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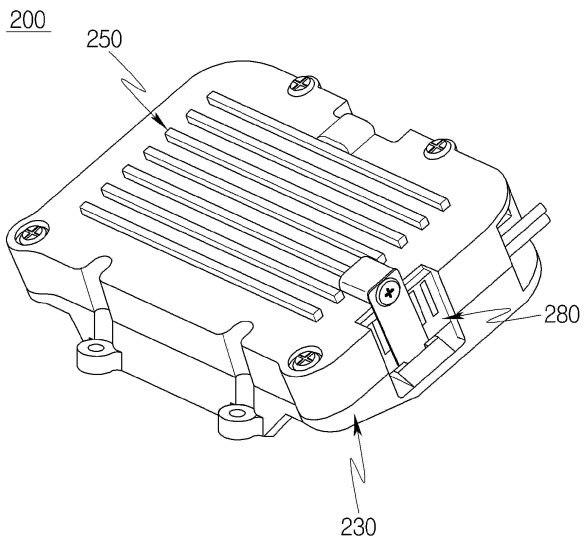
(54) CLEANER AND METHOD FOR CONTROLLING CLEANER

(57) The present disclosure relates to a wet mop rag module for a cleaner, the wet mop rag module including a module housing, a water tank configured to store water therein, at least one rotary cleaning unit to which a mop rag is coupled, and a steam generator configured to heat water supplied from the water tank, in which the steam generator includes a heating chamber having a flow path in which moisture flows, a heater configured to supply heat to the heating chamber, and an overheating shut-off device configured to cut off a supply of power to the heater when a temperature of the heating chamber is equal to or higher than a predetermined reference temperature, thereby preventing the heating chamber from being overheated.

[FIG. 11]



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Description

[Technical Field]

[0001] The present disclosure relates to a cleaner and a method of controlling cleaner, and more particularly, to a cleaner including a wet mop rag module configured to discharge water to a mop rag and suck or wipe away dust or debris in a cleaning target region, and a method of controlling the cleaner.

[Background Art]

[0002] A cleaner refers to a device that cleans a target cleaning region by sucking dust or debris or wiping the target cleaning region.

[0003] The cleaners may be classified into a manual cleaner which is moved directly by a user to perform a cleaning operation, and an automatic cleaner which performs a cleaning operation while autonomously traveling.

[0004] Further, depending on the shape of the cleaner, the manual cleaners may be classified into a canister cleaner, an upright cleaner, a handy cleaner, a stick cleaner, and the like.

[0005] Methods of cleaning floors are broadly classified into a dry-cleaning method and a wet-cleaning method. The dry-cleaning method refers to a method of wiping up or sucking dust, and a vacuum cleaner in the related art uses the dry-cleaning method. The wet-cleaning method refers to a method of performing a cleaning operation by wiping up the dust with a wet mop rag.

[0006] In the related art, a dry-cleaning dedicated cleaner is used to perform the dry-cleaning method, and a wet-cleaning dedicated cleaner is used to perform the wet-cleaning method. However, a user is inconvenienced because the user needs to purchase the two types of cleaners to clean various types of floors. To solve the above-mentioned problem, research has been conducted on a cleaner including a single main body, a dry-cleaning module, and a wet-cleaning module and configured such that the dry-cleaning module is mounted on the main body to perform the dry-cleaning method and the wet-cleaning module (wet mop rag module) is mounted on the main body to perform the wet-cleaning method.

[0007] However, in case that debris adheres to the floor during the wet cleaning, the debris may still remain on the floor even though the mop rag, which absorbs water, wipes the floor while rotating.

[0008] In addition, in a case in which microorganisms and the like proliferate on the floor, there is a limitation in perfectly eliminating the microorganisms even though the cleaner wipes the floor by rotating the mop rag with absorbed water.

[0009] In order to cope with the limitation, a method of heating water by using a heater and supplying high-temperature water or steam to the mop rag.

[0010] In this case, a steam wet mop rag module includes a water container configured to store water, a heater configured to produce steam by heating water, and a mop rag configured to receive water or steam and wipe the floor. In this case, the respective components may be configured into a single assembly so that the respective components may be easily replaced. For example, in case that the water container or the heater is disposed in the main body, the water container or the heater is an unnecessary component during the dry cleaning. For this reason, a weight of the water container or the heater makes it difficult for the user to conveniently clean the floor. Therefore, the water container or the heater may be disposed in the steam wet mop rag module instead of the main body of the cleaner for ease of cleaning, ease of replacement of the module, and spatial utilization.

[0011] U.S. Patent No. US9420933B2 (August 23, 2016) discloses a heater used for a steam wet mop rag cleaner.

[0012] The steam wet mop rag cleaner is configured to receive water from a water tank, produce steam by using a steam generator, and supply the steam to a cleaning pad.

[0013] In this case, the steam generator heats water by using a heater in a state in which the steam generator stores the water, and the steam generator discharges the steam, which is heated and flows upward, to the cleaning pad through a discharge port provided at an upper side of the steam generator.

[0014] In addition, Korean Patent No. KR1609444B1 (March 30, 2016) discloses a wet cleaner equipped with a steam generation means.

[0015] The wet cleaner is configured such that both a water supply port and a steam discharge port are disposed at an upper side of the steam generation means, and the water supply port and the steam discharge port are connected by means of a U-shaped tube.

[0016] As described above, in the steam generator in the related art, the discharge port for discharging the steam is generally disposed at the upper side of the steam generator.

[0017] However, even though the steam is intended to be supplied to the mop rag, the steam heated by the heater flows upward because the steam has a relatively lower density than water, and there may occur a limitation in that water, instead of steam, is mainly supplied to the mop rag disposed below the heater.

[0018] In addition, in case that the heater sways while the wet mop rag module moves along a floor surface, there may occur a limitation in that the water flowing in the heater is discharged to the mop rag without being sufficiently heated.

[Disclosure]

[Technical Problem]

[0019] The present disclosure has been made in an effort to solve the above-mentioned problem with the wet

mop rag module of the cleaner in the related art, and an object of the present disclosure is to provide a wet mop rag module for a cleaner, which is capable of improving a sterilization effect and an effect of removing debris by supplying high-temperature water or steam to a mop rag.

[0020] The present disclosure has also been made in an effort to provide a wet mop rag module for a cleaner, which is capable of heating water to a target temperature while the water introduced into a steam generator flows.

[0021] The present disclosure has also been made in an effort to provide a wet mop rag module for a cleaner, which is capable of preventing a steam generator from being overheated.

[0022] The present disclosure has also been made in an effort to provide a wet mop rag module for a cleaner, which is capable of maintaining a rotation of a wet mop rag while cutting off a supply of power to a steam generator.

[0023] The present disclosure has also been made in an effort to provide a wet mop rag module for a cleaner, which is capable of adjusting a temperature and phase of moisture to be selectively supplied to a mop rag.

[Technical Solution]

[0024] In order to achieve the above-mentioned objects, a wet mop rag module for a cleaner, which cleans a floor surface by wiping away debris, may include: a module housing; a water tank coupled to the module housing and configured to store water therein; at least one rotary cleaning unit disposed at a lower side of the module housing and configured such that a mop rag is coupled to the rotary cleaning unit; and a steam generator configured to heat water supplied from the water tank.

[0025] In this case, the steam generator may include: a heating chamber having a flow path in which moisture flows; a heater disposed at a lower side of the heating chamber and configured to supply heat to the heating chamber; and an overheating shut-off device disposed at one side of the heating chamber and configured to cut off a supply of power to the heater when a temperature of the heating chamber is equal to or higher than a predetermined reference temperature.

[0026] The steam generator may further include a temperature detector disposed on a lateral surface of the heating chamber and configured to measure the temperature of the heating chamber.

[0027] The steam generator may further include: a lower cover disposed at a lower side of the heater and configured to cover the heater; and a lower insulator disposed between the heater and the lower cover and configured to block heat transferred from the heater.

[0028] The steam generator may further include: a sealer disposed at an upper side of the heating chamber and configured to seal the upper side of the heating chamber; an upper insulator disposed at an upper side of the sealer and configured to block heat transferred from the heating chamber; and an upper cover disposed at an upper side of the upper insulator.

[0029] The heater may be provided as two or more heaters symmetrically disposed based on an imaginary symmetric surface, and the overheating shut-off device may be disposed on the symmetric surface.

[0030] The wet mop rag module may further include: a module battery configured to supply power to the heater, in which the overheating shut-off device cuts off a supply of power from the module battery to the heater when the temperature of the heating chamber is equal to or higher than the reference temperature.

[0031] In order to achieve the above-mentioned objects, a cleaner may further include a cleaner main body including a main battery, in which when the temperature of the heating chamber is equal to or higher than the reference temperature, the drive motor may receive power, and a supply of power to the heater may be cut off.

[0032] In this case, the cleaner may further include: a module battery configured to supply power to the steam generator, in which the main battery supplies power to the drive motor, and the module battery supplies power to the heater.

[0033] In addition, the overheating shut-off device may cut off a supply of power from the module battery to the heater when the temperature of the heating chamber is equal to or higher than the reference temperature.

[Advantageous Effects]

[0034] As described above, according to the wet mop rag module of the cleaner according to the present disclosure, it is possible to improve the sterilization and debris removing effects by supplying high-temperature water or steam to the mop rag by means of the heater.

[0035] In addition, the flow guide wall and the flow delay protrusion are formed in the heating chamber, such that the water introduced into the steam generator may be heated to the target temperature while the water flows.

[0036] In addition, it is possible to provide the wet mop rag module of cleaner in which the temperature may be measured by the temperature detector, and the heater may be controlled to selectively adjust the temperature and phase of the moisture to be supplied to the mop rag.

[0037] In addition, the overheating shut-off device may be disposed on the lateral surface of the heating chamber, and the overheating shut-off device may cut off the supply of power to the heater when the steam generator is overheated, thereby preventing the heating chamber from being overheated.

[0038] In addition, the module battery may be further provided separately from the main battery provided in the cleaner main body, the power of the main battery is supplied to the drive motor, and the power of the module battery is supplied to the heater, such that when the steam generator is overheated, the supply of power to the heater is cut off, but the supply of power to the main battery is maintained, and thus the rotation of the wet mop rag may be maintained.

[Description of Drawings]

[0039]

FIG. 1 is a perspective view illustrating a cleaner according to an embodiment of the present disclosure.
FIG. 2 is a coupled perspective view for explaining a wet mop rag module for a cleaner according to an embodiment of the present disclosure.
FIG. 3 is an exploded perspective view of FIG. 2.
FIG. 4 is a perspective view illustrating a state in which an upper housing is excluded from the wet mop rag module according to the embodiment of the present disclosure.
FIG. 5 is a bottom plan view of FIG. 4.
FIG. 6 is a top plan view of FIG. 4.
FIG. 7 is a rear view illustrating a rear side of the wet mop rag module according to the embodiment of the present disclosure.
FIG. 8 is a cross-sectional view of the wet mop rag module according to the embodiment of the present disclosure.
FIG. 9 is a perspective view for explaining a steam generator of the wet mop rag module according to the embodiment of the present disclosure.
FIG. 10 is an exploded perspective view for explaining the steam generator of the wet mop rag module according to the embodiment of the present disclosure.
FIG. 11 is a coupled perspective view of FIG. 10.
FIG. 12 is a top plan view for explaining a heating chamber of the steam generator of the wet mop rag module according to the embodiment of the present disclosure.
FIG. 13 is a side view illustrating a state in which an upper cover is excluded from the steam generator according to the embodiment of the present disclosure.
FIG. 14 is a cross-sectional view of the steam generator according to the embodiment of the present disclosure.
FIG. 15 is a block diagram for explaining a configuration for controlling the wet mop rag module according to the embodiment of the present disclosure.
FIG. 16 is a flowchart for explaining a method of preventing the wet mop rag module according to the embodiment of the present disclosure from being overheated.

[Mode for Invention]

[0040] Hereinafter, exemplary embodiments of the present disclosure will be described in detail with reference to the accompanying drawings.

[0041] The present disclosure may be variously modified and may have various embodiments, and particular embodiments illustrated in the drawings will be specifically described below. The description of the embodiments is not intended to limit the present disclosure to the particular embodiments, but it should be interpreted that the present disclosure is to cover all modifications, equivalents and alternatives falling within the spirit and technical scope of the present disclosure.

[0042] FIG. 1 is a perspective view of a cleaner according to an embodiment of the present disclosure, FIGS. 2 and 3 are a coupled perspective view and an exploded perspective view for explaining a wet mop rag module according to the embodiment of the present disclosure, FIGS. 4 to 6 are views illustrating a state in which an upper housing is excluded from the wet mop rag module according to the embodiment of the present disclosure, FIG. 7 is a rear view illustrating a rear side of the wet mop rag module according to the embodiment of the present disclosure, and FIG. 8 is a cross-sectional view of the wet mop rag module according to the embodiment of the present disclosure.

[0043] The term "floor surface" used in the present specification may mean not only a floor surface of a room such as a living room but also a cleaning surface such as a carpet.

[0044] With reference to FIGS. 1 to 8, a cleaner 1 according to an embodiment of the present disclosure may include a cleaner main body 400 equipped with a suction motor configured to generate a suction force, a wet mop rag module 100 connected to the cleaner main body 400 and configured to clean the floor surface by wiping the floor surface while sucking air and debris on the floor surface, and an extension tube 300 configured to connect the cleaner main body 400 and the wet mop rag module 100.

[0045] The wet mop rag module 100 according to the embodiment of the present disclosure may include a module housing 110, and a connection tube 180 connected to the module housing 110 and configured to be movable.

[0046] For example, the wet mop rag module 100 according to the present embodiment may be used by being connected to a handy cleaner or a canister cleaner.

[0047] That is, the wet mop rag module 100 may be detachably connected to the cleaner main body 400 or the extension tube 300. When the wet mop rag module 100 is connected to the cleaner main body 400 or the extension tube 300, a user may clean the floor surface by using the wet mop rag module 100. In this case, the cleaner main body 400 connected to the wet mop rag module 100 may separate dust in air by means of a multi-cyclone method.

[0048] The wet mop rag module 100 may be operated by power supplied from the cleaner main body 400. Specifically, the wet mop rag module 100 may be operated by power received from a main battery 410 provided in the cleaner main body 400.

[0049] Because the cleaner main body 400 connected to the wet mop rag module 100 includes the suction motor (not illustrated), a suction force generated by the suction

motor (not illustrated) may be applied to the wet mop rag module 100.

[0050] Therefore, in the present embodiment, the wet mop rag module 100 may serve to suck debris and air on the floor surface and guide the debris and air to the cleaner main body 400.

[0051] The connection tube 180 may be connected to a central portion of a rear side of the module housing 110 and guide the introduced air to the cleaner 1. However, the present disclosure is not limited thereto.

[0052] The directions according to the present embodiment will be defined to assist in understanding the present disclosure. A portion of the wet mop rag module 100, which is connected to the connection tube 180, may be defined as a rear portion (rear side) of the wet mop rag module 100, and a portion of the wet mop rag module 100, which is opposite to the portion of the wet mop rag module 100 connected to the connection tube 180, may be defined as a front portion (front side) of the wet mop rag module 100. Further, a direction in which the front and rear sides are connected may be referred to as a forward/rearward direction.

[0053] In addition, based on a state in which an intake port 113a is viewed from the connection tube 180, a left side of a flow path forming part 113 may be defined as a left side of the wet mop rag module 100, and a right side of the flow path forming part 113 may be defined as a right side of the wet mop rag module 100. Further, a direction in which the left and right sides are connected may be referred to as a leftward/rightward direction. The leftward/rightward direction may mean a direction perpendicular to the forward/rearward direction on a horizontal plane.

[0054] In addition, based on a state in which the wet mop rag module 100 is placed on the floor surface, i.e., a state in which mop rags 150 are placed on the floor surface and may wipe the floor surface, a direction toward the floor surface may be defined as a lower or downward side, and a direction away from the floor surface may be defined as an upper or upward side.

[0055] The wet mop rag module 100 may further include rotary cleaning units 140 rotatably provided at a lower side of the module housing 110. For example, the rotary cleaning unit 140 may be a rotary plate formed in a circular plate shape.

[0056] For example, a pair of rotary cleaning units 140 may be arranged in the leftward/rightward direction. In this case, the pair of rotary cleaning units 140 may be independently rotated. For example, the rotary cleaning units 140 may include a first rotary cleaning unit 141 and a second rotary cleaning unit 142.

