

[0083] The second water supply nozzle 86 fixedly extends through the lower part of the rear of the water tub 20 to directly supply water to the bottom of the water tub through the second water supply nozzle 86, during a deodorizing operation, thereby preventing the supply of water to the object in the rotary tub 30 without the driving of the rotary tub 30.

[0084] The water supply valve 82 is preferably an electric-powered three way valve to close both the first and third water supply pipes 81 and 85 or selectively close the first water supply pipe 81 or the third water supply

pipe 85.

[0085] Hereinafter, the operation of the washing machine according to the second embodiment will be described.

[0086] FIG. 7 is a flow chart illustrating a water supply step performed by the washing machine according to the second embodiment of the present invention.

[0087] The control method of the washing machine according to the second embodiment is identical to that of the washing machine according to the first embodiment except for the water supply step. Accordingly, only the water supply step performed by the washing machine according to the second embodiment will be described below.

[0088] First, when an object to be deodorized is put in the rotary tub 30, the weight of the object is detected, and the supply of water is initiated. The control unit 75 controls the water supply unit 80 to be operated such that the third water supply pipe 85 is opened by the water supply valve 82 (S300). As a result, water is directly supplied to the first heater 15 side at the bottom of the water tub 20 through the third water supply pipe 85. At this time, the supply of water to the object in the rotary tub is prevented without the driving of the rotary tub 30, unlike the first embodiment.

[0089] Subsequently, the water level of the received water is detected (S310), it is determined whether the detected water level is the heater safety level (the water level at which the first heater is fully soaked in the water) (S320), and, when it is determined that the detected water level is the heater safety level, the water supply unit 80 is turned off (S330) to end the water supply step.

[0090] The subsequent control method of this embodiment is identical to that of the previous first embodiment, and a description thereof will not be given.

[0091] As apparent from the above description, the washing machine according to the present invention and the control method thereof are capable of humidifying an object to be deodorized using the first heater mounted at the bottom of the water tub without the provision of an additional unit. Consequently, the manufacturing costs of the washing machine are reduced. Also, the object is humidified using high-temperature steam. Consequently, the deodorization efficiency is improved.

[0092] Furthermore, the washing machine according to the present invention is capable of heating air introduced from the outside of the water tub, supplying hot air to the object, and draining smell particles, separated from the object, to the outside of the machine body through the drainage unit. Consequently, the deodorization efficiency is improved.

[0093] Although a few embodiments of the present invention have been shown and described, it would be appreciated by those skilled in the art that changes may be made in this embodiment without departing from the principles and spirit of the invention, the scope of which is defined in the claims and their equivalents.

Claims

1. A washing machine comprising:

a water supply unit;
a rotary tub;
a water tub;
a first heater mounted in the water tub to generate steam necessary to humidify an object to be deodorized; and
a blowing unit to suction air from the outside of the water tub and supply the suctioned air into the rotary tub.

2. The washing machine according to claim 1, further comprising:

a control unit to control the water supply unit, the rotary tub, and the first heater.

3. The washing machine according to claim 2, wherein the control unit rotates the rotary tub when the water supply unit is driven.

4. The washing machine according to claim 1, further comprising:

an exhaust unit to exhaust air, containing smell particles separated from the object, to the outside.

5. The washing machine according to claim 1, wherein the water supply unit includes a water supply pipe and a water supply nozzle, the water supply nozzle being located adjacent to the first heater.

6. The washing machine according to claim 1, wherein the blowing unit includes a second heater to heat air.

7. The washing machine according to claim 2, wherein the control unit drives the first heater, and, after the lapse of a predetermined time, drives the blowing unit.

8. A control method of a washing machine, including a water tub and a rotary tub mounted in the water tub, to remove a smell from an object to be deodorized, the control method comprising:

humidifying the object by supplying steam to the object; and
deodorizing the humidified object by separating smell particles from the object.

9. The control method according to claim 8, wherein the humidifying the object includes supplying water into the water tub, and the supplying water into the water tub includes rotating the rotary tub to prevent

the water from being supplied to the object in the rotary tub.

