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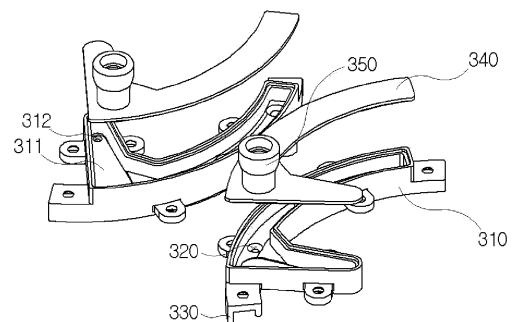
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(54) **MOP MODULE OF CLEANING DEVICE**

(57) There is disclosed a mop module of a vacuum cleaner including a module housing; a water tank disposed above the module housing and configured to store water therein; at least one rotary cleaning part disposed under the module housing, the rotary cleaning part to which a mop is coupled; a heat generator configured to heat water supplied from the water tank; and a diffuser provided under the heat generator and configured to supply moisture heated in the heat generator to the mop, and the diffuser may include a diffuser housing coupled to the module housing; and a moisture supply hole formed in the diffuser housing, the moisture supply hole through which the moisture heated in the heat generator is discharged, and the moisture supply hole may be provided along a circumferential direction in plural, and the plurality of moisture supply holes have different diameter, respectively, thereby causing an effect of making the flow amount of the discharged moisture uniform.

【 FIG. 12】



【 FIG. 13】

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Description

[BACKGROUND]

[Technical Field]

[0001] Embodiments of the present disclosure relate to a mop module of a vacuum cleaner, more particularly, a mop module of a vacuum cleaner configured to discharge water onto a mop to suck up or wipe out dust or foreign substances in a cleaning object area to be cleaned.

[Background of the Disclosure]

[0002] A vacuum cleaner is an electric appliance that cleans by sucking up or mopping away dust or foreign substances in a cleaning object area to be cleaned.

[0003] Such vacuum cleaners may be classified into manual cleaners that perform cleaning while the user moves the cleaner, and automatic cleaners that perform cleaning while driving on their own.

[0004] The manual vacuum cleaners may be classified into canister type vacuum cleaners, upright type vacuum cleaners, handheld vacuum cleaners and stick type vacuum cleaners, depending on the shape.

[0005] The methods of cleaning the floor are largely divided into dry cleaning and wet cleaning. The drying cleaning is a method of cleaning the floor by sweeping or sucking up dust and a conventional vacuum cleaner is an example of the dry cleaning. The wet cleaning is a method of cleaning the floor by wiping away dust with a mop.

[0006] Conventionally, a dry-only vacuum cleaner was used for dry cleaning, and a wet-only vacuum cleaner was used for wet drying. However, there was the inconvenience of having to purchase the above two different types of vacuum cleaners to clean different types of floors. To solve the above-mentioned disadvantage, a method has been studied in which a main body, a dry-cleaning module and a wet cleaning module are provided, and in which the dry-cleaning module is mounted on the main body for dry cleaning and the wet cleaning module (i.e., mop module) is mounted on the main body for wet cleaning.

[0007] However, in wet cleaning, if foreign substances are stuck to the floor, the foreign substances might still remain even after the floor is cleaned by rotating the mop that has absorbed water.

[0008] In addition, if microorganisms are growing on the floor, there is a limitation in that the microorganisms might not be completely sterilized even after rotating the wet mop to clean the floor.

[0009] To solve the disadvantages, a method of heating water through a heater and supplying high-temperature water or steam to the mop may be considered.

[0010] In this instance, a steam mop module includes a water tank that stores water, a heater that heats the water to create steam and a mop that receives water or steam to clean the floor. Here, it is preferred that each part is

configured as a single assembly to facilitate replacement. For example, when the water tank or heater is disposed in a main body, there is a problem that cleaning becomes difficult due to the weight of the water tank or heater, which is an unnecessary part during the dry cleaning. Accordingly, in terms of easy cleaning, easy module replacement and space utilization, it is preferred to dispose the water tank or heater in the steam mop module rather than the main body of the vacuum cleaner.

[0011] Meanwhile, a vacuum cleaner including a steam generator is generally provided with power via a cord, so the vacuum cleaner can continuously operate the steam generator to supply steam.

[0012] In contrast, a cordless vacuum cleaner is provided with power by a battery, so there may be a limit to the time it can generate steam. Therefore, it is necessary to quickly supply the steam generated from the steam generator to the mop before it condenses.

[0013] Korean Patent Publication No. KR 10-2008-0020304A (March 05, 2008) discloses a steam vacuum cleaner configured to supply steam to a rotary mop.

[0014] In the steam vacuum cleaner, a plurality of holes are provided in a cross shape on a rotary plate, and steam is supplied to the mop through the plurality of holes.

[0015] However, if the steam outlet holes area formed on the rotary plate as mentioned above, the rotary plate and the mop rotate together so that the steam discharged from the holes may be continuously supplied to the same position on the mop. Accordingly, there are locations where steam is supplied and other locations where steam is not supplied in the mop, so that there may be a limit to the cleaning ability of the mop that varies greatly based on the locations.

[0016] Meanwhile, Korean Patent No. 1668046B1 (October 14, 2016) discloses a steam cleaner in which a spray part is provided in a housing to supply steam to a rotary mop.

[0017] In the steam cleaner, a spray part in which a spray hole is formed may be protruded from a lower housing of the cleaner in an arc-shape, and can discharge steam toward a rotating unit (i.e., rotary plate).

[0018] However, in the steam cleaner, a plurality of spray holes may be formed at regular intervals along a circumferential direction. If the plurality of spray holes are formed as mentioned above, the hydraulic pressure of steam sprayed from a spray hole positioned close to a steam inlet hole is higher than the hydraulic pressure of steam sprayed from a spray hole positioned far from the steam inlet. Accordingly, a relatively large amount of steam may be discharged from the spray hole positioned close to the steam inlet, and a relatively small amount of steam may be discharged from the other spray holes.

[0019] Accordingly, a mop might be supplied moisture unevenly. In the spray part having the plurality of holes formed therein, the cleaning performance of the mop may deteriorate due to uneven steam supply.

[0020] In general, during the process of discharging

steam through an outlet hole of a diffuser, some of the steam may condense to form a drain, and the drain could obstruct the discharge of steam as it is discharged through the outlet hole.

[0021] Specifically, the drain generated during the process of steam discharge, might momentarily block the outlet hole and the flow amount and pressure of steam discharged through the outlet hole may decrease. In addition, if the drain is discharged by the pressure of steam, the flow amount and pressure of steam discharged through the outlet hole might rather increase.

[0022] Accordingly, the flow rate and pressure of steam discharged through the outlet hole might be uneven and the moisture supplied to the mop might be uneven disadvantageously.