[0057] The rotary cleaning units 140 may be coupled to the mop rags 150. For example, the mop rag 150 may be formed in a circular plate shape. The mop rags 150 may include a first mop rag 151 and a second mop rag 152.

[0058] The mop rag 150 is brought into contact with the floor surface by a load of the wet mop rag module 100 in the state in which the mop rag 150 is placed on the floor surface, such that a frictional force between the mop rag 150 and the floor surface increases.

[0059] The module housing 110 may define an external shape of the wet mop rag module 100 and have the intake port 113a through which air is introduced. For example, the intake port 113a may be formed at a front end of the lower side of the module housing 110. The intake port 113a may extend from the module housing 110 in the leftward/rightward direction.

[0060] The module housing 110 may include a lower housing 111 and an upper housing 112 coupled to an upper side of the lower housing 111.

[0061] The rotary cleaning units 140 are mounted on the lower housing 111, and the lower housing 111 may define an external shape of the wet mop rag module 100.

[0062] The lower housing 111 may include a bottom surface 111a to which the rotary cleaning unit 140 is coupled. In this case, in the state in which the wet mop rag module 100 is placed on the floor surface, a lower surface of the bottom surface 11 1a is disposed to face the floor surface. A moisture supply unit 130, a steam generator 200, and drive motors 170 may be provided on an upper surface of the bottom surface 111a.

[0063] The intake port 113a may be formed in the lower housing 111. Specifically, the intake port 113a may be formed in the bottom surface 111a of the lower housing 111. The intake port 113a means a space into which air containing dust may be introduced. With this configuration, when the suction motor (not illustrated) of the cleaner main body 400 operates, dust and air existing around the floor surface may be sucked into a flow path of the wet mop rag module 100 through the intake port 113a.

[0064] The lower housing 111 may be equipped with a board installation part on which a printed circuit board 190 configured to control the drive motors 170 is installed. For example, the board installation part may be provided in the form of a hook extending upward from the lower housing 111.

[0065] The board installation part may be disposed on the lower housing 111 and positioned at one side of the flow path forming part 113. However, the present disclosure is not limited thereto. For example, the printed circuit board 190 may be disposed at a position adjacent to first and second operating parts 191 and 192. Therefore, a switch installed on the printed circuit board 190 may detect operations of the first and second operating parts 191 and 192.

[0066] Nozzle holes (not illustrated) may be formed in the lower housing 111, and diffusers 137 may penetrate the nozzle holes. Water or steam (moisture vapor) having passed through the steam generator 200 and the diffusers 137 may be supplied to the mop rags 150 through the nozzle holes (not illustrated).

[0067] Meanwhile, the lower housing 111 may be equipped with a light-emitting module 160. Specifically, the light-emitting module 160 may be provided on a front surface of the lower housing 111.

[0068] The upper housing 112 may cover an upper side of the lower housing 111 and define an external shape of the wet mop rag module 100 according to the present disclosure.

[0069] In addition, the module housing 110 may further include the flow path forming part 113 configured to define a flow path that communicates with the intake port 113a and guides the air introduced from the intake port 113a to the cleaner main body 400.

[0070] The flow path forming part 113 may be coupled to a central portion of the upper side of the lower housing 111, and an end of the flow path forming part 113 may be connected to the connection tube 180.

[0071] Therefore, the intake port 113a may extend in the forward/rearward direction approximately rectilinearly as the flow path forming part 113 is arranged. Therefore, a length of the intake port 113a may be minimized, and a loss of the flow path in the wet mop rag module 100 may be minimized.

[0072] A front side of the flow path forming part 113 may cover an upper side of the intake port 113a. The flow path forming part 113 may be disposed such that the flow path forming part 113 is inclined upward in a direction from a front end to a rear side of the flow path forming part 113. That is, an upper surface of the flow path forming part 113 may be inclined at a predetermined angle with respect to the floor surface. In addition, the upper surface of the flow path forming part 113 may be inclined at a predetermined angle with respect to the bottom surface 1 1 1a of the lower housing 111.

[0073] Therefore, a height of the front side of the flow path forming part 113 may be lower than a height of the rear side of the flow path forming part 113.

[0074] According to the present embodiment, the height of the front side of the flow path forming part 113 is low, which makes it possible to reduce a height of a front side of the wet mop rag module 100 based on an overall height of the wet mop rag module 100. The lower the height of the wet mop rag module 100, the higher the likelihood that the wet mop rag module 100 enters a narrow space below furniture or a chair and cleans the narrow space.

[0075] Meanwhile, in the present embodiment, the steam generator 200 may be disposed above the flow path forming part 113. With this configuration, the steam generator 200 may be stably supported in the state in which the steam generator 200 is disposed at a predetermined angle with respect to the floor surface.

[0076] A blocker 114 is disposed on a lower surface of the lower housing 111 (the lower surface of the bottom surface 111a). The blocker 114 may block a front space in which the intake port 113a is disposed and a rear space in which the mop rags 150 are disposed, thereby preventing moisture discharged from the mop rags 150 from being diffused into the intake port 113a. For example, the blocker 114 may include a central portion 114a and extension portions 114b. In this case, a pair of extension portions 114b may be symmetrically connected to two opposite ends based on the central portion 114a. Further, the central portion 114a may be disposed at a rear side of the intake port 113a and prevent the moisture from flowing toward the intake port 113a. Further, the extension portion 114b may have an arc shape and surround the circular mop rag 150.

[0077] A plurality of rollers may be provided on the lower surface of the bottom surface 111a of the lower housing 111 and allow the wet mop rag module 100 to move smoothly.

[0078] For example, front rollers 115 may be disposed on the lower housing 111 and positioned at front sides of the mop rags 150. The front rollers 115 may include a first roller 115a and a second roller 115b. The first roller 115a and the second roller 115b may be disposed to be spaced apart from each other in the leftward/rightward direction.

[0079] The first and second rollers 115a and 115b may be rotatably connected to shafts, respectively. The shaft may be fixed to the lower side of the lower housing 111 in a state in which the shaft extends in the leftward/rightward direction.

[0080] A distance between the shaft and a front end of the lower housing 111 may be longer than a minimum distance between the mop rag 150 and the front end of the lower housing 111.

[0081] For example, the rotary cleaning units 140 may be at least partially positioned between the shaft of the first roller 115a and the shaft of the second roller 115b.

[0082] With this arrangement, the rotary cleaning units 140 may be positioned maximally close to the intake port 113a, and an area of the floor surface, on which the wet mop rag module 100 is positioned and the rotary cleaning units 140 performs a cleaning operation, may be increased, such that the performance in cleaning the floor may be improved.

[0083] In the present embodiment, the first and second rollers 115a and 115b are coupled to the lower side of the lower housing 111, which makes it possible to improve mobility of the wet mop rag module 100.

[0084] A third roller 116 may be further provided on the lower housing 111. Therefore, the first and second rollers 115a and 115b and the third roller 116 may support the wet mop rag module 100 at three points. In this case, the third roller 116 may be positioned at rear sides of the mop rags 150 so as not to interfere with the mop rags 150.

[0085] The lower housing 111 may have cooling air inlet ports 117. Outside air may be introduced into the module housing 110 through the cooling air inlet ports 117. In addition, the cooling air inlet ports 117 may be formed in a front sidewall of the lower housing 111. With this configuration, when the wet mop rag module 100 is moved forward by the user's manipulation, the amount of air to be introduced may increase.

[0086] The upper housing 112 may have cooling air discharge ports 118. The air in the module housing 110 may be discharged to the outside through the cooling air discharge ports 118. In addition, the cooling air discharge

ports 118 may be formed in sidewalls at two opposite sides of the upper housing 112. With this configuration, the air introduced through the cooling air inlet ports 117 may be guided to pass over the drive motors 170 while the air flows toward the cooling air discharge ports 118, which makes it possible to prevent the drive motors 170 from being overheated.

[0087] Further, based on the state in which the lower housing 111 is placed on the floor surface, the cooling air discharge port 118 may be disposed to be farther from the ground surface than the cooling air inlet port 117 from the ground surface. With this configuration, the heated air may be moved upward in the module housing 110 and effectively discharged through the cooling air discharge ports 118.

[0088] The wet mop rag module 100 may further include a water tank 120 capable of supplying water to the mop rags 150.

[0089] The water tank 120 may be separably connected to the module housing 110. Specifically, the water tank 120 may be coupled to an upper side of the upper housing 112. For example, the water tank 120 may be mounted on a water container seating portion formed on an upper surface of the upper housing 112.

[0090] In addition, the water tank 120 may be disposed above the steam generator 200. Specifically, the water tank 120 is disposed above the steam generator 200 and spaced apart from the steam generator 200. That is, the water tank 120 may be disposed above the steam generator 200 with the upper housing 112 interposed therebetween.

[0091] The water tank 120 may define an external appearance of the wet mop rag module 100 in the state in which the water tank 120 is mounted on the module housing 110.

[0092] The entire upper side wall of the water tank 120 may substantially define an upper external appearance of the wet mop rag module 100. Therefore, the user may visually check whether the water tank 120 is mounted on the module housing 110.

[0093] The module housing 110 may further include a water tank separating button configured to be manipulated by the user to separate the water tank 120 in the state in which the water tank 120 is mounted on the module housing 110. For example, the water tank separating button may be positioned on a central portion of the wet mop rag module 100. Therefore, the user may easily recognize the water tank separating button and manipulate the water tank separating button.

[0094] In the state in which the water tank 120 is mounted on the module housing 110, water in the water tank 120 may be supplied to the mop rags 150. Specifically, the water stored in the water tank 120 may be supplied to the mop rags 150 through the moisture supply unit 130.

[0095] Specifically, a space capable of storing water is formed in the water tank 120. The water stored in the water tank 120 may be supplied to the steam generator 200 through at least one hose. The water introduced into the steam generator 200 may be heated and changed in phase into steam (moisture vapor) depending on the user's selection. The water or steam heated by the steam generator 200 may be supplied to the mop rags 150 through the diffusers 137.

[0096] The water tank 120 includes a water supply port. The water supply port is a hole through which the water is introduced into the water tank 120. For example, the water supply port may be formed in a lateral surface of the water tank 120.

[0097] The water tank 120 includes a drain port. The drain port is a hole through which the water stored in the water tank 120 is discharged. The water discharged from the drain port may flow to the steam generator 200. The drain port may be formed in a lower surface of the water tank 120.

[0098] The water tank 120 includes an air hole. The air hole is a hole through which air may be introduced into the water tank 120. When the water stored in the water tank 120 is discharged to the outside, a pressure in the water tank 120 is lowered, and air may be introduced into the water tank 120 through the air hole to compensate for the lowered pressure. For example, the air hole may be formed at an upper end of the water tank 120.

[0099] The wet mop rag module 100 according to the present disclosure may include the moisture supply unit 130 having a flow path through which the water introduced from the water tank 120 is supplied to the mop rags 150.

[0100] Specifically, the moisture supply unit 130 may include a water tank connection part 131 configured to introduce water in the water tank 120 into the module housing 110, a water inlet tube 132 configured to supply the water, which is introduced into the water tank connection part 131, to a water pump 133, a guide tube 134 configured to supply the water from the water pump 133 to a 'T'-shaped connector, and water supply tubes 135 configured to supply the water, which is introduced into the connector, to the steam generator 200.

[0101] The water tank connection part 131 may operate a valve (not illustrated) in the water tank 120, and the water may flow in the water tank connection part 131.

[0102] The water tank connection part 131 may be coupled to a lower side of the upper housing 112, and a part of the water tank connection part 131 may protrude upward while penetrating the upper housing 112.

[0103] The water tank connection part 131, which protrudes upward, may be retracted into the water tank 120 while penetrating a discharge port of the water tank 120 when the water tank 120 is seated on the upper housing 112.

[0104] The upper housing 112 may include a sealer to prevent the water discharged from the water tank 120 from leaking from a periphery of the water tank connection part 131. For example, the sealer may be made of rubber, coupled to the upper housing 112, and disposed at the upper side of the upper housing 112.

[0105] The water pump 133 may be installed on the

upper housing 112 and control the discharge of the water from the water tank 120.

[0106] The water pump 133 may provide a flow force to water. The water pump 133 may include a first connection port connected to the water inlet tube 132, and a second connection port connected to the guide tube 134. In this case, based on the water pump 133, the first connection port may be an inlet, and the second connection port may be an outlet.

[0107] The water pump 133 is a pump in which a valve body operates to expand or contract the water and allow the first connection port and the second connection port to communicate with each other. Because the water pump 133 may be implemented by a publicly-known structure, a detailed description thereof will be omitted.

[0108] The water supply tubes 135 may connect the connector to water inlet ports 212 of the steam generator 200. For example, the water supply tubes 135 may be a pair of tubes branching off from the connector.

[0109] Therefore, the water supplied to the water inlet tube 132 flows into the water pump 133 and then flows to the guide tube 134. The water flowing through the guide tube 134 flows to the water supply tubes 135 by means of the connector. Further, the water flowing through the water supply tubes 135 is supplied to the steam generator 200.

[0110] The steam generator 200 is a device configured to heat water. The steam generator 200 is disposed in the module housing 110. Specifically, the steam generator 200 is installed on an upper surface of the lower housing 111.

[0111] Meanwhile, in the present disclosure, the steam generator 200 is disposed to be inclined. Specifically, based on the state in which the module housing 110 is placed on the floor surface, a bottom surface of the steam generator 200 may be disposed at a predetermined angle α with respect to the floor surface.

[0112] A specific structure and effect of the steam generator 200 according to the present disclosure will be described below.

[0113] The diffusers 137 are configured to discharge the water in the water tank 120 to the mop rags 150.

[0114] Specifically, the diffuser 137 may include at least one nozzle and supply the moisture, which is discharged from the steam generator 200, to the mop rag 150 through the nozzle.

[0115] The diffuser 137 may be accommodated in a space defined in the module housing 110. A part of the diffuser 137 may be exposed to the outside of the module housing 110 while passing through a nozzle hole (not illustrated) formed in the module housing 110.

[0116] The diffusers 137 may be provided as a pair of diffusers 137 mounted on the module housing 110 and arranged in the leftward/rightward direction. In addition, the pair of diffusers 137 arranged in the leftward/rightward direction may be formed symmetrically (mirror-symmetrically).

[0117] The diffusers 137 may be connected to the steam generator 200 and supply the moisture, which flows through the steam generator 200, to the mop rags 150.

[0118] The diffuser 137 includes a diffuser main body 137a and a connection tube 137b.

[0119] The diffuser main body 137a may have therein a diffusion flow path through which the moisture may flow, and the diffuser main body 137a may include nozzles through which the moisture flowing through the diffusion flow path is discharged to the mop rag. For example, the diffuser main body 137a may have a circular arc shape. The nozzles may be provided as a plurality of nozzles, and the plurality of nozzles may be disposed at predetermined intervals. With this configuration, the diffuser main body 137a may stably supply moisture to the mop rag 150 having the circular plate shape.

[0120] The connection tube 137b may be provided on the diffuser main body 137a and coupled to a moisture discharge port 213 of the steam generator 200. A flow path formed in the connection tube 137b may communicate with the moisture discharge port 213 and the diffusion flow path formed in the diffuser main body 137a. With this configuration, the moisture discharged from the steam generator 200 may pass through the connection tube 137b and then be discharged to the mop rag 150 through the diffuser main body 137a.

[0121] Further, the moisture sprayed from the diffuser 137 may pass through water passing holes formed in the rotary cleaning unit 140 and then be supplied to the mop rag 150. The mop rag 150 wipes the floor while rotating in the state in which the mop rag 150 absorbs the moisture supplied through the diffuser 137.

[0122] The rotary cleaning units 140 may rotate by receiving power from the drive motors 170. For example, the rotary cleaning unit 140 may be a rotary plate. The rotary cleaning unit 140 may have a circular plate shape, and the mop rag 150 may be attached to a lower surface of the rotary cleaning unit 140.

[0123] In this case, the rotary cleaning unit 140 having a circular plate shape may be disposed in parallel with the floor surface in the state in which the wet mop rag module 100 is placed on the floor surface. Alternatively, the rotary cleaning unit 140 having a circular plate shape may be disposed in parallel with the bottom surface 111a of the lower housing 111.

[0124] For example, the rotary cleaning units 140 may be disposed at the lower side of the module housing 110 and positioned rearward of the intake port 113a.

[0125] Therefore, when the wet mop rag module 100 performs the cleaning operation while moving forward, debris and air on the floor surface may be sucked into the intake port 113a, and then the floor surface may be wiped by the mop rags 150.