10. The control method according to claim 8, wherein the humidifying the object includes heating the water received in the water tub, and the object is humidified using steam generated by heating the water received in the water tub. 5
11. The control method according to claim 8, wherein the humidifying the object includes rotating the rotary tub to uniformly humidify the object. 10
12. The control method according to claim 8, wherein the deodorizing the humidified object includes draining water from the water tub. 15
13. The control method according to claim 8, wherein the deodorizing the humidified object includes supplying hot air to the object. 20
14. The control method according to claim 13, wherein the supplying hot air to the object includes rotating the rotary tub in alternating directions. 25
15. The control method according to claim 13, wherein the deodorizing the humidified object includes supplying air, introduced from the outside of the water tub, to the object. 30
16. The control method according to claim 8, wherein the deodorizing the humidified object includes draining the smell particles, separated from the object, to the outside. 35

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FIG. 1

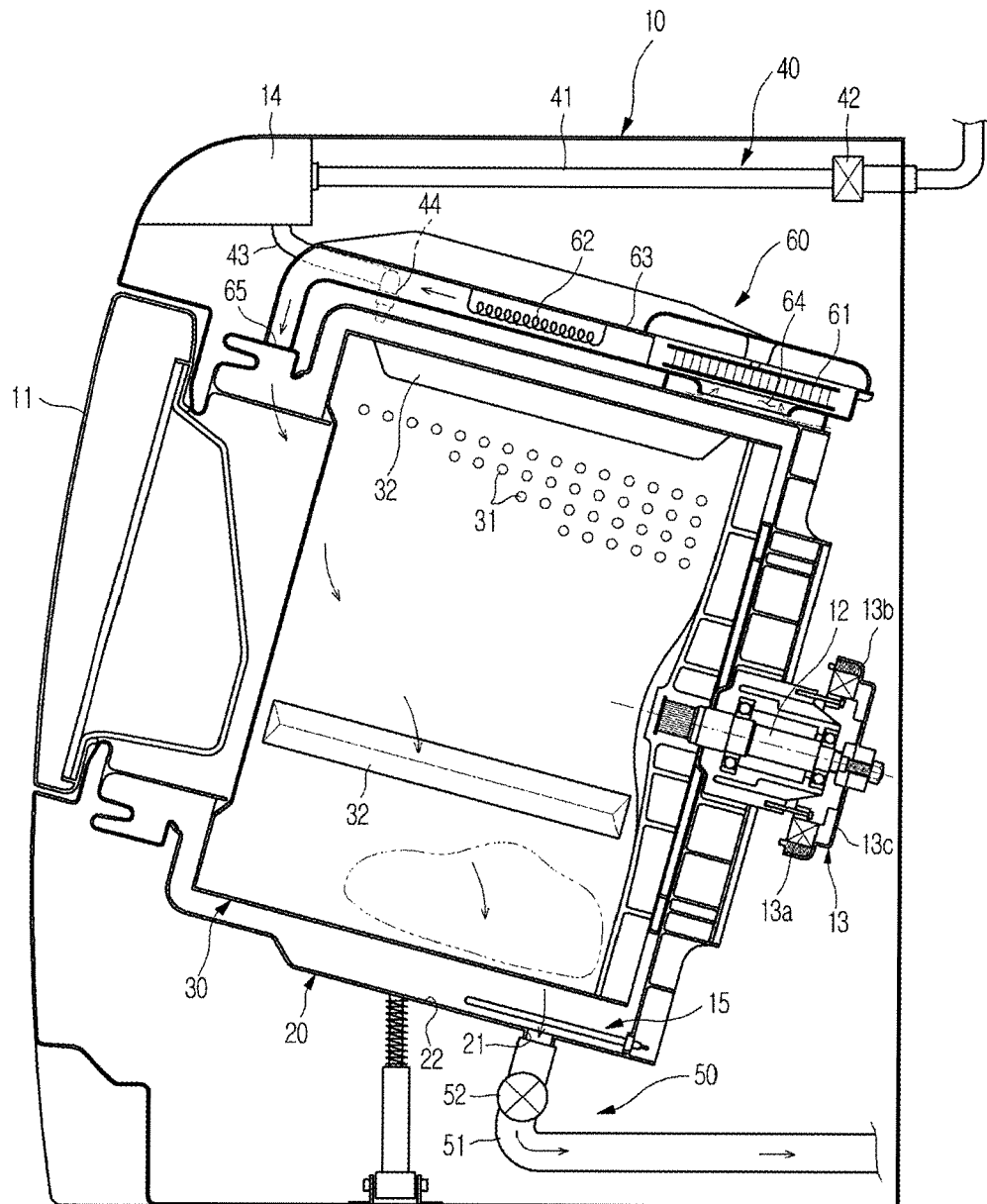


FIG. 2

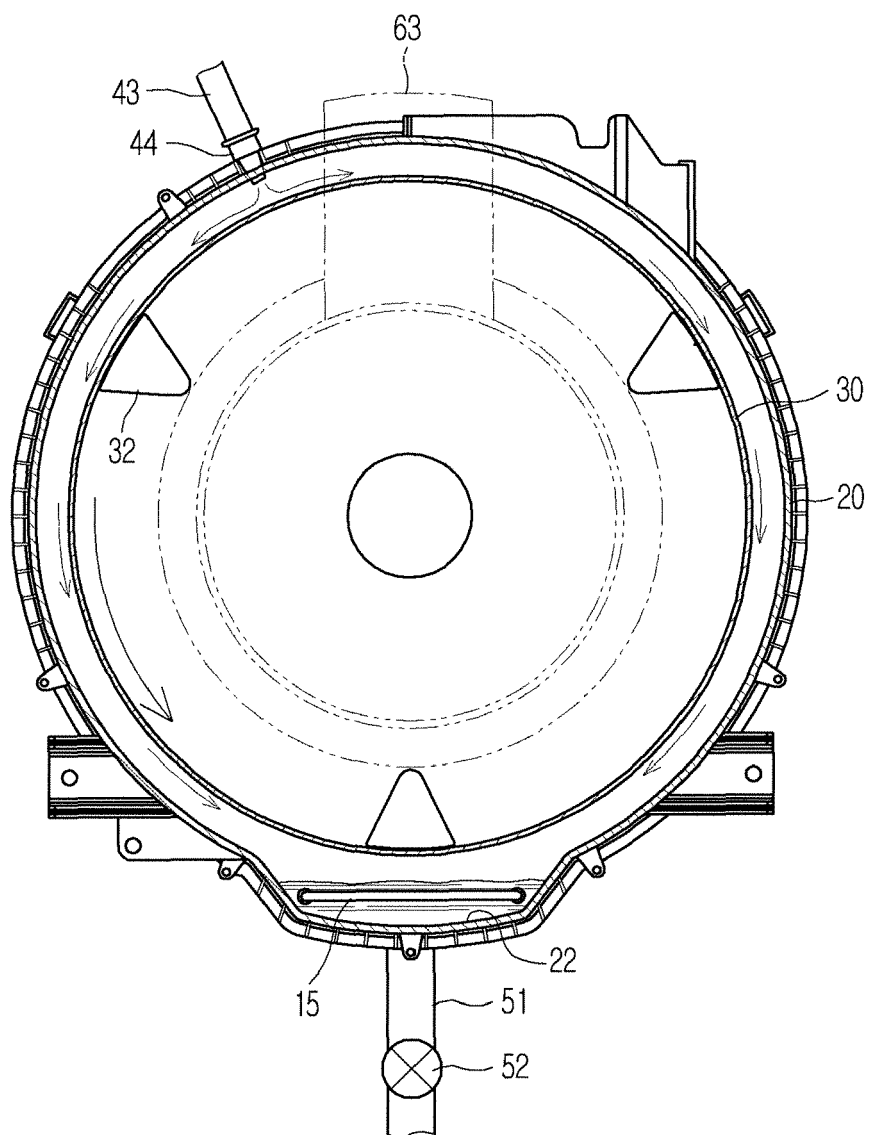


FIG. 3