[DETAILED DESCRIPTION OF THE INVENTION]

[Technical problem]

[0023] Accordingly, one object of the present disclosure is to solve the above-noted disadvantages of the prior art, and to provide a mop module of a vacuum cleaner that may increase sterilization and foreign substance removal effect by supplying high temperature water or steam to a mop.

[0024] A further object of the present disclosure is to provide a mop module of a vacuum cleaner that may evenly supply high-temperature water or steam to a wide area of the mop at the same time.

[0025] A still further object of the present disclosure is to provide a mop module of a vacuum cleaner that may supply high-temperature water or steam flow and hydraulic pressure to a mop stably and evenly.

[0026] A still further object of the present disclosure is to provide a mop module of a vacuum cleaner that may minimize heat loss of moisture a process of supplying high-temperature water or steam to a mop.

[TECHNICAL SOLUTION]

[0027] To solve the objects of the present disclosure, a mop module of a vacuum cleaner configured to perform cleaning by wiping out foreign substances from the floor surface, the mop module may include a module housing; a water tank disposed above the module housing and configured to store water therein; at least one rotary cleaning part disposed under the module housing, the rotary cleaning part to which a mop is coupled; a heat generator configured to heat water supplied from the water tank; and a diffuser provided under the heat generator and configured to supply moisture heated in the heat generator to the mop.

[0028] At this time, the diffuser may include a diffuser housing coupled to the module housing; and a moisture supply hole formed in the diffuser housing, the moisture supply hole through which the moisture heated in the heat generator is discharged, and at least one moisture supply

hole may be provided along a circumferential direction

[0029] At this time, the moisture supply hole may be provided in plural and the plurality of moisture supply holes may have different diameters, respectively.

[0030] Especially, the diffuser may be connected to the heat generator, and the plurality of moisture supply holes may have diameters that gradually increase as getting farther away from a point connected to the heat generator.

[0031] The mop diffuser may further include a guide rib protruding downward from the diffuser housing and formed along a circumferential direction.

[0032] The diffuser may further include a drain discharge portion downwardly formed from the diffuser housing.

[0033] Alternatively, the diffuser may be connected to the heat generator, and may have an inner space where moisture flows, which becomes narrower as getting farther away from a point connected to the heat generator.

[0034] At this time, the diffuser may further include a diffuser cover coupled to the diffuser housing and forming a space in which moisture flows.

[0035] The diffuser cover may include a cover body covering the diffuser housing; and a flow rate adjustment part protruding toward the diffuser housing from the cover body.

[0036] At this time, the flow rate adjustment part may have a protruding height that varies based on the distance from a point connected to the heat generator.

[0037] The flow rate adjustment part may have a protruding height that increases as getting farther away from a point connected to the heat generator.

[0038] In a mop module of a vacuum cleaner configured to perform cleaning by wiping off foreign substances on the floor surface, the moisture supply hole may be formed along a circumferential direction in a shape of a long hole.

[0039] The moisture supply hole may be formed along a circumferential direction, with a radial diameter that increases gradually.

[0040] The diffuser may further include a guide pole protruding toward the heat generator from the diffuser housing and configured to eliminate a water film generated in the heat generator.

[0041] The diffuser may further include a guide inclined surface configured to guide moisture introduced from the heat generator to the moisture supply hole.

[0042] As mentioned above, the mop module of the vacuum cleaner according to the present disclosure may increase sterilization and foreign substance removal effect by supplying high temperature water or steam to a mop.

[0043] Furthermore, the plurality of moisture supply holes may be formed in the diffuser along the circumferential surface. Accordingly, there is an effect of supplying moisture to a wide area of a mop at the same time.

[0044] Still further, the diffuser may have the outlet hole

with the diameter that gradually increases the flow rate as getting farther away from the point where moisture is introduced. Accordingly, there is an effect of making the flow amount of the moisture discharged from the plurality of moisture supply holes uniform.

[0045] Still further, the diffuser may increase the flow rate as getting farther away from the point where the moisture is introduced. Accordingly, there is an effect of making the flow amount of the moisture discharged from the plurality of moisture supply holes uniform.

[0046] Still further, the diffuser may include the outlet hole formed in the shape of the long hole formed along the circumferential direction. Accordingly, there is an effect of preventing the steam discharge from becoming unstable due to the drain blocking the outlet hole.

[0047] Still further, it is possible to minimize the distance through which moisture discharged from the heat generator is supplied to the mop, thereby minimizing heat loss of the moisture.

[Description of Drawings]

[0048]

FIG. 1 is a perspective view of a vacuum cleaner according to one embodiment of the present disclosure;

FIG. 2 is a perspective view to describe a mop module according to one embodiment of the present disclosure;

FIG. 3 is an exploded perspective view of FIG. 2;

FIG. 4 is a perspective view of a state where an upper housing is removed from a mop module according to one embodiment of the present disclosure;

FIG. 5 is a plane view of FIG. 4;

FIG. 6 is a bottom view of FIG. 2

FIG. 7 is a bottom view illustrating a state where a mop is removed from FIG. 6;

FIG. 8 is a rear view of FIG. 2;

FIG. 9 is a cross-sectional view of FIG. 2;

FIG. 10 is a perspective view to describe a heat generator and a diffuser in a mop module according to one embodiment of the present disclosure;

FIG. 11 is an exploded perspective view of a heat generator according to one embodiment of the present disclosure;

FIG. 12 is an exploded perspective view to describe the structure of a diffuser in a mop module according to one embodiment of the present disclosure;

FIG. 13 is a bottom view to describe the structure of a diffuser in a mop module according to one embodiment of the present disclosure;

FIG. 14a is a cross-sectional view to describe the structure in which a drain is discharged from a diffuser of a mop module according to one embodiment of the present disclosure;

FIG. 14b is a view to describe an arrangement relation among a diffuser, a rotary cleaning part and a

mop in a mop module according to one embodiment of the present disclosure;

FIG. 15 is a bottom view to describe a mop module according to a second embodiment of the present disclosure;

FIG. 16 is a perspective view to describe the structure of a diffuser in the mop module according to the second embodiment;

FIG. 17 is a cross-sectional view to describe flow path diameter variation inside the diffuser in the mop module according to the second embodiment of the present disclosure;

FIG. 18 is a bottom view to describe a mop module according to a third embodiment of the present disclosure;

FIG. 19 is a plane view to describe the structure of a diffuser in the mop module according to the third embodiment;

FIG. 20 is a bottom view to describe the structure of the diffuser in the mop module according to the second embodiment;

FIG. 21 is a cross-sectional view to describe an inner structure of the diffuser in the mop module according to the third embodiment of the present disclosure; and

FIG. 22 is a cross-sectional view to describe the inner structure of the diffuser according to the third embodiment of the present disclosure.

FIG. 23 is a bottom view to describe a mop module according to a fourth embodiment of the present disclosure;

FIG. 24 is a diagram to describe a flow rate adjustment part in the mop module according to the fourth embodiment of the present disclosure.