[0126] One or more rotary cleaning units 140 may be provided at the lower side of the module housing 110. For example, the rotary cleaning units 140 may include the first rotary cleaning unit 141 connected to a first drive motor 171 and having the first mop rag 151 attached

thereto, and the second rotary cleaning unit 142 connected to a second drive motor 172 and having the second mop rag 152 attached thereto.

[0127] Specifically, the rotary cleaning unit 140 may include an outer body having a circular ring shape, an inner body positioned at a central region of the outer body and spaced apart from an inner peripheral surface of the outer body, and a plurality of connection ribs configured to connect an outer peripheral surface of the inner body to the inner peripheral surface of the outer body.

[0128] In addition, the rotary cleaning unit 140 may include a plurality of water passing holes formed in a circumferential direction to supply the mop rag 150 with the water discharged through the diffuser 137.

[0129] Meanwhile, the rotary cleaning unit 140 may include an attachment means to which the mop rag 150 is attached. For example, the attachment means may be a Velcro fastener.

[0130] The rotary cleaning unit 140 may be disposed at the lower side of the lower housing 111. That is, the rotary cleaning unit 140 may be disposed outside the module housing 110.

[0131] In addition, the rotary cleaning unit 140 may be connected to the drive motor 170 and receive power. For example, the rotary cleaning unit 140 may be connected to the drive motor 170 by means of at least one gear and rotated by the operation of the drive motor 170.

[0132] The rotary cleaning units 140 may include the first rotary cleaning unit 141 and the second rotary cleaning unit 142. For example, based on the intake port 113a in the state in which the wet mop rag module 100 is placed on the floor surface, the first rotary cleaning unit 141 may mean the rotary cleaning unit 140 disposed at the left side, and the second rotary cleaning unit 142 may mean the rotary cleaning unit 140 disposed at the right side. However, the present disclosure is not limited thereto, and the left and right sides may be changed.

[0133] In the present embodiment, a rotation center of the first rotary cleaning unit 141 and a rotation center of the second rotary cleaning unit 142 are spaced apart from each other in the leftward/rightward direction.

[0134] The rotation center of the rotary cleaning unit 140 may be positioned to be farther from a front end of the module housing 110 than is a central axis that bisects a length of the module housing 110 based on the forward/rearward direction. This is to prevent the rotary cleaning unit 140 from clogging the intake port 113a.

[0135] A distance between the rotation center of the first rotary cleaning unit 141 and the rotation center of the second rotary cleaning unit 142 may be larger than a diameter of the mop rag 150. This is to reduce friction between the first and second mop rags 151 and 152 caused by interference between the first and second mop rags 151 and 152 while the first and second mop rags 151 and 152 rotate and to prevent a cleanable area from being reduced by a portion in which the first and second mop rags 151 and 152 interfere with each other.

[0136] The mop rags 150 may wipe the floor surface while rotating.

[0137] The mop rags 150 may be coupled to lower sides of the rotary cleaning units 140 and face the floor surface.

[0138] The mop rag 150 is configured such that a bottom surface of the mop rag 150 facing the floor has a predetermined area. The mop rag 150 has a flat shape. The mop rag 150 is configured such that a width (or diameter) of the mop rag 150 in a horizontal direction is sufficiently larger than a height of the mop rag 150 in a vertical direction. When the mop rag 150 is coupled to the lower housing 111, the bottom surface of the mop rag 150 may be disposed in parallel with the floor surface.

[0139] The bottom surface of the mop rag 150 may have an approximately circular shape, and the mop rag 150 may have a rotationally symmetrical shape as a whole. In addition, the mop rag 150 may be attached to or detached from the bottom surface of the rotary cleaning unit 140. The mop rag 150 may be coupled to the rotary cleaning unit 140 and rotated together with the rotary cleaning unit 140.

[0140] In the state in which the rotary cleaning unit 140 and the mop rag 150 are coupled to the lower side of the module housing 110, a part of the mop rag 150 protrudes outward from the wet mop rag module 100, such that the mop rag 150 cleans not only a portion of the floor surface positioned below the wet mop rag module 100 but also a portion of the floor surface positioned outward from the wet mop rag module 100.

[0141] For example, the mop rag 150 may not only protrude toward two opposite sides of the wet mop rag module 100 but also protrude rearward.

[0142] The mop rags 150 may include the first mop rag 151 coupled to the first rotary cleaning unit 141, and the second mop rag 152 coupled to the second rotary cleaning unit 142. Therefore, when the first rotary cleaning unit 141 rotates by receiving power from the first drive motor 171, the first mop rag 151 may also rotate. When the second rotary cleaning unit 142 rotates by receiving power from the second drive motor 172, the second mop rag 152 may also rotate.

[0143] Meanwhile, in the present embodiment, the wet mop rag module 100 may further include the light-emitting module 160.

[0144] The light-emitting module 160 may emit light to a location in front of the wet mop rag module 100 and allow the user to recognize debris or microorganisms existing in front of the wet mop rag module 100.

[0145] The light-emitting module 160 may be disposed at a front side of the module housing 110. For example, the light-emitting module 160 may be disposed on the front surface of the lower housing 111. The light-emitting module 160 may be provided as a plurality of light-emitting modules 160, and the plurality of light-emitting modules 160 may be disposed in the leftward/rightward direction. In this case, the light-emitting module 160 may be disposed rearward of the cooling air inlet ports 117. With this arrangement, the light-emitting module 160 may

be cooled by air introduced from the cooling air inlet ports 117.

[0146] Meanwhile, the light-emitting module 160 may include a light-emitting member and a diffusion plate.

[0147] The light-emitting member may emit light to a location in front of or below the wet mop rag module. For example, the light-emitting member may include a plurality of LEDs. In this case, the light emitted from the light-emitting member may be visible rays. According to the embodiments, the light emitted from the light-emitting member may be infrared (IR) rays or ultraviolet (UV) ray. With this configuration, when the light-emitting member operates, the user may recognize whether debris or microorganism exists at a location in front of the wet mop rag module 100. Further, the light-emitting member may sterilize or eliminate debris or microorganism existing at the location in front of the wet mop rag module 100, thereby improving hygiene.

[0148] In addition, the diffusion plate may be disposed forward of the light-emitting member and diffuse the light emitted from the light-emitting member.

[0149] Meanwhile, the wet mop rag module 100 may further include the drive motors 170 configured to provide power for rotating the mop rags 150 and the rotary cleaning units 140.

[0150] Specifically, the drive motors 170 may include the first drive motor 171 configured to rotate the first rotary cleaning unit 141, and the second drive motor 172 configured to rotate the second rotary cleaning unit 142.

[0151] As described above, the first and second drive motors 171 and 172 operate independently. Therefore, even though any one of the first and second drive motors 171 and 172 is broken down, the rotary cleaning unit 140 may be rotated by the other of the first and second drive motors 171 and 172.

[0152] Meanwhile, the first and second drive motors 171 and 172 may be arranged on the module housing 110 and spaced apart from each other in the leftward/rightward direction. Further, the first and second drive motors 171 and 172 may be positioned rearward of the intake port 113a.

[0153] The drive motors 170 may be disposed in the module housing 110. For example, the drive motors 170 may be seated on the upper side of the lower housing 111 and covered by the upper housing 112. That is, the drive motors 170 may be positioned between the lower and upper housings 111 and 112.

[0154] Meanwhile, the wet mop rag module 100 includes the connection tube 180 coupled to the cleaner main body 400 or the extension tube 300.

[0155] The connection tube 180 may include a first connection tube connected to an end of the flow path forming part 113, a second connection tube rotatably connected to the first connection tube, and a guide tube configured to allow the internal spaces of the first and second connection tubes to communicate with each other.

[0156] The first connection tube has a tubular shape. One axial end of the first connection tube may be connected to an end of the flow path forming part 113, and the other axial end of the first connection tube may be rotatably coupled to the second connection tube. In this case, the first connection tube has a shape in which a part of an outer peripheral surface thereof is cut out. The first connection tube may be disposed so that the cut-out portion is directed upward toward the second connection tube. With this configuration, in the state in which the wet mop rag module 100 is placed on the ground surface, an angle of the second connection tube with respect to the ground surface may be changed by a motion of the user's arm. That is, the first and second connection tubes may serve as a kind of joint capable of adjusting an angle of the wet mop rag module 100 and an angle of the cleaner main body 400.

[0157] The second connection tube has a tubular shape. One axial end of the second connection tube is rotatably coupled to the first connection tube, and the other axial end of the second connection tube is detachably coupled as the cleaner main body 400 or the extension tube 300 is inserted into the other axial end of the second connection tube.

[0158] Meanwhile, in the present embodiment, a module battery housing 500, which accommodates a module battery 600, may be coupled to the second connection tube.

[0159] Meanwhile, electric wires may be embedded in the first and second connection tubes, respectively, and the electric wire embedded in the first connection tube and the electric wire embedded in the second connection tube may be electrically connected to each other.

[0160] Meanwhile, the guide tube may connect the internal space of the first connection tube and the internal space of the second connection tube. The guide tube may have a flow path formed therein so that the air sucked into the wet mop rag module 100 flows to the extension tube 300 and/or the cleaner main body 400. In this case, the guide tube may be deformed together with the first and second connection tubes when the first and second connection tubes rotate. For example, the guide tube may be provided in the form of a corrugated tube.

[0161] Meanwhile, the wet mop rag module 100 may include the printed circuit board 190 on which a wet mop rag module control unit 700 configured to control the wet mop rag module 100 is disposed. The current may be applied to the printed circuit board 190, and a communication line may be disposed on the printed circuit board 190. In this case, the printed circuit board 190 may be cooled by air which is introduced into the cooling air inlet ports 117 and discharged to the cooling air discharge ports 118.

[0162] Meanwhile, the module housing 110 may further include the first operating part 191 configured to adjust the amount of water to be discharged from the water tank 120. For example, the first operating part 191 may be positioned at the rear side of the module housing 110.

[0163] The user may manipulate the first operating part

191. The user may manipulate the first operating part 191 to allow the water tank 120 to discharge water or not to discharge water.

[0164] Alternatively, the first operating part 191 may adjust the amount of water to be discharged from the water tank 120. For example, the user may manipulate the first operating part 191 so that a first amount of water is discharged per unit time from the water tank 120 or a second amount of water, which is larger than the first amount of water, is discharged per unit time.

[0165] The first operating part 191 may be disposed on the module housing 110 and configured to pivot in the leftward/rightward direction. According to the embodiments, the first operating part 191 may pivot in the upward/downward direction.

[0166] For example, the amount of water to be discharged is 0 when the first operating part 191 is positioned at a neutral position. When the first operating part 191 is pushed leftward and the first operating part 191 pivots leftward, the first amount of water may be discharged per unit time from the water tank 120. Further, when the first operating part 191 is pushed rightward and the first operating part 191 pivots rightward, the second amount of water may be discharged per unit time from the water tank 120.

[0167] Meanwhile, the module housing 110 may further include the second operating part 192 configured to adjust a phase of the moisture discharged from the steam generator 200. For example, the second operating part 192 may be positioned at the rear side of the module housing 110.

[0168] The user may adjust the second operating part 192. The user may adjust the second operating part 192 so that the water or steam (moisture vapor) may be discharged from the steam generator 200 to the mop rag 150.

[0169] The second operating part 192 may be rotatably provided on the module housing 110. For example, the second operating part 192 may be a rotary handle (dial).

[0170] For example, in a state in which the second operating part 192 is rotated and positioned at a first position, the steam generator 200 does not heat water and may discharge room-temperature water to the mop rag 150. In addition, in a state in which the second operating part 192 is rotated and positioned at a second position different from the first position, the steam generator 200 may heat water and discharge the heated water to the mop rag 150. In addition, in a state in which the second operating part 192 is rotated and positioned at a third position different from the first and second positions, the steam generator 200 changes the phase of water into steam (moisture vapor) by heating the water and then discharges the steam to the mop rag 150.

[0171] FIG. 9 is a perspective view for explaining the steam generator of the wet mop rag module according to the embodiment of the present disclosure, FIG. 10 is an exploded perspective view for explaining the steam generator of the wet mop rag module according to the embodiment of the present disclosure, FIG. 11 is a coupled perspective view of FIG. 10, FIG. 12 is a top plan view for explaining a heating chamber of the steam generator of the wet mop rag module according to the embodiment of the present disclosure, FIG. 13 is a side view illustrating a state in which an upper cover is excluded from the steam generator according to the embodiment of the present disclosure, and FIG. 14 is a cross-sectional view of the steam generator according to the embodiment of the present disclosure.

[0172] The steam generator 200 according to the embodiment of the present disclosure will be described with reference to FIGS. 3 and 9 to 14.

[0173] The steam generator 200 may produce high-temperature water or steam (moisture vapor) by heating water. The steam generator 200 may heat the water, which is supplied from the water tank 120, and supply the heated water to the mop rags 150.

[0174] The steam generator 200 is provided in the wet mop rag module 100 instead of the cleaner main body 400. This is to prevent the cleaning operation from becoming inconvenient because of a weight and volume of the steam generator during the dry cleaning in case that the steam generator is disposed in the cleaner main body.

[0175] The steam generator 200 may be coupled to an upper portion of the lower housing 111 (the upper surface of the bottom surface 111a). For example, the steam generator 200 may be coupled to the upper surface of the flow path forming part 113. In this case, because the flow path forming part 113 is coupled to a central portion of the upper surface of the lower housing 111, the steam generator 200 may also be disposed on the central portion of the lower housing 111. With this configuration, when the steam generator 200 operates, a particular position may not be overheated by heat supplied from the steam generator 200, thereby preventing damage to the wet mop rag module 100. In addition, an overall volume of the wet mop rag module 100 may be minimized.

[0176] The steam generator 200 may include a heating chamber 210, a heater 220, a lower cover 230, a sealer 240, an upper cover 250, a lower insulator 260, an upper insulator 270, an overheating shut-off device 280, and a temperature detector 290.

[0177] In this case, the heater 220 may be disposed at a lower side of the heating chamber 210, the lower insulator 260 may be disposed at a lower side of the heater 220, and the lower cover 230 may be disposed at a lower side of the lower insulator 260 and cover a lower side of the steam generator 200. In addition, the sealer 240 may be disposed at an upper side of the heating chamber 210, the upper insulator 270 may be disposed at an upper side of the sealer 240, and the upper cover 250 may be disposed at an upper side of the upper insulator 270 and cover an upper side of the steam generator 200. Meanwhile, the overheating shut-off device 280 and the temperature detector 290 are disposed on an outer surface of the heating chamber 210.

[0178] A flow path, through which the moisture flows,

may be formed in the heating chamber 210, and the heating chamber 210 may provide a space in which the moisture flowing through the flow path is heated by receiving heat generated from the heater 220.

[0179] Specifically, the heating chamber 210 includes a chamber main body 211, the water inlet ports 212, the moisture discharge ports 213, a partition wall 214, flow guide walls 215, flow delay protrusions 216, and a water storage groove 217.

[0180] The chamber main body 211 may define an external appearance of the heating chamber 210 and provide therein a space in which the moisture may flow. For example, the chamber main body 211 may be formed in a shape similar to a quadrangular box. For example, a quadrangular plate-shaped bottom surface may be formed at a lowermost side of the chamber main body 211, and four sidewalls 218 may be formed to be perpendicular to the bottom surface and connected to the bottom surface. Further, an upper side of the chamber main body 211 may be opened. Therefore, an interior of the chamber main body 211 may be a space surrounded by the bottom surface and the four sidewalls 218. In this case, the four sidewalls may be respectively referred to as a front sidewall 218a, a rear sidewall 218b, a left sidewall 218c, and a right sidewall 281d depending on the positions at which the sidewalls are disposed.

[0181] Meanwhile, the space in the chamber main body 211 may be divided by the partition wall 214 to be described below. For example, a space, which is disposed at a left side based on the partition wall 214, may be referred to as a first chamber 211a, and a space, which is disposed at a right side based on the partition wall 214, may be referred to as a second chamber 211b. The left and right sides of the first and second chambers 211a and 211b may be changed.

[0182] Meanwhile, the chamber main body 211 may have the water inlet ports 212 and the moisture discharge ports 213. Specifically, the water inlet ports 212 and the moisture discharge ports 213 may be formed in the bottom surface of the chamber main body 211. In this case, the water inlet ports 212 and the moisture discharge ports 213 may be disposed to be farthest in the forward/rearward direction of the wet mop rag module 100. This is to ensure a sufficient heating time by maximizing a distance that the water introduced into the water inlet port 212 flows until the water is discharged to the moisture discharge port 213.