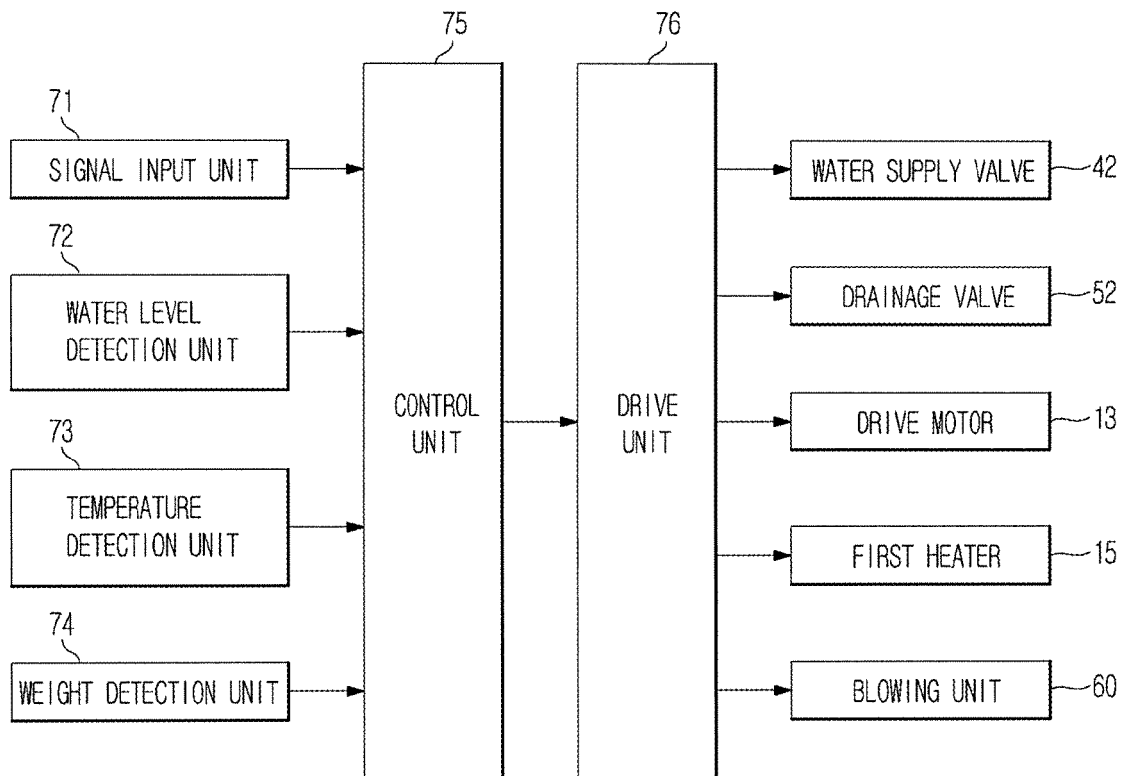


FIG. 4

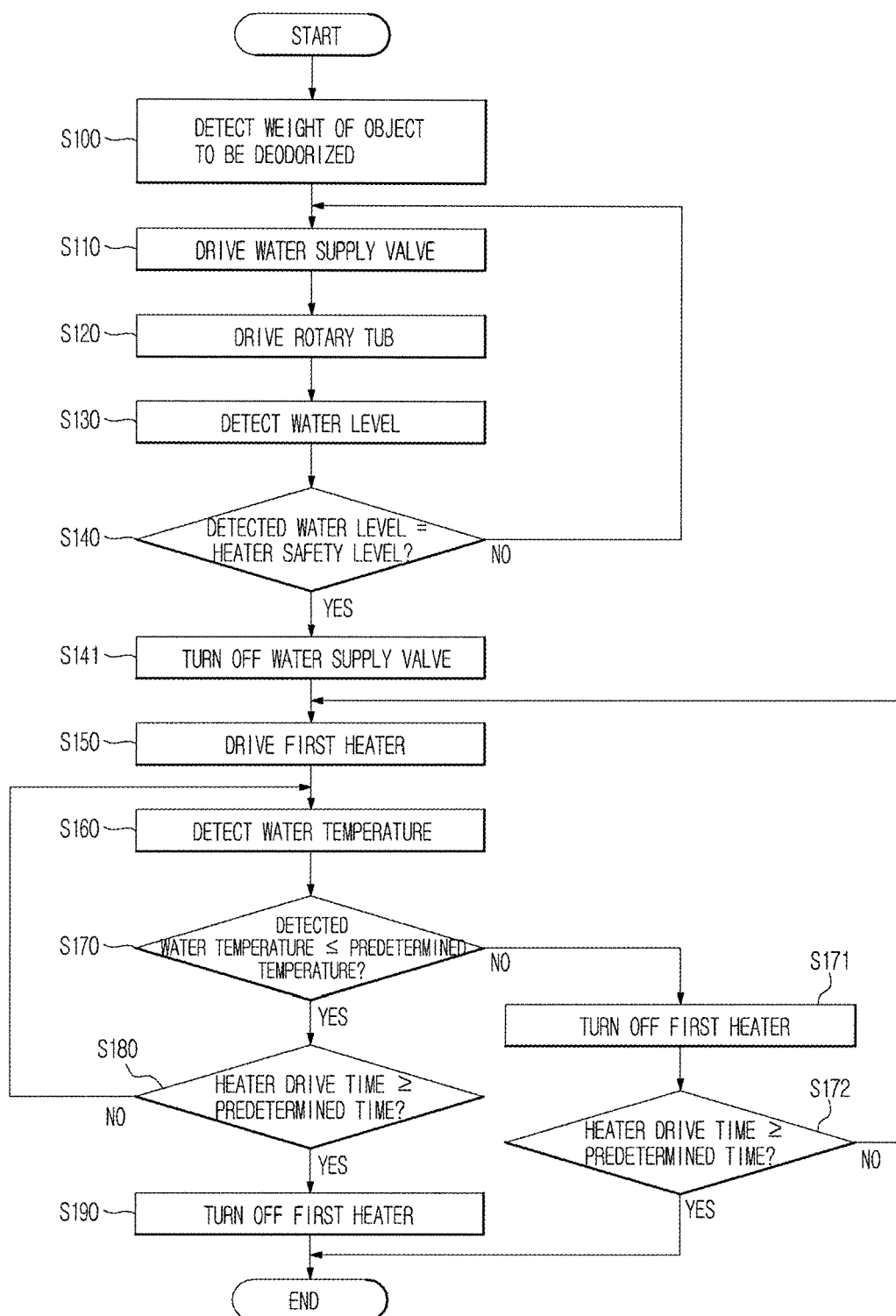


FIG. 5

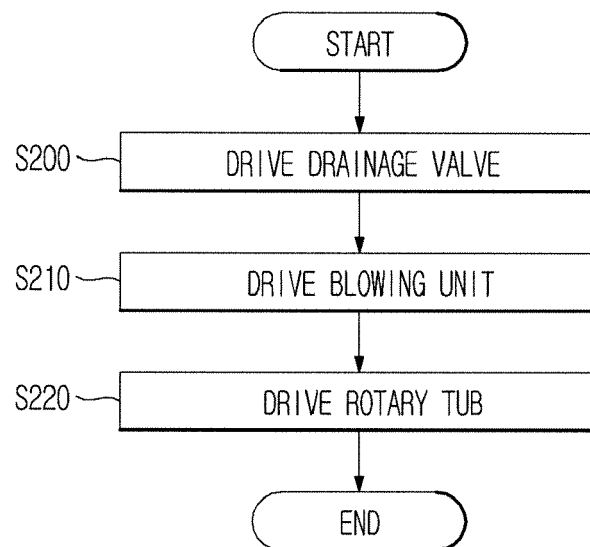


FIG. 6

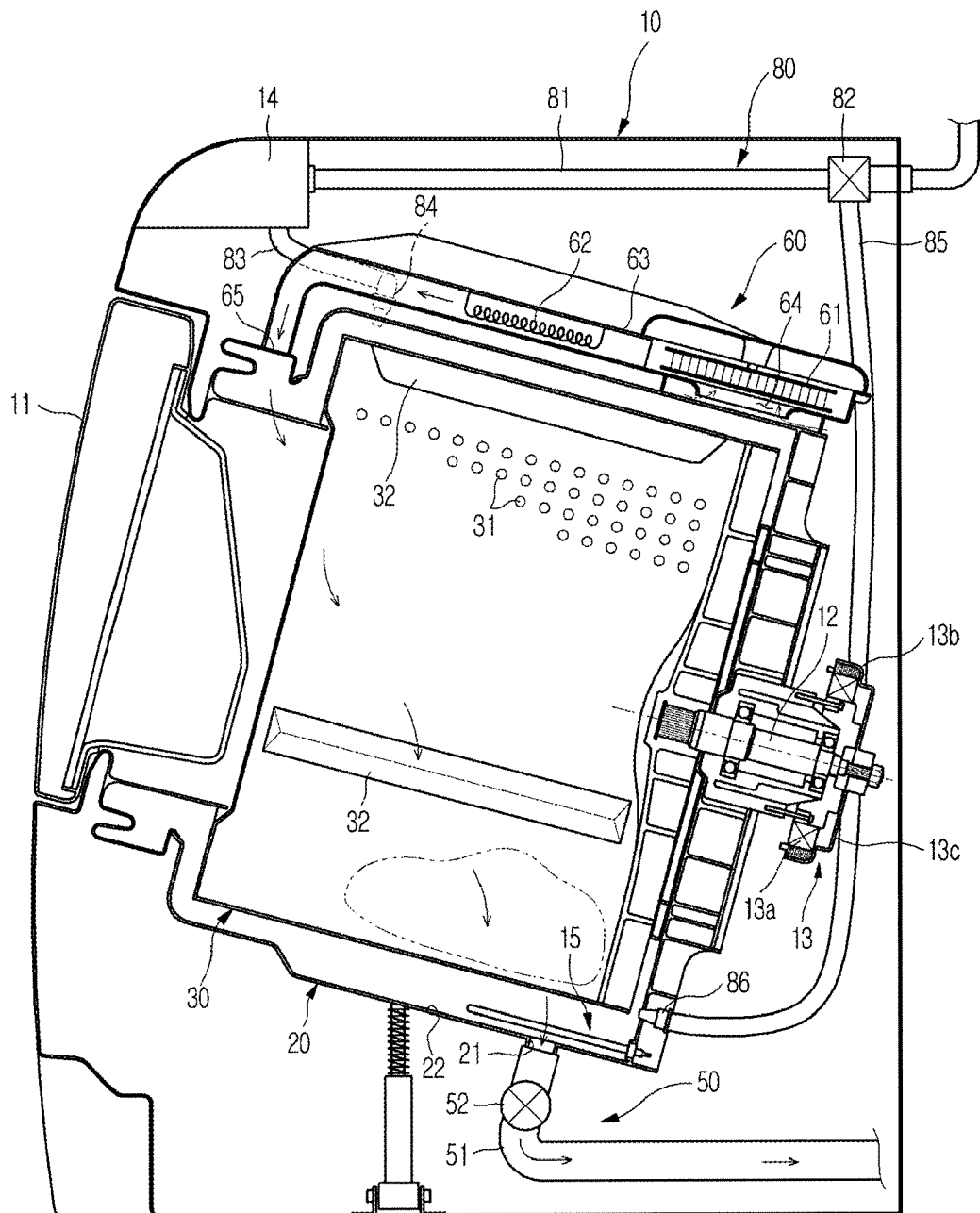
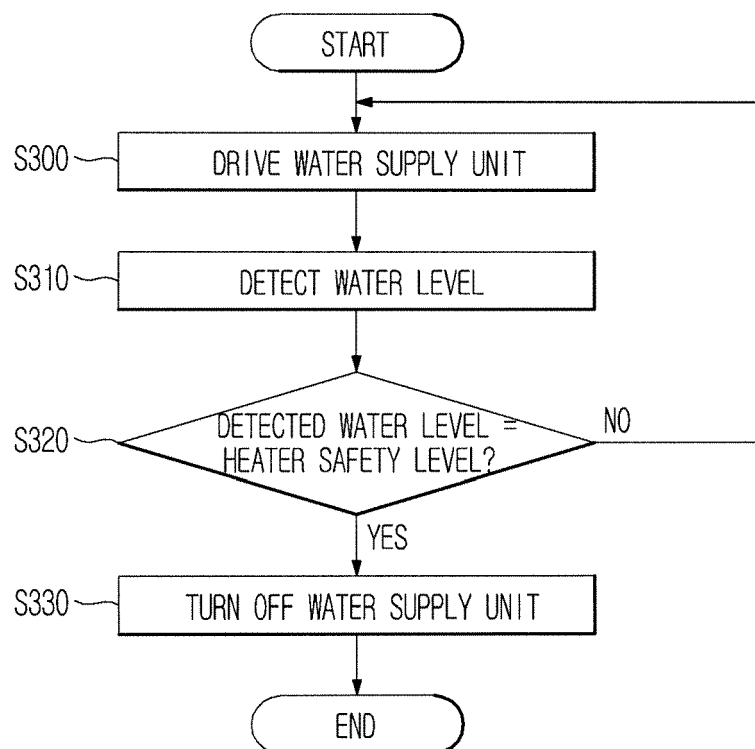


FIG. 7



REFERENCES CITED IN THE DESCRIPTION

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