FIG. 25 is a bottom view to describe a mop module according to a fifth embodiment of the present disclosure.

[DESCRIPTION OF SPECIFIC EMBODIMENTS]

[0049] Description will now be given in detail according to exemplary embodiments disclosed herein, with reference to the accompanying drawings.

[0050] 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.

[0051] FIG. 1 is a perspective view of a vacuum cleaner according to one embodiment of the present disclosure. FIGS. 2 to 9 are views to describe a mop module one embodiment of the present disclosure.

[0052] Referring to FIGS. 1 to 9, a vacuum cleaner 1 according to one embodiment of the present disclosure

may include a cleaner body 500 including a suction motor for generating a suction power, a mop module 100 connected to the cleaner body 500 and configured to suck in air and foreign substances from the floor surface and clean the floor surface, and an extension pipe 400 connecting the cleaner body 500 and the mop module 100 to each other.

[0053] The mop module 100 according to the embodiment of the present disclosure may include a module housing 110 and a connection pipe 180 movably connected to the module housing 110.

[0054] The mop module 100 according to this embodiment may be connected to a handheld type vacuum cleaner or canister type vacuum cleaner to be used as one example.

[0055] Specifically, the mop module 100 may be detachably connected to a cleaner body 500 or an extension pipe 400. since the mop module 100 is connected to the cleaner body 500 or the extension pipe 400, the user can use the mop module 100 in cleaning the floor surface to be cleaned. At this time, the cleaner body 500 to which the mop module 100 is connected may separate dust in the air, using a multi-cyclone method.

[0056] The mop module 100 may be operated by receiving power from the cleaner body 500. Specifically, the mop module 100 may be operated by receiving power from a battery (not shown) provided in the cleaner body 500.

[0057] The cleaner body 500 to which the mop module 100 is connected may include a suction motor (not shown), so that the suction force generated by the suction motor (not shown) can be applied to the mop module 100.

[0058] Accordingly, the mop module 100 may perform the role of sucking in foreign substances and air from the floor surface and guiding them to the cleaner body 500.

[0059] The connection pipe 180 may be connected to a backside center portion of the module housing 110 to guide the sucked air to the vacuum cleaner 1, but the embodiments of the present disclosure are not limited thereto.

[0060] To help understanding, the direction of this embodiment is defined as follows. The portion to which the connection pipe 180 is connected in the mop module 100 may be said to be the back (i.e., rear or backward) of the mop module 100 and the opposite portion thereof may be said to be the front (i.e., forward) of the mop module 100. The direction that connects the front and rear to each other may be called the front-back direction.

[0061] In addition, with respect to the view of looking at a suction hole 113 from the connection pipe 180, the left side may be referred to as the left side of the mop module 100 and the right side as the right side of the mop module 100. The direction connecting the left side and the right side may be referred to as the left-right direction. The left-right direction may mean the direction perpendicular to each other on the forward-backward direction and the horizontal plane.

[0062] With respect to the state where the mop module

100 is placed on the floor surface, in other words, the state where the mop 150 placed on the floor surface is ready to clean it, the direction approaching the floor may be referred to as 'downward' or the lower side and the direction getting away from the floor may be referred to as upward or upper side.

[0063] The mop module 100 may further include a rotary cleaning part 140 rotatably provided under the module housing 110. For example, the rotary cleaning part 140 may be a rotary plate formed in the shape of a disk.

[0064] As one example, the rotary cleaning part 140 may be provided in a pair and arranged in the left-right direction. At this time, the pair of rotary cleaning parts 140 may be rotatable independently. For example, the rotary cleaning part 140 may include a first rotary cleaning part 141 and a second rotary part 142.

[0065] The rotary cleaning part 140 may be coupled to the mop 150. The mop 150 may be formed in the shape of a disk, for example. The mop 150 may include a first mop 151 and a second mop 152.

[0066] Since the mop 150 is in close contact with the floor surface due to the load of the mop module 100 in a state of placing the mop 150 on the floor, the frictional force between the mop 150 and the floor increases.

[0067] The module housing 110 may define the exterior of the mop module 100 and may have a suction hole 113 formed to suck in air. For example, the suction hole 113 may be formed in a front end of a lower surface of the module housing 110. The suction hole 113 may extend in the left-right direction from the module housing 110.

[0068] The module housing 110 may include a lower housing 111, an upper housing 112 coupled to the top of the lower housing 111.

[0069] The lower housing 111 may have the rotary cleaning part 140 secured thereto and may define the exterior of the mop module 100.

[0070] The lower housing 111 may include a lower surface 111a to which the rotary cleaning part 140 is coupled. At this time, a bottom of the lower surface 111a may be arranged to face the floor when the mop module 100 is placed on the floor, and a moisture supply part 130, a heat generator 200 and a driving motor 170 may be provided on a top of the lower surface 111a.

[0071] The suction hole 113a may be formed in the lower housing 111. Specifically, the suction hole 113a may be formed in the lower surface 111a of the lower housing 111. The suction hole 113a means a space through which air containing dust can be introduced. With this configuration, when a suction motor (not shown) of the cleaner body 500 is operated, dust and air existing around the floor surface may be sucked into the path of the mop module 110 through the suction hole 113a.

[0072] In the lower housing 111 may be provided a circuit board mounting portion on which a printed circuit board 190 configured to control the driving motor 170 is disposed. For example, the circuit board mounting portion may be formed in the shape of a hook extending

upward from the lower housing 111.

[0073] Although not limited, the circuit board mounting portion may be positioned on one side of the path forming portion 113 of the lower housing 111. For example, the printed circuit board 190 may be disposed in a position adjacent to a first operation part 191 and a second operation part 192. Accordingly, a switch mounted on the printed circuit board 190 may detect a user's manipulation of the first operation part and the second operation part 192.

[0074] In the lower housing 111 may be formed a nozzle hole (not shown) through which a diffuser 300 passes. Water or steam (water vapor) passing through the heat generator 200 and the diffuser 300 via the nozzle hole (not shown) may be supplied to the mop 150.

[0075] Meanwhile, a light emitting module 160 may be provided in the lower housing 111. Specifically, the light emitting module 160 may be provided on a front surface of the lower housing 111.

[0076] The upper housing 112 may cover a top of the lower housing 111 and define the exterior of the mop module 100 according to the present disclosure.

[0077] In addition, the module housing 110 may further include a path forming part 113 that is in communication with the suction hole 113a to induce the air flowing from the suction hole 113a to the cleaner body 500.

[0078] The path forming part 113 may be coupled to an upper center portion of the lower housing 111 and ends thereof may be connected to the connection pipe 180.

[0079] Accordingly, since the suction hole 113 can be extended in a roughly straight-line shape in the forward-backward direction by the arrangement of the path forming part 113, the length of the suction hole 113a may be minimized only to minimize path loss in the mop module 100.