[0183] For example, a rear end of the chamber main body 211 is disposed above a front end of the chamber main body 211. That is, the steam generator 200 is inclined rearward and upward. Therefore, the water may be heated while flowing from a rear upper side to a front lower side of the steam generator 200.

[0184] The water inlet ports 212 may be formed in the chamber main body 211, and the water may be introduced into the water inlet ports 212 from the water tank 120. The water inlet port 212 may be a hole formed at an inlet end of the chamber main body 211.

[0185] Specifically, the water supply tube 135 of the water supply unit 130 may be connected to the water inlet port 212. For example, the water supply tube 135 may be coupled to a lower side of the chamber main body 211, and the flow path in the water supply tube 135 and the water inlet port 212 may communicate with each other. Therefore, when the water pump 133 operates, the water stored in the water tank 120 may flow through the water supply tube 135 and then be introduced into the chamber main body 211 by a flow force generated by the water pump 133.

[0186] The moisture heated in the chamber main body 211 may be discharged through the moisture discharge port 213. The moisture discharge port 213 may be a hole formed at an outlet end of the chamber main body 211.

[0187] Specifically, the diffuser 137 may be connected to the moisture discharge port 213. For example, the diffuser 137 may be coupled to the lower side of the chamber main body 211, and the flow path in the diffuser 137 and the moisture discharge port 213 may communicate with each other. Therefore, the moisture (water or steam) heated in the chamber main body 211 may be introduced into the diffuser 137 through the moisture discharge port 213 and then supplied to the mop rag 150.

[0188] Meanwhile, the bottom surface of the steam generator is generally disposed in parallel with the floor surface of the installation location. Further, a pipe, through which the steam is discharged, is provided above the steam generator. Therefore, when the steam (moisture vapor) is produced as the steam generator operates, the hot steam flows upward and is discharged to the outside along the pipe.

[0189] However, in the case of the steam generator structured as described above, there is a high likelihood that the steam comes into contact with an inner wall of the steam generator or the pipe and drains while the steam flows upward. Therefore, it is necessary to reduce a loss of the amount of heat, which may occur while the steam flows, and to heat the draining steam again and supply the steam to the mop rag even though the steam drains.

[0190] In order to meet the necessity, the steam generator 200 according to the embodiment of the present disclosure is disposed to be inclined at a predetermined angle with respect to the floor surface.

[0191] Specifically, in the state in which the wet mop rag module 100 is placed on the floor surface (the state in which the mop rag 150 is placed on the floor surface and may wipe the floor surface), the bottom surface of the chamber main body 211 may be disposed to be inclined at the predetermined angle α with respect to the floor surface.

[0192] The bottom surface 111a of the lower housing 111, which has the lower side to which the rotary cleaning unit 140 and the mop rag 150 are coupled, and the bottom surface of the chamber main body 211 may be disposed to be inclined at the predetermined angle α. That is, an imaginary extension surface of the bottom surface of the

chamber main body 211 may intersect an imaginary extension surface of the bottom surface 111a of the lower housing 111.

[0193] In addition, a height from the floor surface to the water inlet port 212 may be larger than a height from the floor surface to the moisture discharge port 213. Further, a distance from the bottom surface 111a of the lower housing 111 to the water inlet port 212 may be longer than a distance from the bottom surface 111a to the moisture discharge port 213.

[0194] In addition, a shortest distance from the rotary cleaning unit 140 having a circular plate shape to the water inlet port 212 may be longer than a shortest distance from the rotary cleaning unit 140 to the moisture discharge port 213. Further, the bottom surface of the chamber main body 211 may be inclined at the predetermined angle α with respect to an imaginary extension surface of the rotary cleaning unit 140 having a circular plate shape. That is, an imaginary extension line of the bottom surface of the chamber main body 211 may intersect the imaginary extension surface of the rotary cleaning unit 140.

[0195] With this configuration, even though the water introduced into the water inlet port 212 is heated and flows upward by convection, the water may be heated while flowing from the upper side to the lower side in the chamber main body 211 by gravity.

[0196] Moreover, even though the water heated in the chamber main body 211 changes in phase into moisture vapor and flows upward, the moisture vapor may be additionally heated while remaining in the chamber main body 211 without being discharged to the upper side of the chamber main body 211.

[0197] In addition, the draining water produced in the steam generator 200 may be continuously heated without being discharged to the outside.

[0198] The partition wall 214 may be disposed in the forward/rearward direction of the wet mop rag module 100 and protrude upward from the bottom surface of the chamber main body 211. For example, the partition wall 214 may be a wall that connects the sidewalls (the front sidewall 218a and the rear sidewall 218b) disposed at the front and rear sides of the chamber main body 211.

[0199] With this configuration, the partition wall 214 may divide the internal space of the chamber main body 211 into the left and right spaces. That is, the internal space of the chamber main body 211 may be divided into the first chamber 211a and the second chamber 211b based on the partition wall 214 as a boundary.

[0200] Therefore, the moisture, which flows in the first chamber 211a, and the moisture, which flows in the second chamber 211b, may be heated independently without being mixed with each other. As a result, a temperature in the first chamber 211a and a temperature in the second chamber 211b may be different from each other, and the moisture discharged from the first chamber 211a and the moisture discharged from the second chamber 211b may be different in phase from each other. For example, steam may be discharged from the first chamber 211a, and water may be discharged from the second chamber 211b.

[0201] The flow guide walls 215 may protrude in the chamber main body 211. One or more flow guide walls 215 may be formed in the leftward/rightward direction.

[0202] Specifically, the flow guide wall 215 protrudes perpendicularly to the bottom surface of the chamber main body 211. In this case, based on the bottom surface of the chamber main body 211, the flow guide wall 215 may protrude in the leftward/rightward direction of the wet mop rag module 100 and be inclined forward at a predetermined angle. Alternatively, based on the gravitational direction, the flow guide wall 215 may protrude in the leftward/rightward direction of the wet mop rag module 100 and be inclined downward at a predetermined angle. In addition, based on a direction in which the water flows in the heating chamber 210, an interval between the plurality of flow guide walls 215 may gradually increase from the inlet toward the outlet.

[0203] Further, the flow guide wall 215 may be connected to the partition wall 214 or the sidewalls (the left sidewall 218c and the right sidewall 218d) based on the leftward/rightward direction of the chamber main body 211.

[0204] That is, one end of the flow guide wall 215 may be connected to the flow delay protrusion 216, and the other end of the flow guide wall 215 may be connected to the partition wall 214 or the sidewall 218 of the chamber main body 211. In this case, one end of the flow guide wall 215 may be disposed to be closer to the floor surface than the other end to the floor surface (disposed at the lower side based on the gravitational direction).

[0205] With this configuration, the flow path, through which the water may flow, may be formed between the partition wall 214 and the flow guide wall 215 or between the sidewall of the chamber main body 211 and the flow guide wall 215.

[0206] Meanwhile, in the present embodiment, the flow guide walls 215 may be provided as a plurality of flow guide walls 215. In this case, the plurality of flow guide walls 215 may be alternately connected to the partition wall 214 and the sidewall of the chamber main body 211.

[0207] With this configuration, the flow path in the chamber main body 211 may be formed in a zigzag shape. As a result, it is possible to increase the flow path, through which the water flows in the chamber main body 211, and to ensure a sufficient time for which the water in the chamber main body 211 may be heated. In addition, it is possible to increase an area in which heat may be transferred to the water flowing in the chamber main body 211. In addition, it is possible to maintain the supply amount of water or steam by maintaining the flow direction of the moisture even though the steam generator 200 sways.

[0208] The flow delay protrusion 216 may protrude from one end of the flow guide wall 215. Specifically, the flow delay protrusion 216 may protrude rearward from

one end of the flow guide wall 215.

[0209] Meanwhile, in the present embodiment, a rear end (or upper end) of the flow delay protrusion 216 may be disposed to be farther from the floor surface than the other end of the flow guide wall 215 from the floor surface (disposed at the upper side based on the gravitational direction).

[0210] With this configuration, the water flowing along the flow guide wall 215 encounters the flow delay protrusion 216, and a flow velocity of the water may decrease. Therefore, it is possible to ensure a sufficient time for which the water introduced into the steam generator 200 is heated to a target temperature.

[0211] The water storage groove 217 is concavely recessed in the bottom surface of the chamber main body 211. The water storage groove 217 may be disposed at a front side of the bottom surface of the chamber main body 211. Further, the water storage groove 217 may accommodate the water that flows along the flow guide wall 215 and flows on a portion of the bottom surface of the chamber main body 211 that is close to the floor surface (flows at the lower side based on the gravitational direction). In addition, a lowest portion of the water storage groove 217 may be disposed to be closer to the floor surface than the moisture discharge port 213 to the floor surface (disposed at the lower side based on the gravitational direction).

[0212] With this configuration, the water, which does not change in phase into steam while flowing in the chamber main body 211, may be captured in the water storage groove 217 and heated continuously. Therefore, even though the steam generator 200 sways, it is possible to prevent the water, which is not sufficiently heated, from being suddenly discharged to the moisture discharge port 213.

[0213] The chamber main body 211 may define an external appearance of the heating chamber 210 and provide therein a space in which the moisture may flow. For example, the chamber main body 211 may be formed in a shape similar to a quadrangular box. For example, the quadrangular plate-shaped bottom surface may be formed at the lowermost side of the chamber main body 211, and the four sidewalls 218 may be formed to be perpendicular to the bottom surface and connected to the bottom surface. Further, the upper side of the chamber main body 211 may be opened.

[0214] Therefore, the interior of the chamber main body 211 may be a space surrounded by the bottom surface and the four sidewalls 218. In this case, based on the positions at which the four sidewalls are disposed, the four sidewalls may be defined as including the front sidewall 218a disposed at the front side of the chamber main body 211, the rear sidewall 218b disposed at the rear side of the chamber main body 211, the left sidewall 218c disposed at the left side when the front sidewall 218a is viewed from the rear sidewall 218b, and the right sidewall 281d disposed at the right side when the front sidewall 218a is viewed from the rear sidewall 218b.

[0215] The heater 220 may generate heat. The heater 220 refers to a device capable of converting electrical energy into thermal energy. Because the heater 220 may be implemented by a publicly-known structure, a detailed description thereof will be omitted.

[0216] The heater 220 may be disposed at the lower side of the heating chamber 210 and supply heat to the heating chamber 210. Specifically, the heater 220 may be in contact with the bottom surface of the heating chamber 210. Therefore, when the heat is generated by the heater 220, the heating chamber 210 being in contact with the heater 220 may be heated by conduction. Therefore, the heater 220 may receive power from the main battery 410 and/or the module battery 600 provided in the cleaner main body 400 and heat the water flowing in the heating chamber 210.

[0217] Meanwhile, the heater 220 may adjust a temperature of the water in response to the user's input. In addition, the heater 220 may change the phase of the water into steam (moisture vapor) in response to the user's input.

[0218] Meanwhile, in the present embodiment, the heater 220 may be provided as a plurality of heaters 220. For example, the heaters 220 may include a first heater 221 provided in the leftward/rightward direction of the wet mop rag module 100, and a second heater 222 provided in parallel with the first heater 221. As another example, the heaters 220 may include the first heater 221 provided in the forward/rearward direction of the wet mop rag module 100, and the second heater 222 provided in parallel with the first heater 221.

[0219] In this case, the plurality of heaters 220 may be symmetrically disposed. Specifically, the plurality of heaters 220 may be symmetrically disposed based on an imaginary symmetric surface S. In this case, the imaginary symmetric surface S may be disposed to be perpendicular to the bottom surface of the heating chamber 210.

[0220] The lower cover 230 may be disposed below the heater 220 and the lower insulator 260 and cover the heater 220 and the lower insulator 260. For example, the lower cover 230 may be formed in a flat plate shape that may surround the heater 220 and the lower insulator 260. The lower cover 230 may be made of a material capable of blocking heat generated from the heater 220.

[0221] With this configuration, the heat generated by the heater 220 may be prevented from being discharged to the outside of the steam generator 200, thereby improving energy efficiency. In addition, it is possible to prevent the components accommodated in the module housing 110 from being damaged by the heat generated by the heater 220.

[0222] The sealer 240 may be disposed at the upper side of the heating chamber 210 and seal the upper side of the heating chamber 210. Specifically, the sealer 240 may seal the opened upper side of the chamber main body 211. The sealer 240 may be made of a material capable of blocking the passage of the moisture. With this configuration, even though the moisture vapor gen-

erated in the heating chamber 210 flows upward, the moisture vapor may be blocked by the sealer 240 and prevented from leaking to the outside.

[0223] The upper cover 250 may be disposed above the sealer 240 and the upper insulator 270 and cover the sealer 240 and the upper insulator 270. For example, the upper cover 250 may be formed in a flat plate shape that may surround the sealer 240 and the upper insulator 270. The upper cover 250 may be made of a material capable of blocking heat transferred through the sealer 240.

[0224] With this configuration, the heat generated by the heater 220 may be prevented from being discharged to the outside of the steam generator 200, thereby improving energy efficiency. In addition, it is possible to prevent the components accommodated in the module housing 110 from being damaged by the heat generated by the heater 220.

[0225] The lower insulator 260 may be disposed between the heater 220 and the lower cover 230 and block heat transferred from the heater 220. The lower insulator 260 may be formed to have a larger area than the heater 220. For example, the lower insulator 260 may be formed in a flat plate shape and made of a material capable of blocking the heat transfer.

[0226] With this configuration, the heat generated by the heater 220 may be prevented from being discharged to the outside of the steam generator 200, thereby improving energy efficiency. In addition, it is possible to prevent the components accommodated in the module housing 110 from being damaged by the heat generated by the heater 220. In particular, in the present embodiment, the heat generated by the heater 220 may be blocked doubly by the lower insulator 260 and the lower cover 230, thereby maximizing the effect of improving energy efficiency and preventing damage to the component.

[0227] The upper insulator 270 may be disposed above the sealer 240 and block the heat transferred from the heating chamber 210. The upper insulator 270 may be formed to have a larger area than the sealer 240. For example, the upper insulator 270 may be formed in a flat plate shape and made of a material capable of blocking the heat transfer.

[0228] With this configuration, the heat in the heating chamber 210 heated by the heater 220 may be prevented from being discharged to the outside of the steam generator 200, thereby improving energy efficiency. In addition, it is possible to prevent the heat in the heating chamber 210 from being discharged to the outside of the steam generator 200 and damaging the component accommodated in the module housing 110. In particular, in the present embodiment, the heat in the heating chamber 210 may be blocked doubly by the upper insulator 270 and the upper cover 250, thereby maximizing the effect of improving energy efficiency and preventing damage to the component.

[0229] The overheating shut-off device 280 may be disposed on the lateral surface of the heating chamber 210. When a temperature of the heating chamber 210 is equal to or higher than a predetermined reference temperature Tr, the overheating shut-off device 280 may cut off the supply of power to the heater 220.

[0230] The overheating shut-off device 280 may be disposed on the heating chamber 210. Specifically, the overheating shut-off device 280 may be disposed on an outer surface of the sidewall 218 of the heating chamber 210. For example, the overheating shut-off device 280 may be disposed on the outer surface of the left sidewall 218c or the right sidewall 218d.

[0231] The overheating shut-off device 280 may be disposed at a position on the heating chamber 210 at which heat is concentrated. For example, the overheating shut-off device 280 may be disposed on the symmetric surface S. The symmetric surface S may be a reference surface based on which the plurality of heaters 220 is disposed symmetrically. Further, the overheating shut-off device 280 may be disposed in a direction perpendicular to the symmetric surface S.

[0232] Because a surface of the heater 220 is made of a material having high thermal conductivity, surface temperatures of the heater 220 may be uniform. However, in case that the plurality of heaters 220 is disposed, the heat of the two opposite heaters 220 is concentrated between the plurality of heaters 220, which may cause abnormal overheating. Therefore, in case that the overheating shut-off device 280 is disposed on the symmetric surface S, the overheating shut-off device 280 may detect abnormal overheating when the overheating occurs, and the overheating shut-off device 280 may cut off the supply of power to the heater 220.

[0233] In addition, in case that the overheating shut-off device 280 is disposed in the direction perpendicular to the symmetric surface S, at least a part of the overheating shut-off device 280 may detect regions in which the plurality of heaters 220 is disposed. Therefore, abnormal overheating occurring on the plurality of heaters 220 may be detected even by the single overheating shut-off device 280, and the overheating shut-off device 280 may cut off the supply of power to the heater 220.

[0234] The overheating shut-off device 280 may cut off the supply of power to the heater 220 when the temperature of the heating chamber 210 is equal to or higher than the predetermined reference temperature Tr. Specifically, the overheating shut-off device 280 may cut off the supply of power from the module battery 600 to the heater 220 when the temperature of the heating chamber 210 is equal to or higher than the predetermined reference temperature Tr.

[0235] The overheating shut-off device 280 may be a device configured to disconnect a circuit when overheating occurs. For example, the overheating shut-off device 280 may be a thermal protector. The thermal protector may be a device that may use bimetal to automatically disconnect the circuit when overheating occurs. In addition, the overheating shut-off device 280 may include all means for disconnecting the circuit when overheating oc-

curs.

[0236] The temperature detector 290 may measure a temperature of the steam generator 200.

[0237] The temperature detector 290 may be disposed on the lateral surface of the heating chamber 210. Specifically, the temperature detector 290 may be disposed on the outer surface of the sidewall 218 of the heating chamber 210. For example, the temperature detector 290 may be disposed on the outer surface of the rear sidewall 218b.

[0238] The temperature detector 290 may measure the temperature of the heating chamber 210. For example, the temperature detector 290 may be a thermistor. In this case, the temperature detector 290 may transfer information on the measured temperature of the heating chamber 210 to the wet mop rag module control unit 700.

[0239] Meanwhile, with reference to FIG. 1, the cleaner 1 according to the present disclosure may include the extension tube 300.

[0240] The extension tube 300 may be coupled to the cleaner main body 400 and the wet mop rag module 100.

[0241] For example, the extension tube 300 may be formed in a long cylindrical shape. Therefore, an internal space of the extension tube 300 may communicate with an internal space of the wet mop rag module 100. In addition, the extension tube 300 may communicate with a suction flow path formed in a suction part 420 of the cleaner main body 400.

[0242] When a suction force is generated by the suction motor (not illustrated), the suction force may be provided to the wet mop rag module 100 through the suction part 420 and the extension tube 300. Therefore, outside dust and air may be introduced into the cleaner main body 400 through the wet mop rag module 100 and the extension tube 300. In addition, dust and air introduced through the wet mop rag module 100 may pass through the extension tube 300 and then be introduced into the cleaner main body 400.

[0243] Meanwhile, an electric wire may be embedded in the extension tube 300. Therefore, the cleaner main body 400 and the wet mop rag module 100 may be electrically connected to each other through the extension tube 300.

[0244] Meanwhile, with reference to FIG. 1, the cleaner 1 according to the present disclosure may include the cleaner main body 400.

[0245] The cleaner main body 400 may include the suction motor, a dust bin, and the main battery 410. The cleaner main body 400 may operate the suction motor by receiving power from the main battery 410, and the suction force may be generated by the operation of the suction motor.

[0246] The suction flow path may be formed in the cleaner main body 400, such that air and dust introduced from the wet mop rag module 100 may flow.

[0247] Further, the cleaner main body 400 may be equipped with at least one cyclone part that separates dust sucked into the cleaner main body 400 by applying a principle of a dust collector using a centrifugal force. Therefore, the dust may be separated as the air introduced through the suction flow path flows spirally.

[0248] Further, the cleaner main body 400 may be equipped with the dust bin, and the dust bin may store the dust separated from the sucked air by a cyclone flow.

[0249] Further, the main battery 410 may supply power to the wet mop rag module 100. In this case, the main battery 410 may supply power to the drive motor 170 of the wet mop rag module 100. Further, the main battery 410 may supply power to the water pump 133 of the wet mop rag module 100.

[0250] Meanwhile, in case that the module battery 600 is coupled to the cleaner 1, the main battery 410 may supply power to the drive motor 170 and the water pump 133, but the main battery 410 may not supply power to the steam generator 200. On the contrary, in case that the module battery 600 is not coupled to the cleaner 1, the main battery 410 may supply power to the drive motor 170, the water pump 133, and the steam generator 200.

[0251] Further, the cleaner main body 400 may be equipped with an input part, such that the user may set whether to supply power, intensity of air suction, intensity of the rotation of the mop rag, the amount of water to be supplied, whether to heat water, and whether to supply steam.

[0252] With reference to FIGS. 1 and 2, the cleaner 1 according to the present disclosure may include the module battery housing 500.

[0253] The module battery housing 500 may be coupled to the wet mop rag module 100 or the extension tube 300, and the module battery 600 may be detachably coupled to the module battery housing 500. For example, the module battery housing 500 may be coupled to the connection tube 180 of the wet mop rag module 100, and the module battery 600 may be detachably accommodated in the module battery housing 500.

[0254] The module battery housing 500 may electrically connect the module battery 600 to the steam generator 200. With this configuration, the electrical energy of the module battery 600 may be supplied to the steam generator 200 required to be supplied with high electric power.

[0255] On the contrary, the module battery housing 500 may connect, in series, the module battery 600 and a battery (not illustrated) provided in the cleaner main body 400. With this configuration, the electric power may be stably supplied when the supply of high electric power is required such as when the steam generator 200 operates.

[0256] On the contrary, the module battery housing 500 may connect, in parallel, the module battery 600 and the main battery 410 provided in the cleaner main body 400. With this configuration, the use time of the cleaner 1 may be extended.

[0257] With reference to FIGS. 1 and 2, the cleaner 1 according to the present disclosure may include the module battery 600.

[0258] The module battery 600 may store electrical energy therein. For example, the module battery 600 may be a secondary battery.

[0259] The module battery 600 may supply power to the wet mop rag module 100. Specifically, the module battery 600 may supply power to the steam generator 200. In this case, the module battery 600 and the steam generator 200 may be electrically connected, and the overheating shut-off device 280 may be connected between the module battery 600 and the steam generator 200. That is, the power supplied from the module battery 600 may pass through the overheating shut-off device 280 and be supplied to the heater 220 of the steam generator 200.

[0260] The power supply relationship between the module battery 600 and the main battery 410 in the present embodiment will be described below.

[0261] In the present embodiment, in case that the module battery 600 is not mounted in the cleaner 1, the main battery 410 may supply power to the cleaner main body 400 and the wet mop rag module 100.

[0262] Meanwhile, in case that the module battery 600 is mounted in the cleaner 1, the main battery 410 may supply power to the cleaner main body 400 and the wet mop rag module 100, but the main battery 410 may not supply power to the steam generator 200.

[0263] That is, in case that the module battery 600 is mounted in the cleaner 1, the main battery 410 may supply power to the drive motor 170 and the water pump 133 of the wet mop rag module 100, and the module battery 600 may supply power to the steam generator 200.

[0264] Meanwhile, the overheating shut-off device 280 disconnects the module battery 600 and the heater 220 when the temperature of the heating chamber 210 is equal to or higher than the reference temperature Tr in the state in which the module battery 600 is mounted in the cleaner 1. Therefore, the supply of power to the heater 220 is cut off. In contrast, the drive motor 170 and the water pump 133 may continuously receive power from the main battery 410.

[0265] With this configuration, when the steam generator 200 is overheated, only the function of heating the water is stopped, and the function of supplying water to the mop rag and the function of rotating the mop rag may be maintained. Therefore, the water, which has already been heated, may be supplied to the mop rag, such that the cleaning performance of the wet mop rag module 100 may be maintained.

[0266] FIG. 15 is a view for explaining a configuration for controlling the cleaning module according to the embodiment of the present disclosure.

[0267] A configuration for controlling the wet mop rag module 100 according to the embodiment of the present disclosure will be described with reference to FIGS. 1 to 15.

[0268] The wet mop rag module 100 according to the embodiment of the present disclosure includes the wet mop rag module control unit 700.

[0269] The wet mop rag module control unit 700 may include a memory (not illustrated) and a timer (not illustrated). The memory (not illustrated) may store preset information. The timer (not illustrated) may measure time.

[0270] Although not illustrated, the wet mop rag module control unit 700 may receive a control signal inputted through the cleaner main body 400, the wet mop rag module 100, or an external terminal (not illustrated). For example, the wet mop rag module control unit 700 may be connected to the cleaner main body 400, the wet mop rag module 100, or the external terminal (not illustrated) through wired communication or wireless communication.

[0271] The wet mop rag module control unit 700 may control the components included in the wet mop rag module 100.

[0272] The wet mop rag module control unit 700 may be connected to the first operating part 191 and the second operating part 192 so as to transmit or receive signals therebetween. For example, the wet mop rag module control unit 700 may be electrically connected to the first operating part 191 and the second operating part 192 and transmit and receive electrical signals. With this configuration, the wet mop rag module 100 may receive a user input-based control signal from the first operating part 191 and/or the second operating part 192 and operate in response to the received control signal.

[0273] In addition, the wet mop rag module control unit 700 may be connected to the overheating shut-off device 280 so as to transmit or receive signals therebetween. When the heating chamber 210 is overheated to the predetermined reference temperature Tr or higher, the overheating shut-off device 280 may transfer information on the overheating to the wet mop rag module control unit 700.

[0274] The wet mop rag module control unit 700 may be connected to the temperature detector 290 so as to transmit or receive signals therebetween. The temperature detector 290 may measure the temperature of the steam generator 200 and transfer information on the temperature of the steam generator 200 to the wet mop rag module control unit 700.

[0275] The wet mop rag module control unit 700 may receive power from the main battery 410.

[0276] According to the embodiment, the wet mop rag module control unit 700 may receive power from the module battery 600.

[0277] The wet mop rag module control unit 700 may control the water pump 133. The wet mop rag module control unit 700 may control the amount of moisture to be supplied from the water tank 120 to the mop rag 150 in response to a control signal inputted from the first operating part 191. For example, the wet mop rag module control unit 700 may control an operating time of the water pump 133 in response to a control signal inputted from the first operating part 191.

[0278] The wet mop rag module control unit 700 may control the heater 220. The wet mop rag module control

unit 700 may control the temperature and phase of the moisture to be supplied to the mop rag 150 in response to a control signal inputted from the second operating part 192. For example, in response to the control signal inputted from the second operating part 192, the wet mop rag module control unit 700 may control the operating time of the heater 220 and the amount of electric power to be applied to the heater 220. In addition, in case that the temperature of the steam generator 200 measured by the temperature detector 290 is different from a preset target temperature, the wet mop rag module control unit 700 may change the operating time of the heater 220 and the amount of electric power to be applied to the heater 220.

[0279] With this configuration, according to the present disclosure, the temperature of the water introduced into the steam generator 200 or the phase of the moisture may be maintained, and the energy efficiency may be improved.

[0280] In addition, according to the embodiment, the wet mop rag module control unit 700 may control the light-emitting module 160. The wet mop rag module control unit 700 may control and turn on or off the light-emitting module 160 in response to the user's control input. In addition, the wet mop rag module control unit 700 may control the light amount of the light-emitting module 160 in response to the user's control input.

[0281] In addition, according to the embodiment, the wet mop rag module control unit 700 may control the drive motor 170. The wet mop rag module control unit 700 may control a rotational speed (rpm) of the drive motor 170 in response to the user's control input.

[0282] Meanwhile, FIG. 16 is a flowchart for explaining a method of preventing the wet mop rag module according to the embodiment of the present disclosure from being overheated.

[0283] The method of preventing the wet mop rag module according to the embodiment of the present disclosure from being overheated will be described with reference to FIGS. 15 and 16.

[0284] In the embodiment of the present disclosure, the wet mop rag module control unit 700 may prevent overheating by controlling the heater 220.

[0285] When the heater 220 operates, the temperature detector 290 may measure the temperature of the steam generator 200. Further, the temperature detector 290 may transfer information on the temperature of the steam generator 200 to the wet mop rag module control unit 700 (S10).

[0286] The wet mop rag module control unit 700 may use the information received from the temperature detector 290 and determine whether the temperature of the steam generator 200 is equal to or higher than the preset reference temperature Tr (S20).

[0287] In this case, when the temperature of the steam generator 200 is equal to or higher than the preset reference temperature Tr, the wet mop rag module control unit 700 may determine that overheating has occurred, and the wet mop rag module control unit 700 may count the number of times the overheating occurs (S30). For example, the process of counting the number of times may mean that the number of times is set to one when the temperature of the steam generator 200 becomes equal to or higher than the reference temperature Tr for the first time, the number of times is increased to two when the temperature of the steam generator 200 becomes equal to or higher than the reference temperature Tr again thereafter, and thus the number of times is cumulatively increased as described above.

[0288] In contrast, the counted number of times may be initialized to zero when the temperature of the steam generator 200 is lower than the preset reference temperature Tr.

[0289] Further, the wet mop rag module control unit 700 may determine whether the counted number of times reaches a preset reference number of times (S40). For example, the wet mop rag module control unit 700 may determine whether the counted number of times reaches five.

[0290] In this case, when the counted number of times reaches the preset reference number of times, the wet mop rag module control unit 700 may end the operation of the heater 220 (S50). For example, when the counted number of times reaches five, the wet mop rag module control unit 700 may end the operation of the heater 220.

[0291] With the above-mentioned control, the operation of the heater 220 is ended when the heater 220 is sufficiently heated and the temperature exceeds a target temperature, such that the steam generator 200 is prevented from being overheated.

[0292] In addition, even though instantaneous overheating occurs or a detection error of the temperature detector 290 occurs, the wet mop rag module control unit 700 may verify whether the steam generator 200 is actually overheated, and thus the wet mop rag module control unit 700 may stably control the heater 220.

[0293] While the present disclosure has been described with reference to the specific embodiments, the specific embodiments are only for specifically explaining the present disclosure, and the present disclosure is not limited to the specific embodiments. It is apparent that the present disclosure may be modified or altered by those skilled in the art without departing from the technical spirit of the present disclosure.

[0294] All the simple modifications or alterations to the present disclosure fall within the scope of the present disclosure, and the specific protection scope of the present disclosure will be defined by the appended claims.

Claims

1. A wet mop rag module for a cleaner, which cleans a floor surface by wiping away debris, the wet mop rag module comprising:

a module housing;
a water tank coupled to the module housing and configured to store water therein;
at least one rotary cleaning unit disposed at a lower side of the module housing and configured such that a mop rag is coupled to the rotary cleaning unit; and
a steam generator configured to heat water supplied from the water tank,
wherein the steam generator comprises:

a heating chamber having a flow path in which moisture flows;
a heater disposed at a lower side of the heating chamber and configured to supply heat to the heating chamber; and
an overheating shut-off device disposed at one side of the heating chamber and configured to cut off a supply of power to the heater when a temperature of the heating chamber is equal to or higher than a predetermined reference temperature.

2. The wet mop rag module of claim 1, wherein the steam generator further comprises a temperature detector disposed on a lateral surface of the heating chamber and configured to measure the temperature of the heating chamber.

3. The wet mop rag module of claim 1, wherein the steam generator further comprises:

a lower cover disposed at a lower side of the heater and configured to cover the heater; and
a lower insulator disposed between the heater and the lower cover and configured to block heat transferred from the heater.

4. The wet mop rag module of claim 1, wherein the steam generator further comprising:

a sealer disposed at an upper side of the heating chamber and configured to seal the upper side of the heating chamber;
an upper insulator disposed at an upper side of the sealer and configured to block heat transferred from the heating chamber; and
an upper cover disposed at an upper side of the upper insulator.

5. The wet mop rag module of claim 1, wherein the heater is provided as two or more heaters symmetrically disposed based on an imaginary symmetric surface, and the overheating shut-off device is disposed on the symmetric surface.

6. The wet mop rag module of claim 1, further comprising:

a module battery configured to supply power to the heater,
wherein the overheating shut-off device cuts off a supply of power from the module battery to the heater when the temperature of the heating chamber is equal to or higher than the reference temperature.

7. A cleaner comprising:

a cleaner main body comprising a main battery; and
a wet mop rag module connected to the cleaner main body and configured to clean a floor surface by wiping away debris,
wherein the wet mop rag module comprises:

a module housing;
a water tank coupled to the module housing and configured to store water therein;
at least one rotary cleaning unit disposed at a lower side of the module housing and configured such that a mop rag is coupled to the rotary cleaning unit;
a drive motor accommodated in the module housing and configured to provide a rotational force to the rotary cleaning unit; and
a steam generator configured to heat water supplied from the water tank, and
wherein the steam generator comprises:

a heating chamber having a flow path in which moisture flows;
a heater disposed at a lower side of the heating chamber and configured to supply heat to the heating chamber; and
an overheating shut-off device disposed at one side of the heating chamber and configured to cut off a supply of power to the heater when a temperature of the heating chamber is equal to or higher than a predetermined reference temperature.