[0080] A front portion of the path forming part 113 may cover an upper portion of the suction hole 113a. The path forming part 113 may be arranged so that it is inclined upward from a front end to a rear end. In other words, an upper surface of the forming path 113 may be inclined at a predetermined angle with respect to the floor surface. Also, the upper surface of the path forming part 113 may be inclined at a predetermined angle with respect to the lower surface of the lower housing 111.

[0081] Accordingly, the path forming part 113 may be formed with a front portion that is lower in height than a rear portion.

[0082] According to this embodiment, since the front portion is lower in the path forming part 113 mentioned above, there is an advantage in that the height of the front portion can be reduced among the total height of the above-mentioned mop module 100. The lower the height of the mop module 100, the higher the possibility of being inserted into narrow spaces under furniture or chairs to clean the spaces.

[0083] Meanwhile, the heat generator 200 may be arranged on an upper portion of the path forming part 113 according to this embodiment. With this configuration,

the heat forming part 113 may be stably supported while being disposed at predetermined angle with the floor surface.

[0084] A blocker 114 may be disposed on a bottom surface of the lower housing 111 (i.e., a bottom surface of the lower surface). The blocker 114 may block the front space where the suction hole 113a is disposed and the rear space where the mop 150 is disposed, so as to block the moisture emitted from the mop 150 from spreading into the suction hole 113a. For example, the blocker 114 may include a center portion 114a and an extension portion 114b. At this time, a pair of extension portions 114b may be symmetrically connected to both ends of the center portion 114a. The center portion 114a may be disposed at a rear portion of the suction hole 113a to block moisture from flowing toward the suction hole 113a. The extension portion 114b may be provided in an arc shape to surround the circular mop 150.

[0085] A plurality of rollers may be provided on the lower surface 111a of the lower housing 111 to facilitate the smooth movement of the mop module 100.

[0086] As one example, a front roller 115 may be provided in front of the mop 150 in the lower housing 111. The front roller 115 may include a first roller 115a and a second roller 115b. The first roller 115a and the second roller 115b may be spaced a preset distance apart from each other in the left-right direction.

[0087] The first roller 115a and the second roller 115b may be rotatably connected to shafts, respectively. Each shaft may be secured to a lower portion of the lower housing 111 in a state where it extended in the left-right direction.

[0088] The distance between the shaft and the front end of the lower housing 111 is greater than the minimum distance between the mop 150 and the front end of the lower housing.

[0089] As one example, at least predetermined portion of the rotary cleaning part 140 may be provided between the shaft of the first roller 115a and the shaft of the second roller 115b.

[0090] With this arrangement, the rotary cleaning part 140 may be positioned as close as possible to the suction hole 113a, and the area cleaned by the rotary cleaning part 140 among the floor surface area where the mop module 100 is positioned may be increased, thereby improving floor cleaning performance.

[0091] In this embodiment, the first roller 115a and the second roller 115b may be coupled to the lower portion of the lower housing 111, thereby improving the mobility of the mop module 100.

[0092] The lower housing 111 may further include a third roller 116. Accordingly, the first roller 115a and the second roller 115b may support the mop module 100 at three points, together with the third roller 116. At this time, the third roller 116 may be positioned at the rear of the mop 150 so as not to interfere with the mop 150.

[0093] A cool air inlet hole 117 may be formed in the lower housing 111 according to one embodiment. Out-

side air may be introduced into the module housing 110 through the cool air inlet hole 117. Or, the cool air inlet hole 117 may be formed in a front lateral wall of the lower housing 111. With this configuration, when the user operates to move the mop module 100 forward, the air intake amount may increase.

[0094] A cool air outlet hole 118 may be formed in the upper housing 112. Air inside the module housing 110 may be discharged to the outside through the cool air outlet hole 118. Or, the cool air outlet hole 118 may be formed in each of the two lateral surfaces of the upper housing 112. With this configuration, while the air introduced through the cool air inlet hole 117 is flowing to the cool air outlet hole 118, there is an advantage in that the air can be induced to pass through the driving motor 170 and overheating of the driving motor 170 may be prevented.

[0095] With respect to the state where the lower housing 111 is placed on the floor surface, the cool air outlet hole 118 may be positioned farther from the floor than the cool air inlet hole 117. With this configuration, the air heated inside the module housing 110 may rise to be effectively discharged through the cool air outlet hole 118.

[0096] The mop module 100 may further include a water tank 120 to supply moisture to the mop 150.

[0097] The water tank 120 may be detachably connected to the module housing 110. Specifically, the water tank 120 may be coupled to an upper portion of the upper housing 112. For example, the water tank 120 may be secured to a water tank securing portion formed on an upper surface of the upper housing 112.

[0098] In addition, the water tank 120 may be disposed above the heat generator 200. Specifically, the water tank 120 may be disposed above the heat generator 200, spaced apart therefrom. That is, the water tank 120 may be disposed above the heat generator 200 with the upper housing 112 in between.

[0099] In the state where the water tank 120 is secured to the module housing 110, the water tank 120 may define the exterior appearance of the mop module 100.

[0100] An entire upper wall of the water tank 120 may substantially define the upper surface of the mop module 100. Accordingly, the user can visually check whether the water tank 120 is mounted in the module housing 110.

[0101] The module housing 110 may further include a water tank separation button operated to separate the water tank 120, in the state where the water tank 120 is secured to the module housing 110. For example, the water tank separation button may be disposed at the center of the mop module 100. Accordingly, the user can easily recognize and operate the water tank separation button.

[0102] In the state where the water tank 120 is secured to the module housing 110, water from the water tank 120 may be supplied to the mop 150. Specifically, water stored in the water tank 120 may be supplied to the mop 150 through a moisture supply part 130.

[0103] More specifically, the water tank 120 may have

a space that store water. Water stored in the water tank 120 may be supplied to the heat generator 200 through at least one hose. Water introduced to the heat generator 200 may be heated and may also be converted into steam (i.e., water vapor), depending on the user's choice. Water or steam heated in the heat generator 200 may be supplied to the mop 150 through the diffuser 137.

[0104] The water tank 120 may include a water supply hole. The water supply hole is a hole through which water is introduced into the water tank. For example, the water supply hole may be formed on a lateral surface of the water tank 120.

[0105] The water tank 120 may include water discharge hole. The water discharge hole is a hole through which water stored in the water tank 120 is discharged. Water discharged from the water discharge hole may flow into the heat generator 200. The water discharge hole may be formed on a lower surface of the water tank 120.

[0106] The water tank 120 may include an air hole. The air hole is a hole through which air is introduced into the water tank 120. When water stored in the water tank 120 is discharged to the outside, the pressure inside the water tank 120 decreases and air can flow into the water tank 120 through the air hole to compensate for the decreased pressure. For example, the air hole may be formed on an upper end of the water tank 120.

[0107] The mop module 100 according to the present disclosure may include a moisture supply part 130 in which a path supplying water introduced from the water tank 120 to the mop 150 is formed.