8. The cleaner of claim 7, wherein when the temperature of the heating chamber is equal to or higher than the reference temperature, the drive motor receives power, and a supply of power to the heater is cut off.

9. The cleaner of claim 7, further comprising:

a module battery configured to supply power to the steam generator,
wherein the main battery supplies power to the drive motor, and the module battery supplies power to the heater.

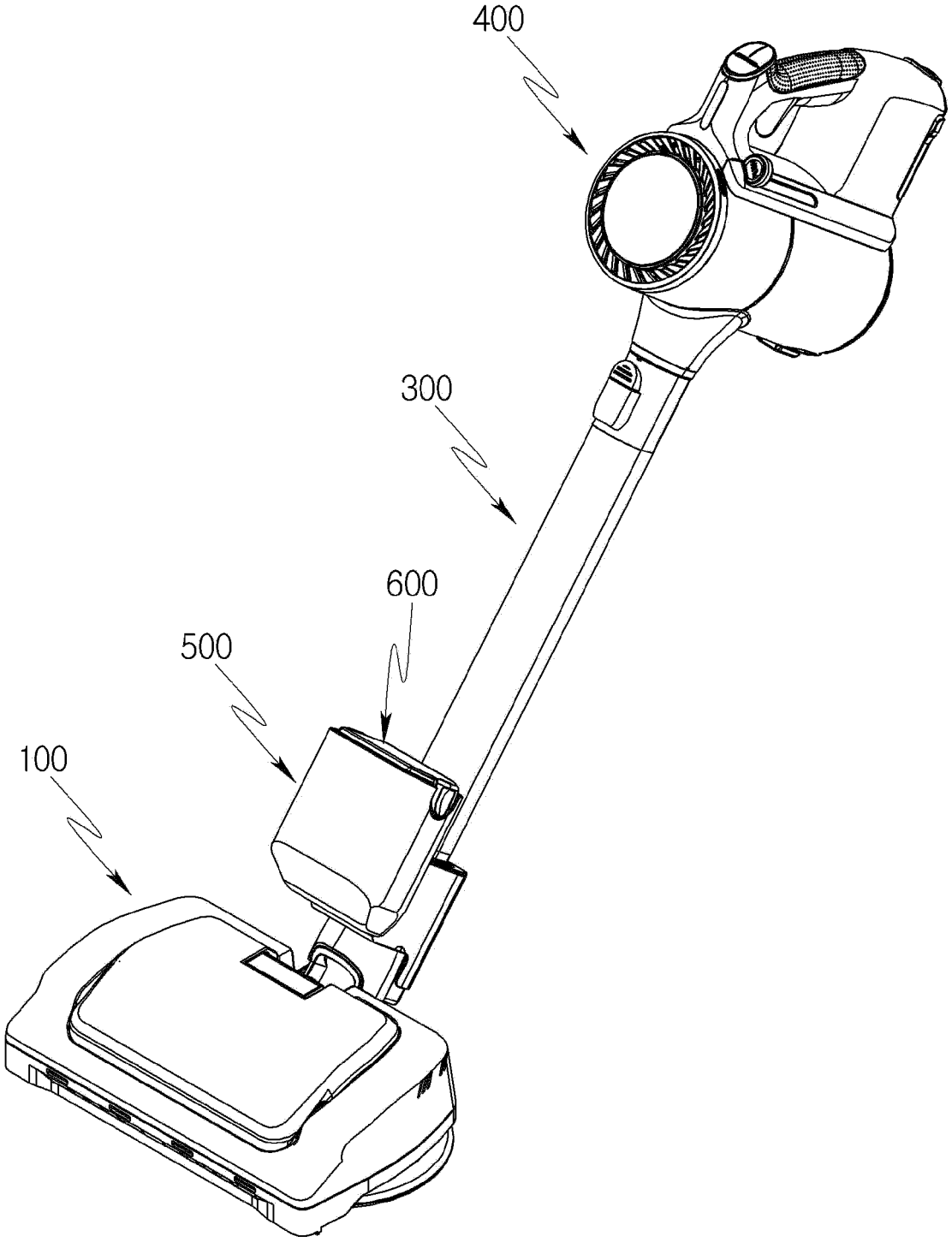
10. The cleaner of claim 9, wherein the overheating shut-off device cuts off a supply of power from the module battery to the heater when the temperature of the heating chamber is equal to or higher than the reference temperature.

11. A method of controlling a cleaner comprising a wet mop rag module configured to supply a pair of mop rags with water heated by a steam generator, the method comprising:

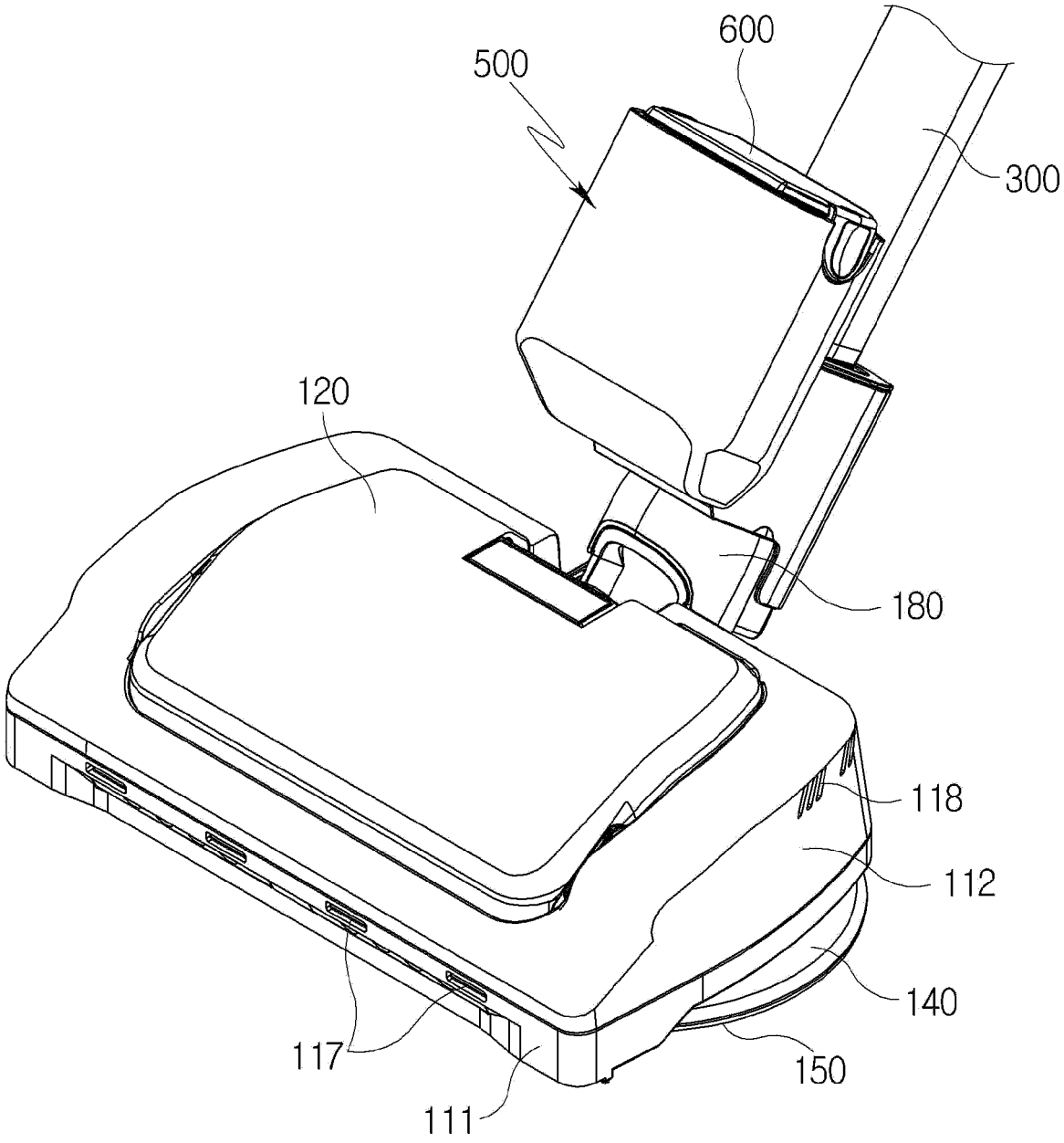
measuring a temperature of the steam generator;
determining whether the temperature of the steam generator is equal to or higher than a preset reference temperature;
determining that overheating occurs when the temperature of the steam generator is equal to or higher than the preset reference temperature, and counting the number of times the overheating occurs; and
ending an operation of the steam generator when the counted number of times is equal to or larger than a preset reference number of times.

12. The method of claim 11, wherein the counted number of times is initialized to zero when the temperature of the steam generator is lower than the preset reference temperature.

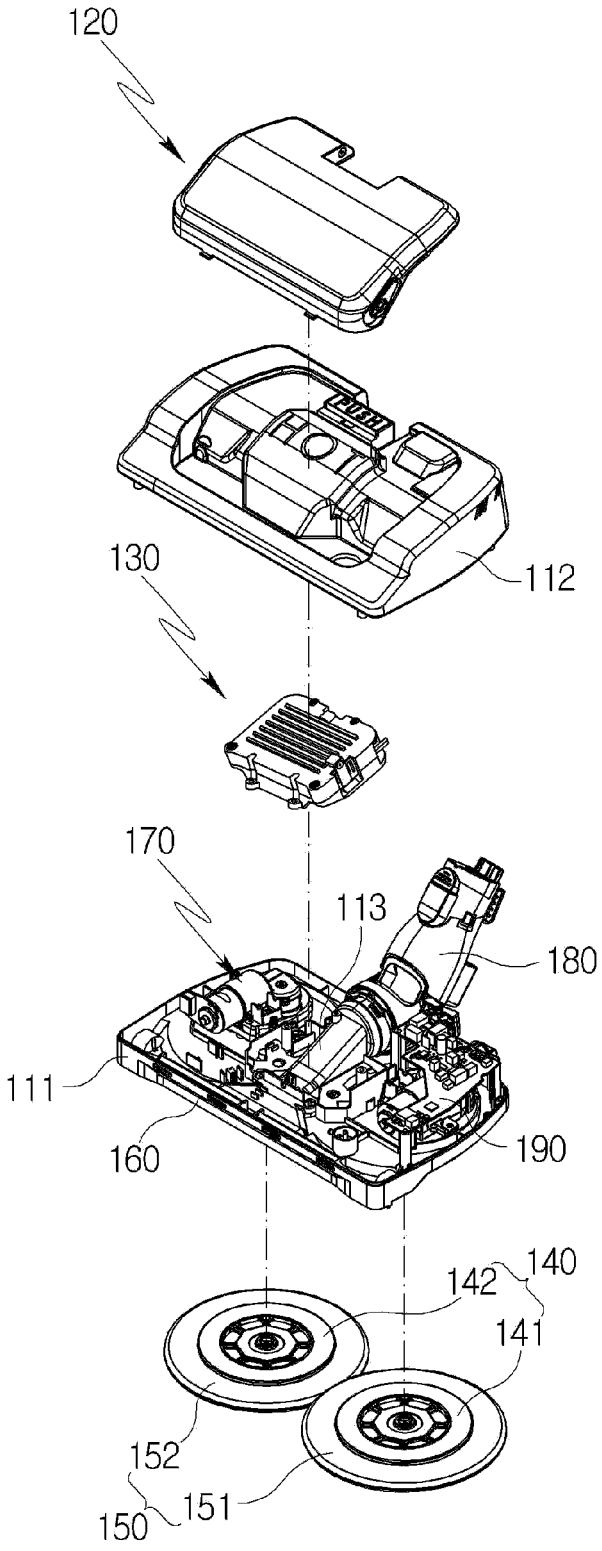
[FIG. 1]



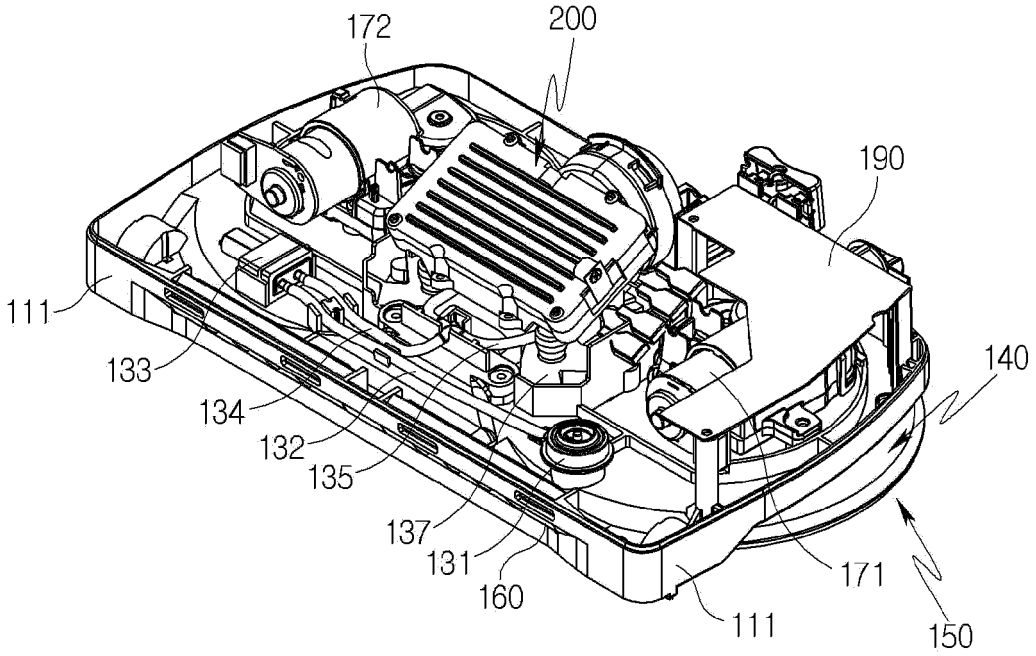
[FIG. 2]



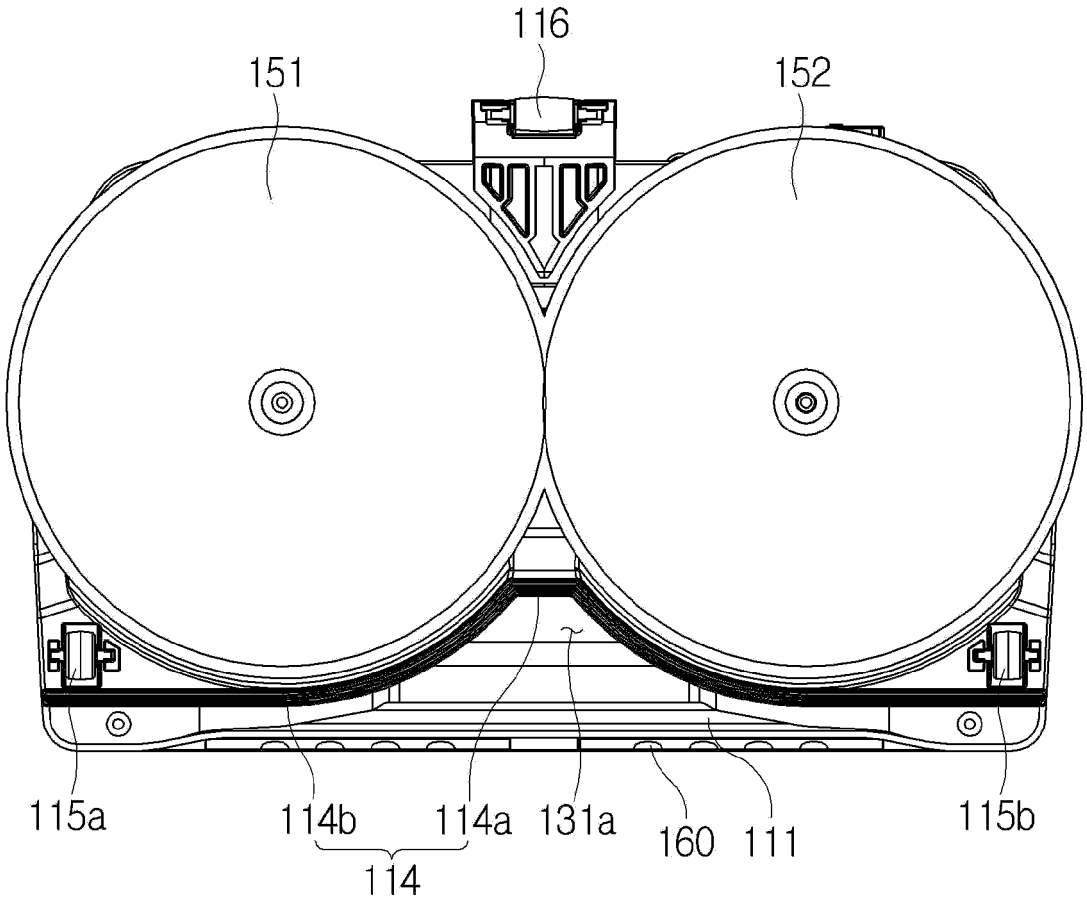
[FIG. 3]