[0108] Specifically, the moisture supply part 130 may include a water tank connecting portion 131 that introduces water from the water tank 120 into the module housing 110; a water inlet pipe 132 that supplies water introduced into the water tank connecting portion 131 to a water pump 133; a guide pipe 134 that supplies water from the water pump 133 to a connector; and a water supply pipe 135 that supplies water introduced into the connector to the heat generator 200.

[0109] The water tank connecting portion 131 may put a valve (not shown) provided in the water tank 120 into operation, so that water can flow.

[0110] The water tank connecting portion 131 may be coupled to a lower area of the upper housing 112, and a predetermined area of the water tank connecting portion 131 may protrude upward through the upper housing 112.

[0111] When the water tank 120 is mounted in the upper housing 112, the water tank connecting portion 131 protruding upward may pass through the outlet hole of the water tank 120 and then be introduced into the water tank 120.

[0112] The upper housing 112 may include a sealer that prevents water discharged from the water tank 120 from leaking around the water tank connecting portion 131. For example, the sealer may be made of rubber and may be coupled to the upper housing 112, on the upper area of the upper housing 112.

[0113] A water pump 133 configured to control water

discharged from the water tank 120 may be installed in the upper housing 112.

[0114] The water pump 133 may provide water flow force. The water pump 133 may include a first connection port to which a water inlet pipe 132 is connected, and a second connection port to which a guide pipe 134 is connected. At this time, the first connection port may be an inlet and the second connection port may be an outlet, with respect to the water pump 133.

[0115] The water pump 133 is a pump that operates to facilitate communication between the first connection port and the second connection port, while expanding or contracting as the internal valve operates, which can be implemented by the well-known structure and detailed description thereof will be omitted.

[0116] The water supply pipe 135 may connect the connector and the water inlet hole 212 of the heat generator 200 to each other. For example, the water supply pipe 135 may be a pair of pipes branching from the above connector.

[0117] Accordingly, after water supplied to the water inlet pipe 132 is introduced into the water pump 133, water may flow to the guide pipe 134. Water flowing into the guide pipe 134 may be flowed to the water supply pipe 135 by the connector. Then, water flowed into the water supply pipe 135 may be supplied to the heat generator 200.

[0118] The heat generator 200 is a device that heats water. The heat generator 200 may be disposed inside the module housing 110. Specifically, the heat generator 200 may be installed on the upper surface of the lower housing 111.

[0119] Meanwhile, the heat generator 200 according to the present disclosure may be inclinedly disposed. Specifically, with respect to the state where the module housing 110 is placed on the floor surface, the lower surface of the heat generator 200 may be disposed to form a predetermined angle (α) with the floor surface.

[0120] The specific structure and effect of the heat generator 200 according to the present disclosure will be described later.

[0121] The diffuser 137 may be configured to discharge water from the water tank 120 to the mop 150.

[0122] Specifically, the diffuser 137 may include at least moisture supply hole 320, and may supply moisture discharged from the heat generator 200 through the at least one moisture supply hole 320 to the mop 150.

[0123] The diffuser 137 may be accommodated in a space formed in the module housing 110, and a certain area of the diffuser 137 may pass through a nozzle hole (not shown) formed in the module housing 110 and exposed to the outside of the module housing 110.

[0124] A pair of diffusers 137 may be secured to the module housing 110 and arranged in the left-right direction. In addition, the pair of diffusers 137 arranged in the left-right direction may be formed in a symmetrical shape (i.e., mirror image) to each other.

[0125] The diffuser 137 may be connected to the heat

generator 200 to supply moisture flowing in the heat generator 200 to the mop 150.

[0126] The detailed structure and effect of the diffuser 300 will be described later.

[0127] The rotary cleaning part 140 may be rotatable by power supplied from a driving motor 170. For example, the rotary cleaning part 140 may be a rotary plate. The rotary cleaning part 140 may be formed in a circular disc shape, and the mop 150 may be attached to a lower surface of the rotary cleaning part 140.

[0128] At this time, the rotary cleaning part 140 may be placed parallel to the floor surface while the mop module 100 is placed on the floor surface. Or, the circular-shaped rotary cleaning part 140 may be disposed parallel to the lower surface 111a of the lower housing 111.

[0129] The rotary cleaning part 140 may be positioned in the rear of the suction hole 113a under the module housing 110 as one example.

[0130] Accordingly, when the user moves the mop module 100 forward and cleans, foreign substances and air on the floor surface may be sucked in the suction hole 113a and then the floor surface may be wiped by the mop 150.

[0131] At least one rotary cleaning part 140 may be provided under the module housing 110. For example, the rotary cleaning part 140 may include a first rotary cleaning part 141 connected to a first driving motor 171 and having a first mop 151 attached thereto, and a second rotary cleaning part 142 connected to a second driving motor 172 and having a second mop 152 attached thereto.

[0132] Specifically, the rotary cleaning part 140 may include an outer body having a circular-ring shape; an inner body provided in a center area of the outer body, spaced apart from an inner circumferential surface of the outer body; and a plurality of connection ribs connecting an outer circumferential surface of the inner body and an inner circumferential surface of the outer body to each other.

[0133] Meanwhile, the rotary cleaning part 140 may include means for attaching the mop 150. As one example, the attaching means may be Velcro.

[0134] The rotary cleaning part 140 may be disposed under the lower housing 111. That is, the rotary cleaning part 140 may be disposed outside the module housing 110.

[0135] In addition, the rotary cleaning part 140 may be connected to the driving motor 170 to be supplied power. For example, the rotary cleaning part 140 may be connected to the driving motor 170 via at least one gear, and may be rotated by the operation of the driving motor 170.

[0136] The rotary cleaning part 140 may include a first rotary cleaning part 141 and a second rotary cleaning part 142. For example, with respect to the suction hole 113 while the mop module 100 is placed on the floor surface, the first rotary cleaning part 141 may mean the rotary cleaning part disposed on the left and the second rotary cleaning part 142 may mean the rotary cleaning part 140

disposed on the right. However, the present disclosure is not limited thereto and the left and right may be switched.

[0137] In this embodiment, the rotation center of the first rotary cleaning part 141 and the rotation center of the second rotary cleaning part 142 may be spaced apart in the left-right direction.

[0138] That is, the rotation centers P1 and P2 of the rotary cleaning part 140 may be arranged symmetrically with respect to the center line C that dissects the left and right lengths of the module housing 110.

[0139] In addition, the rotation centers P1 and P2 of the rotary cleaning part 140 may be positioned farther from the front end of the module housing 110 than the central axis that bisects the front and rear lengths of the module housing 110. This is to prevent the rotary cleaning part 140 from blocking the suction hole 113a.

[0140] The distance between the rotation center P1 of the first rotary cleaning part 141 and the rotation center P2 of the second rotary cleaning part 142 may be greater than the diameter of the mop 150. This is to reduce mutual friction caused by interference between the first mop 151 and the second mop 152 while they are rotating, and to prevent the cleanable area from being reduced as much as the amount of the interference.

[0141] The mop 150 may clean the floor surface by rotating motion.

[0142] The mop 150 may be coupled to the lower surface of the rotary cleaning part 140 to face the floor surface.

[0143] The mop 150 may have a lower surface facing the floor and the lower surface has a predetermined area. The mop 150 may be formed in a flat shape. The mop 150 may be formed to have the horizontal width (or diameter) sufficiently larger than the vertical height. When the mop 150 is coupled to the lower housing 111, the lower surface of the mop 150 may be parallel to the floor surface.

[0144] The lower surface of the mop 150 may be generally circular and the mop 150 may be formed in an overall rotationally symmetrical shape. In addition, the mop 150 may be attached to or detached from the lower surface of the rotary cleaning part 140, and may be coupled to the rotary cleaning part 140 to rotate together with the rotary cleaning part 140.

[0145] While the rotary cleaning part 140 and the mop 150 are coupled to the lower surface of the module housing 110, a certain area of the mop 150 may protrude outward to the outside of the mop module 100 so that not only the floor surface located under the mop module 100 but also the floor surface located outside the mop module 100 can be cleaned.

[0146] As one example, the mop 150 may protrude not only to both sides but also the rear side of the mop module 100.

[0147] The mop 150 may include a first mop 151 coupled to the first rotary cleaning part 141 and a second mop 152 coupled to the second rotary cleaning part 142. Accordingly, when the first rotary cleaning part 141 is rotated by the power transferred from the first driving

motor 171, the first mop 151 may be rotated together. When the second rotary cleaning part 142 is rotated by the power transferred from the second driving motor 172, the second mop 152 may be rotated together.

[0148] Meanwhile, the mop module 100 may further include a light emitting module 160.

[0149] The light emitting module 150 may be configured to detect foreign substances or microorganisms present in front of the mop module 100 by irradiating light in front of the mop module 100.

[0150] The light emitting module 160 may be provided in front of the module housing 110. For example, the light emitting module 160 may be provided on a front surface of the lower housing 111 and a plurality of light emitting modules 160 may be provided along the left-right direction. At this time, the light emitting module 160 may be provided behind the cool air inlet hole 117. With this arrangement, the light emitting module 160 may be cooled by the air introduced into the cool air inlet hole 117.

[0151] Meanwhile, the light emitting module 160 may include a light emitting member and a diffusion plate.

[0152] The light emitting module may emit light toward or downward. For example, the light emitting module may include a plurality of LEDs. At this time, the light emitted by the light emitting module may be visible light or infrared IR or ultraviolet UV light according to embodiments. With this configuration, when the light emitting module is operated, it is possible to check the presence of foreign substances or microorganisms in front of the mop module 100, so there may be the effect of improving hygiene by sterilizing foreign substances or microorganisms in front of the mop module 100.

[0153] In addition, the diffusion plate may be disposed in front of the light emitting member and configured to diffuse the light irradiated from the light emitting member.

[0154] Meanwhile, the mop module 100 may further include a driving motor 170 that supplies power for rotating the mop 150 and the rotary cleaning part 140.

[0155] Specifically, the driving motor 170 may include a first driving motor 171 for rotating the first rotary cleaning part 141 and a second driving motor 172 for driving the second rotary cleaning part 142.

[0156] Since the first driving motor 171 and the second driving motor 172 operate individually as mentioned above, there is an advantage in that even if one of the first and second driving motors 171 and 172 breaks down, the rotation of the rotary cleaning part 140 is possible by the other one.

[0157] Meanwhile, the first driving motor 171 and the second driving motor 172 may be provided in the module housing 110, spaced apart in the left-right direction. They may be positioned behind the suction hole 113.

[0158] The driving motor 170 may be provided within the module housing 110. As one example, the driving motor 170 may be mounted on the upper surface of the lower housing 111 and covered by the upper housing 112. That is, the driving motor 170 may be provided between the lower housing 111 and the upper housing 112.

[0159] Meanwhile, the mop module 100 may include a connection pipe 180 coupled to the cleaner body 400 or the extension pipe 300.

[0160] The connection pipe 180 may include a first connection pipe connected to one end of the path part, a second connection pipe rotatably connected to the first connection pipe, and a guide pipe making the inside of the first connection pipe and the inside of the second connection pipe in communication with each other.

[0161] The first connection pipe may be formed in a tube shape, and one axial end may be connected to an end of the flow path and the other axial end may be rotatably connected to the second connection pipe. At this time, a predetermined area of the first connection pipe may be cut away, and the cut area may be positioned upward, facing the second connection pipe. With this configuration, while the mop module 100 is placed on the floor, the angle formed between the second connection pipe and the floor can be changed based on the movement of the user's arm. That is, the first connection pipe and the second connection pipe may serve as a kind of joint that can adjust the angle of the mop module 100 and the cleaner body 400.

[0162] The second connection pipe may be formed in a tube shape and one axial end may be rotatably connected to the first connection pipe and the other axial end may have the cleaner body 400 or the extension pipe 300 inserted therein so that it can be detachably connected to the other axial end.

[0163] Meanwhile, according to one embodiment, an auxiliary battery may be coupled to the second connection pipe.

[0164] Wires may be embedded in the first connection pipe and the second connection pipe, and the wires embedded in the first connection pipe and the second connection pipe may be electrically connected to each other.

[0165] Meanwhile, the guide pipe may connect the inner space of the first connection and the inner space of the second connection to each other. A flow path may be formed in the guide pipe so that air sucked from the mop module 100 can flow into the extension pipe 300 and/or the cleaner body 400. At this time, the guide pipe may be deformed based on the rotation of the first connection pipe and the rotation of the second connection pipe. As one example, the guide pipe may be formed in a shape of a corrugated tube.

[0166] Meanwhile, the mop module 100 may include a printed circuit board 190 on which a mop module control part 800 for controlling the mop module is disposed configured to control the mop module 100. Current may be applied to the printed circuit board 190 and communication lines may be disposed on the printed circuit board 190. At this time, the printed circuit board 190 may be cooled by the air discharged from the cool air outlet hole 118 after introduced into the cool air inlet hole 117.

[0167] Meanwhile, the module housing 110 may

further include a first operation part 191 configured to adjust the amount of water discharged from the water tank 120. As one example, the first operation part 191 may be positioned behind the module housing 110.

[0168] The first operation part 191 may be manipulated by the user and water can be discharged from the water tank 120 or prevented from being discharged by the operation of the operation part 191.

[0169] Or, the amount of water discharged from the water tank 120 may be adjusted by the first operation part 191. For example, as the user manipulates the first operation part 191, a first amount of water may be discharged per unit time from the water tank 120 or a second amount of water greater than the first amount may be discharged per unit time.