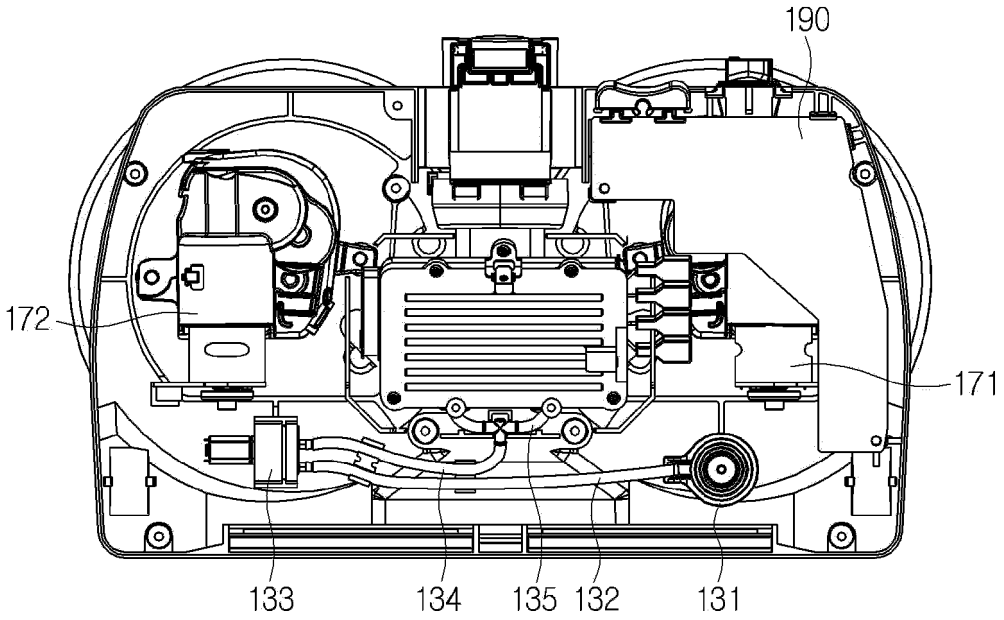
[FIG. 4]



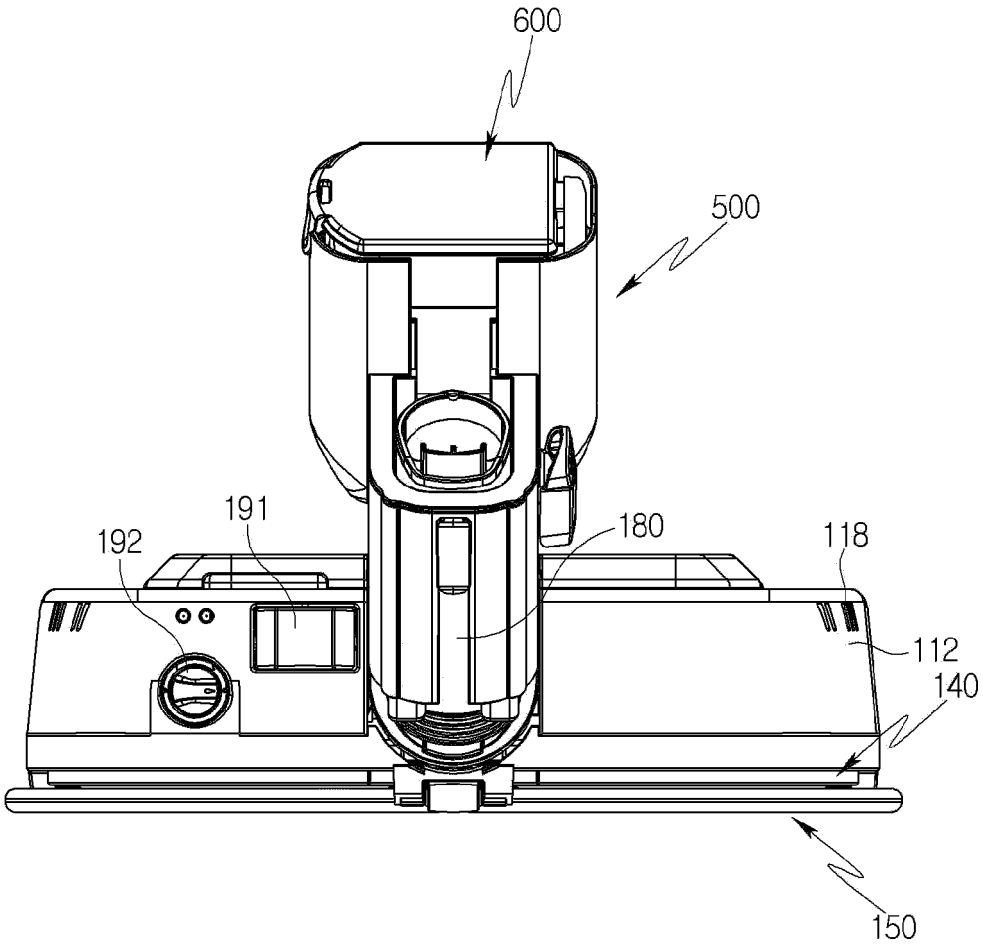
[FIG. 5]



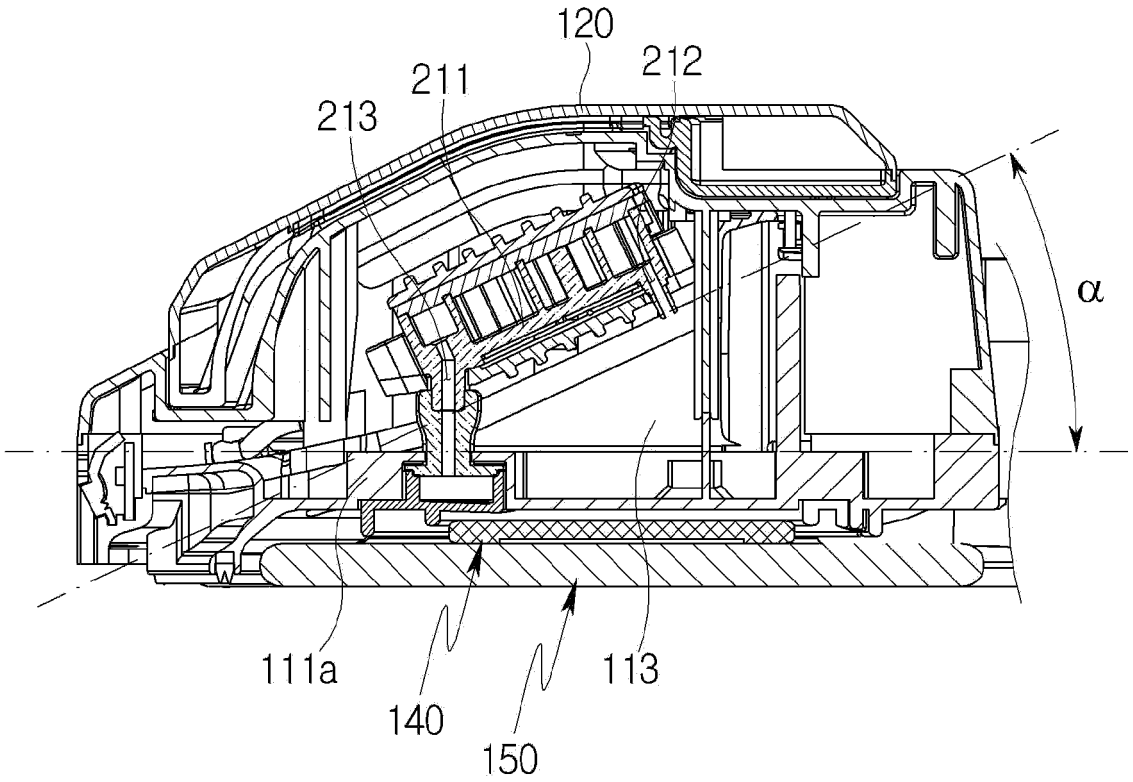
[FIG. 6]



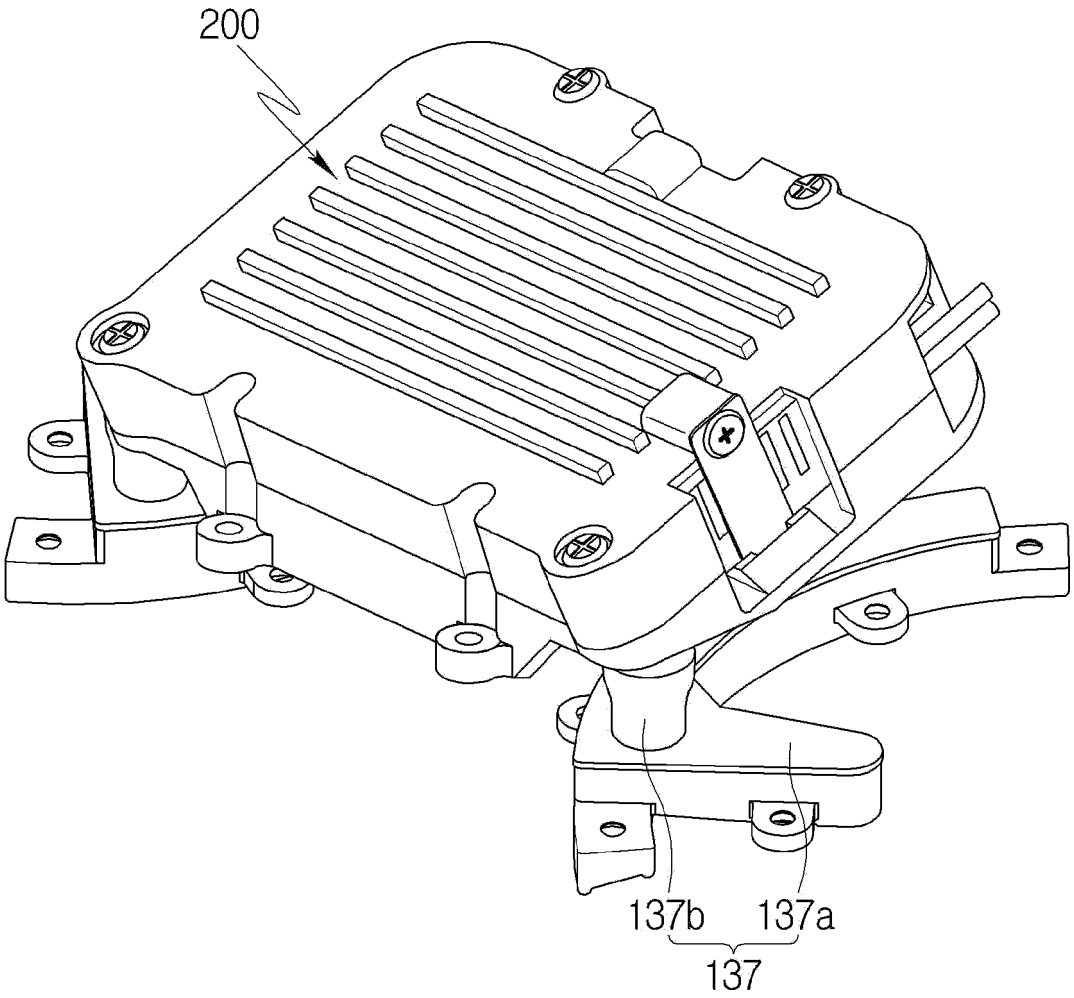
[FIG. 7]



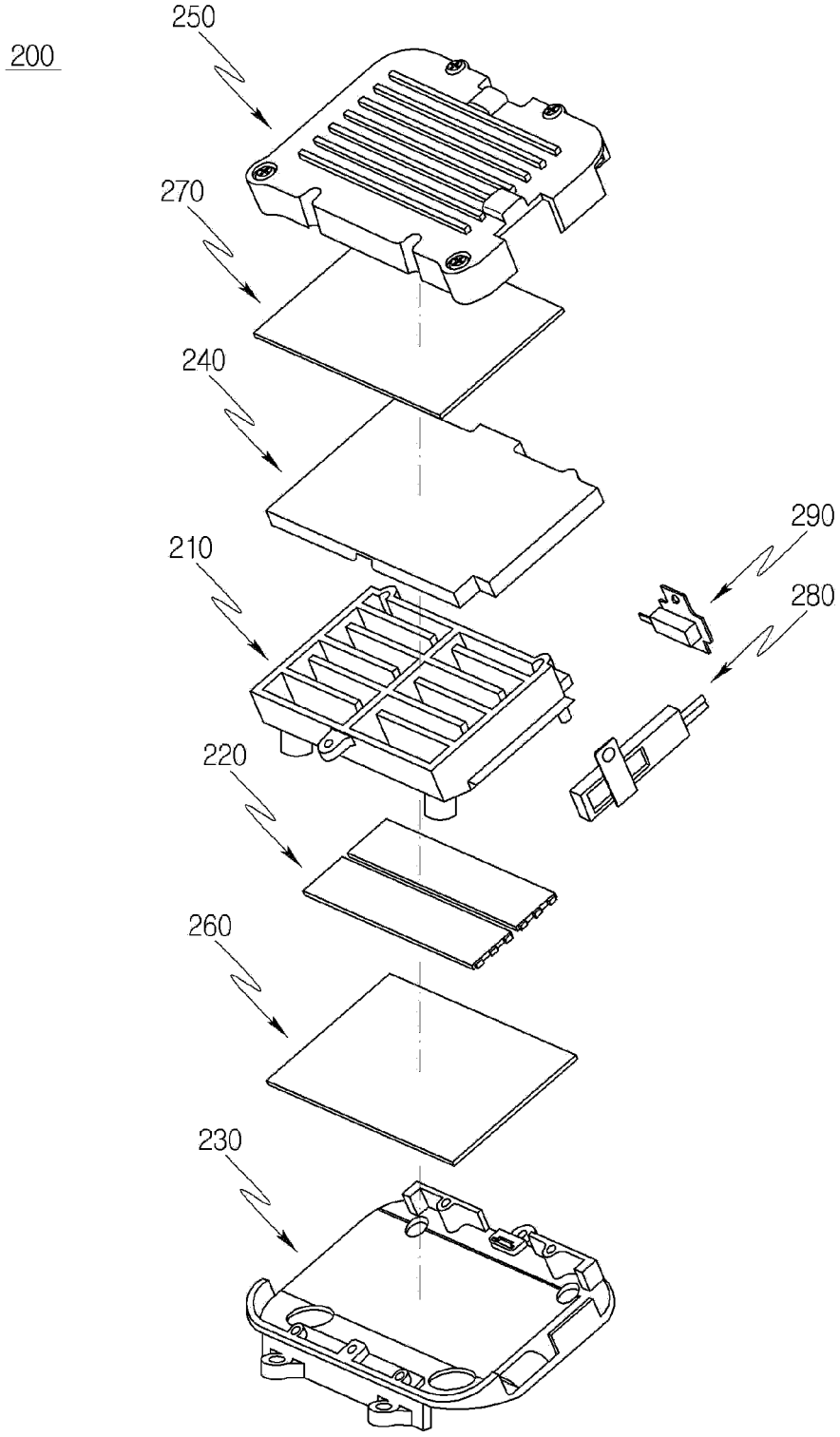
[FIG. 8]



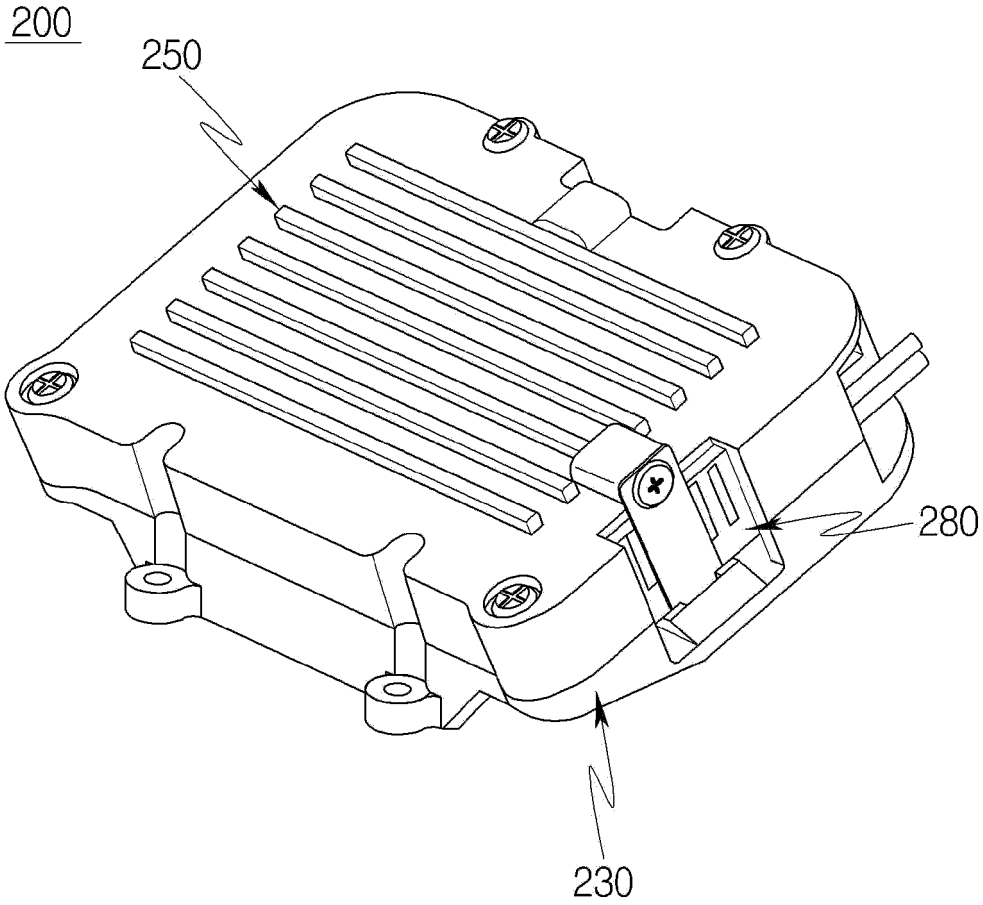
[FIG. 9]



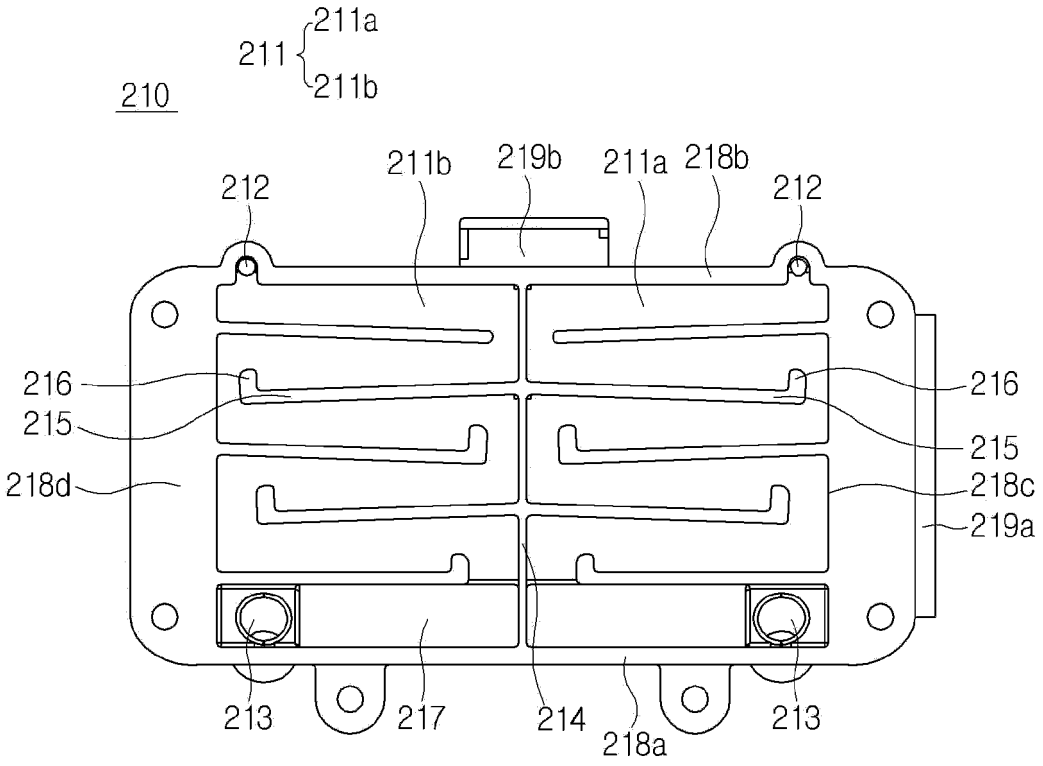
[FIG. 10]



[FIG. 11]



[FIG. 12]


211a
211
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212
211b
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211a
218b
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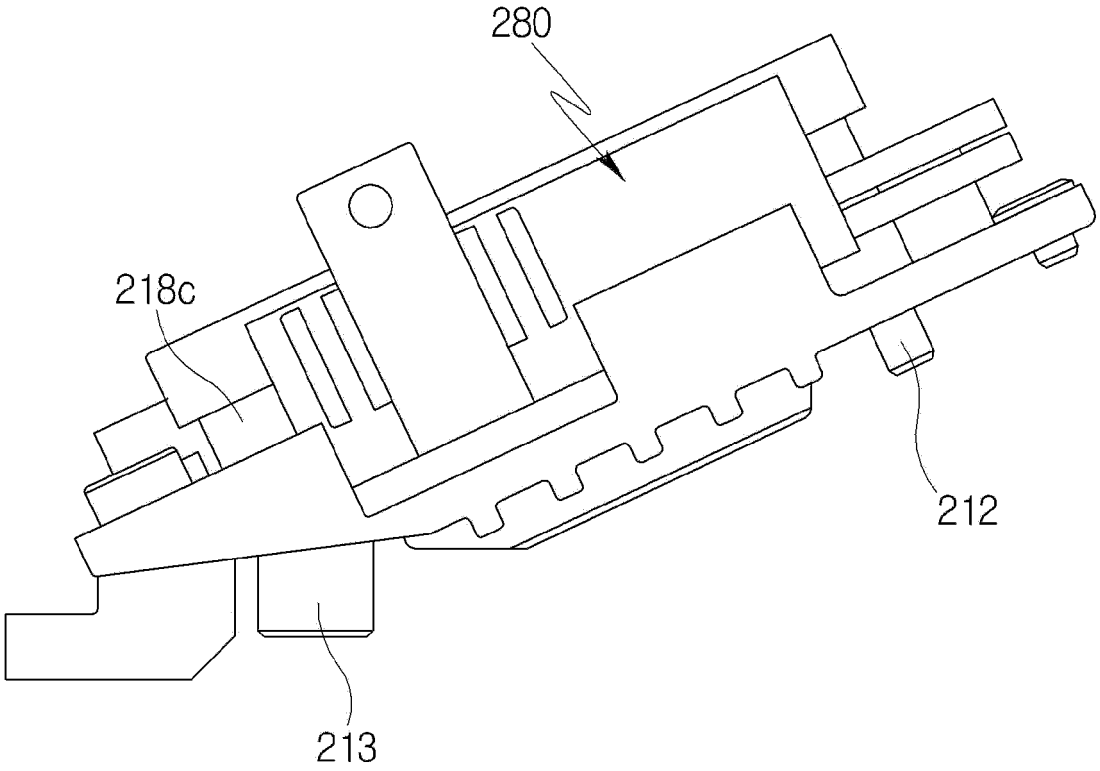
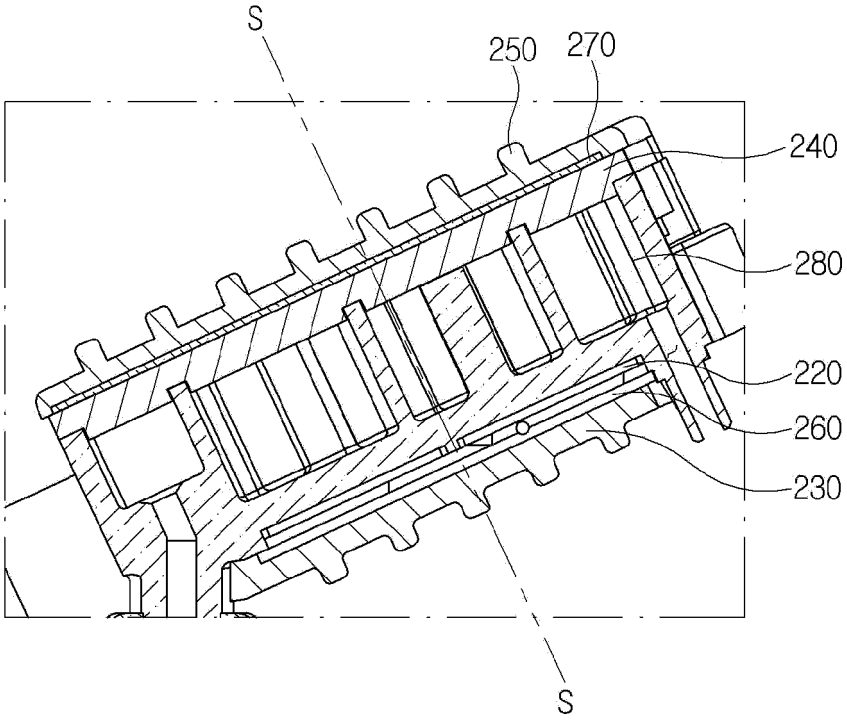
216
215
218d
216
215
218c
219a
213
217
214
218a
213

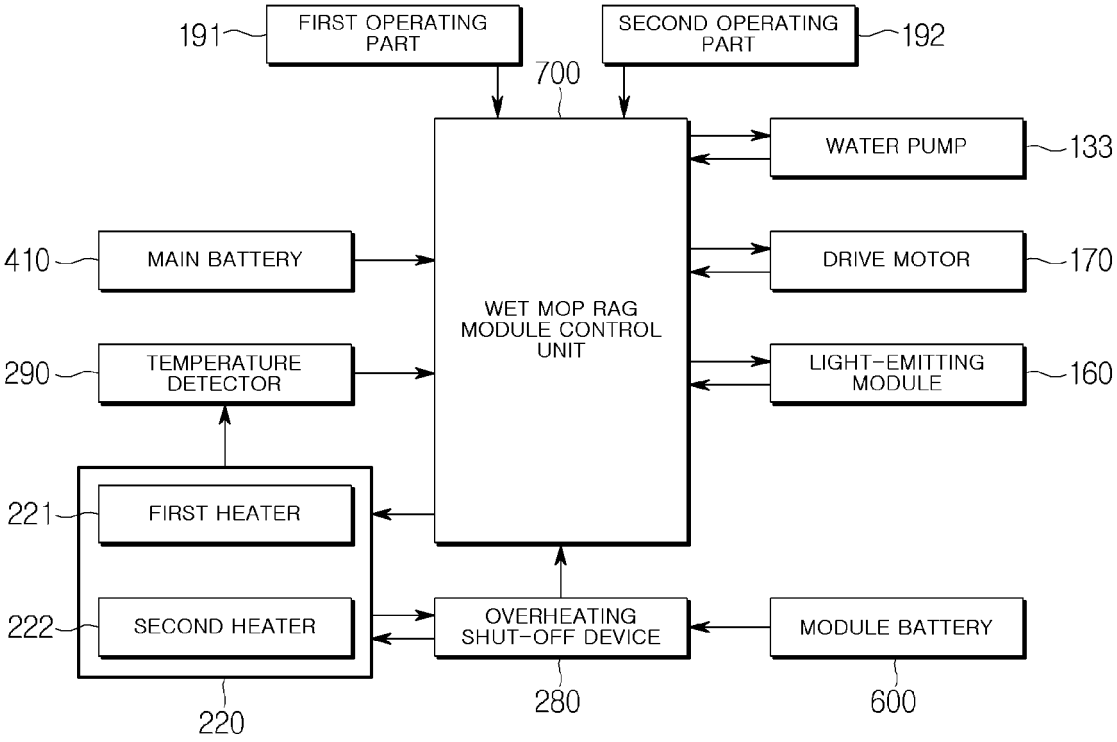
[FIG. 13]



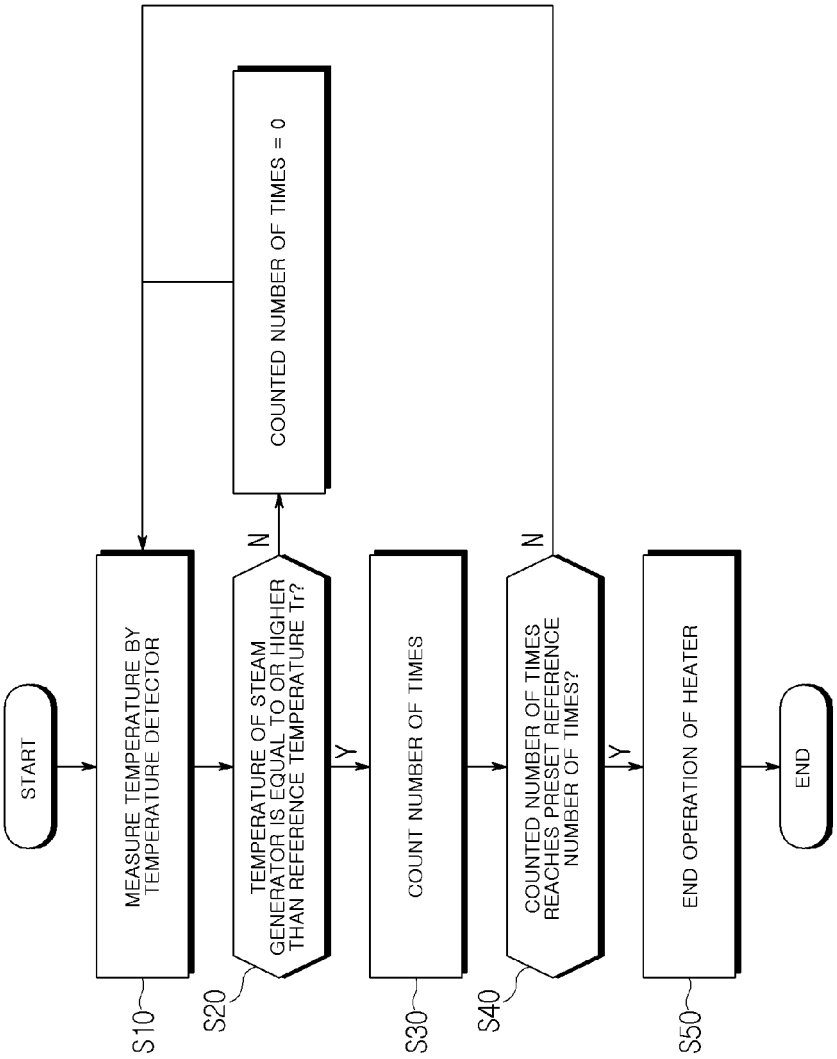
[FIG. 14]



[FIG. 15]


191
FIRST OPERATING PART
SECOND OPERATING PART
192
700
WATER PUMP
133
410
MAIN BATTERY
DRIVE MOTOR
170
WET MOP RAG MODULE CONTROL UNIT
290
TEMPERATURE DETECTOR
LIGHT-EMITTING MODULE
160
221
FIRST HEATER
222
SECOND HEATER
OVERHEATING SHUT-OFF DEVICE
MODULE BATTERY
220
280
600

[FIG. 16]


START
MEASURE TEMPERATURE BY TEMPERATURE DETECTOR
TEMPERATURE OF STEAM GENERATOR IS EQUAL TO OR HIGHER THAN REFERENCE TEMPERATURE Tr?
N
Y
COUNTED NUMBER OF TIMES = 0
COUNT NUMBER OF TIMES
COUNTED NUMBER OF TIMES REACHES PRESET REFERENCE NUMBER OF TIMES?
N
Y
END OPERATION OF HEATER
END
S10
S20
S30
S40
S50

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- US 9420933 B2 **[0011]**
- KR 1609444 B1 **[0014]**