[0170] The first operation part 191 may be configured to pivot left and right in the module housing 110, or may be configured to pivot up and down according to one embodiment.

[0171] For example, when the first operation part 191 is positioned in a neutral position, the water discharge amount may be zero, and when the left side of the first operation part 191 is pushed to pivot to the left, the first amount of water may be discharged per unit time from the water tank 120. When the first operation part 191 is pushed to pivot to the right, the second amount of water may be discharged per unit time from the water tank 120.

[0172] Meanwhile, the module housing 110 may further include a second operation part 192 configured to adjust the phase of moisture discharged from the heat generator 200. For example, the second operation part 192 may be disposed behind the module housing 110.

[0173] The second operation part 192 may be manipulated by the user. By the manipulating of the second operation part 192, water may be discharged to the mop 150 or steam may be discharged from the heat generator 200.

[0174] The second operation part 192 may be rotatably provided in the module housing 110. For example, the second operation part 192 may be a rotary knob (dial).

[0175] For example, while the second operation part 192 is rotated and positioned at a first position, the heat generator 200 may not heat water and water at room temperature may be discharged to the mop 150. In addition, while the second operation part 192 is rotated and positioned at a second position different from the first position, the heat generator 200 may heat water and discharge the heated water to the mop 150. While the second operation part 192 is rotated and positioned at a third position different from the second position, the heat generator 200 may heat water and phase-change heated water to steam (i.e., vapor), then discharge steam to the mop 150.

[0176] FIG. 10 is a perspective view to describe a heat generator and a diffuser in a mop module according to one embodiment of the present disclosure. FIG. 11 is an exploded perspective view of a heat generator according to one embodiment of the present disclosure

[0177] Referring to FIGS. 10 and 11, the heat generator 200 according to one embodiment of the present disclosure will be described as follows.

[0178] The heat generator 200 may heat water and generate high-temperature water or steam. The heat generator 200 may heat the water supplied from the water tank 120 and supply the heated water to the mop 150.

[0179] The heat generator 200 may be provided in the mop module 100, not in the cleaner body 500. This is to prevent the cleaning from becoming inconvenient due to the weight and volume of the heat generator 200 if the heat generator 200 is provided in the mop module 100.

[0180] The heat generator 200 may be coupled to the top of the lower housing 111 (i.e., the top surface of the lower surface 111a). for example, the heat generator 200 may be coupled to an upper surface of the path forming portion 113. At this time, the path forming portion 113 is coupled to an upper surface center of the lower housing 111, so that the heat generator 200 may also be disposed in the center portion of the lower housing 111.

[0181] With this configuration, when the heat generator 200 is operated, a specific location may not be overheated by the heat supplied from the heat generator 200, thereby causing an effect of preventing damage of the mop module 100. In addition, the overall volume of the mop module 100 may be minimized.

[0182] The heat 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 overheat circuit breaker 280 and a temperature detector 290.

[0183] At this time, the heater 220 may be disposed under the heating chamber 210 and the lower insulator 260 may be provided under the heater 220. The lower cover 230 may be disposed under the lower insulator 260. In addition, the sealer 240 may be disposed above the heating chamber 210, the upper insulator 270 may be disposed above the sealer 240, and the upper cover 250 may be disposed above the upper insulator 270, thereby covering an upper portion of the heat generator 200. Meanwhile, the overheat circuit breaker 280 and the temperature detector 290 may be disposed outside the heating chamber 210.

[0184] A path through which moisture flows may be formed within the heating chamber 210, and the heating chamber 220 may provide a space in which the moisture flowing through the path is heated.

[0185] Specifically, the heating chamber 210 may include a chamber body 211, a water inlet hole 212 and a moisture outlet hole 213.

[0186] The chamber body 211 may provide a space in which moisture can flow. For example, the chamber body 211 may be formed in a shape similar to a square box. For example, the chamber body 211 may have a square plate-shaped lower surface formed at the lowest side, and four lateral walls formed perpendicular to the lower surface and thereto. A top of the chamber body 211 may

be open. Accordingly, the inside of the chamber body 211 may be said to be a space surrounded by the lower surface and the four lateral walls.

[0187] Meanwhile, the inner space of the chamber body 211 may be separated by a partition wall. For example, the chamber body 211 may have a left chamber and a right chamber with respect to the partition wall.

[0188] Meanwhile, the water inlet hole 212 and the moisture outlet hole 213 may be formed in the chamber body 211. Specifically, the water inlet hole 212 and the moisture outlet hole 213 may be formed in the lower surface of the chamber body 211. At this time, it is preferred that the water inlet hole 212 and the moisture outlet hole 213 are disposed furthest away from each other in the front-back direction of the mop module 100. This is to secure sufficient heating time by maximizing the distance that the water introduced into the water inlet hole 212 flows until it is discharged from the moisture outlet hole 213.

[0189] For example, a rear end of the chamber body 211 may be disposed higher than a front end of the chamber body 211. That is, the heat generator 200 may have a rearward-upward slope. Accordingly, water may be heated while flowing from a rear upper portion to a front lower portion inside the heat generator 200.

[0190] The water inlet hole 212 may be formed in the chamber body 211 and water may be introduced from the water tank 120. The water inlet hole 212 may be a hole formed at an entrance end of the chamber body 211.

[0191] Specifically, a water supply pipe 135 of the water supply part 130 may be connected to the water inlet hole 212. For example, the water supply pipe 135 may be coupled to a lower portion of the chamber body 211, and the inside of the water supply pipe 135 and the water inlet hole 212 may be in communication with each other. Accordingly, once the water pump 133 is put into operation, the water stored in the water tank 120 may flow through the water supply pipe 135 and then flow into the chamber body 211 by the fluid force generated from the water pump 133.

[0192] The moisture outlet hole 213 may discharge the moisture heated in the chamber body 211. The moisture outlet hole 213 may be a hole formed in an exit end of the chamber body 211.

[0193] Specifically, the diffuser 300 may be connected to the moisture outlet hole 213. For example, the diffuser 300 may be coupled to the lower portion of the chamber body 211, and a path inside the diffuser 300 and the moisture outlet hole 213 may be in communication with each other. Accordingly, the moisture (i.e., water or steam) heated inside the chamber body 211 may pass through the moisture outlet hole 213 and flow into the diffuser 300, to be supplied to the mop 150.

[0194] Meanwhile, generally, the lower surface of the steam generator may be disposed parallel to the floor of the location where it is installed. A pipe through which steam is discharged may be provided in the upper portion of the steam generator. Accordingly, when steam is gen-

erated by the operation of the heat generator, heated steam may rise and flow along the pipe to be discharged to the outside.

[0195] However, in the case of the heat generator with the structure, there is a high possibility that a drain might occur due to the steam coming into contact with the inner wall or pipe of the steam generator during the process of rising. Accordingly, it is necessary to reduce the heat loss that might occur during the flow of steam and to reheat and supply it to the mop even if the drain occurs.

[0196] To solve this disadvantage, the heat generator 200 according to the embodiments of the present disclosure may be inclined at a predetermined angle with respect to the floor surface.

[0197] Specifically, in a state where the mop module 100 is placed on the floor surface (i.e., a state where the mop 150 is placed on the floor surface to be able to wipe the floor surface), the lower surface of the chamber body 211 may be inclined at a predetermined angle (α) with respect to the floor surface.

[0198] The lower surface 111a of the lower housing 111 to which the rotary cleaning part 140 and the mop 150 are coupled and the lower surface of the chamber body 211 may be inclined at a predetermined angle (α). That is, the virtual extension surface of the lower surface of the chamber body 211 may intersect with the virtual extension surface of the lower surface 111a of the lower housing 111.

[0199] In addition, the height from the floor surface to the water inlet hole 212 may be greater than the height from the floor surface to the moisture outlet hole 213. The distance from the lower surface 111a to the water inlet hole 212 may be greater than the distance from the lower surface 111a to the moisture outlet hole 213.

[0200] With this configuration, even if the water introduced into the water inlet hole 212 is heated and rises due to convection, the water may be heated while flowing from the top to the bottom within the chamber body 211 by gravity.

[0201] Furthermore, even if the water heated inside the chamber body 211 changes into steam and rises, the water may not be discharged to the top of the chamber body 211 but may remain inside the chamber body 211 to be additionally heated.

[0202] The partition wall of the heating chamber 210 may protrude upward from the lower surface of the chamber body 211 along the front-back direction of the mop module 100. With this configuration, the partition wall may separate the inner space of the chamber body 211 into left and right spaces. Accordingly, the inner space of the chamber body 211 may be heated independently on the left and right sides.

[0203] In addition, at least one wall may be formed within the heating chamber 210 to guide moisture flow. For example, the flow path within the chamber body 211 may be formed in a zigzag shape. As a result, the flow path of water flowing inside the chamber body 211 may be increased and sufficient time for heating the water therein

may be secured. In addition, there is an effect of increasing the area where heat can be transferred to the water flowing inside the chamber body 211, and there is another effect of maintaining the flow direction of water even if the heat generator 200 shakes, thereby maintaining the supply amount of water or steam.

[0204] The heater 220 may be configured to generate heat. The heater 220 may be a device configured to convert electrical energy into thermal energy, and may be implemented by a well-known structure, thereby omitting detailed description thereof.

[0205] The heater 220 may be provided under the heating chamber 210, and configured to supply heat to the heating chamber 210. Specifically, the heater 220 may be in contact with the lower surface of the heating chamber 210. Accordingly, when heat is generated in the heater 220, the heating chamber 210 in contact with the heater 220 may be heated by convection. Then, the heater 220 may be supplied power from a battery and/or an auxiliary battery 700 provided in the cleaner body 500 to heat water flowing inside the heating chamber 210.

[0206] Meanwhile, the heater 220 may control the temperature of water based on the user's input. In addition, the heater 220 may change the phase of the water into steam (i.e., water vapor) based on the user's input.

[0207] Here, in this embodiment, the heater may be provided in plural. The plurality of heaters 230 may be disposed symmetrically.

[0208] The lower cover 230 may be disposed under the heater 220 and the lower insulator 260, and configured to cover them. For example, the lower cover 230 may be formed in a flat shape but in a shape that can surround the heater 220 and the lower insulator 260. The lower cover 230 may be made of a material capable of blocking the heat generated from the heater 220.

[0209] With this configuration, the heat generated from the heater 220 may be prevented from escaping to the outside of the heat generator 200, thereby improving energy efficiency. In addition, it is possible to prevent damage to the components disposed within the module housing 110 due to the heat generated from the heater 220.

[0210] The sealer 240 may be provided in an upper portion of the heating chamber 210 and configured to seal the upper portion. Specifically, the sealer 240 may seal the open top of the chamber body 211. The sealer 240 may be made of a material capable of blocking the passage of moisture. With this configuration, even if water vapor generated in the heating chamber 210 rises, the water vapor may be blocked by the sealer 240 and prevented from leaking to the outside.

[0211] The upper cover 250 may be disposed above the sealer 240 and the upper insulator 270, and configured to cover them. For example, the upper cover 250 may be formed in a flat shape, but in a shape that can surround the sealer 240 and the upper insulator 270. The upper cover 250 may be made of a material that can block heat transferred through the sealer 240.

[0212] With this configuration, the heat generated in the heater 220 may be prevented from leaking to the outside of the heat generator 200, thereby improving energy efficiency. In addition, it is possible to prevent damage to the component provided within the module housing 110 due to the heat generated in the heater 220.

[0213] The lower insulator 260 may be disposed between the heater 220 and the lower cover 230, and configured to block heat transferred from the heater 220. The lower insulator 260 may be formed to have a wider area than the heater 220. For example, the lower insulator 260 may be formed in a flat shape and made of a material capable of blocking heat transfer.

[0214] With this configuration, it is possible to prevent the heat generated in the heater 220 from leaking to the outside of the heat generator 200, thereby improving energy efficiency. In addition, it is possible to prevent damage to the components provided within the module housing 110 due to the heat generated in the heater 220. Especially, in this embodiment, the heat generated in the heater 220 may be double-blocked by the lower insulator 260 and the lower cover 230, so that the effects of the energy efficiency improvement and the damage to the component may be maximized.

[0215] The upper insulator 270 may be disposed above the sealer 240, and configured to block heat transferred from the heating chamber 210. The upper insulator 270 may be formed to have a wider area than the sealer 240. For example, the upper insulator 270 may be formed in a flat shape and made of a material capable of blocking heat transfer.

[0216] With this configuration, it is possible to prevent the heat of the heating chamber 210 heated by the heater from leaking to the outside of the heat generator 200, thereby improving energy efficiency. In addition, it is possible to prevent damage to the components provided within the module housing 110 due to the heat that has leaked to the outside of the heat generator 200 from the heating chamber 210. Especially, in this embodiment, the heat of the heating chamber 210 may be double-blocked by the upper insulator 270 and the upper cover 250, so that the effects of the energy efficiency improvement and the damage to the component may be maximized.

[0217] The overheat circuit breaker 280 may be disposed on a lateral surface of the heating chamber 210, and it may cut off the power supplied to the heater 220 when the temperature of the heating chamber 210 is higher than a predetermined reference temperature T_r .

[0218] The overheat circuit breaker 280 may be disposed within the heating chamber 210. Specifically, the overheat circuit breaker 280 may be disposed on an outer lateral surface of the heating chamber 210.

[0219] The overheat circuit breaker 280 may be provided in a position where heat is concentrated within the heating chamber 210. The overheat circuit breaker 280 may cut off power supplied to the heater 220, when the temperature of the heating chamber 210 is higher than a predetermined reference temperature T_r .

[0220] The overheat circuit breaker 280 may be a device configured to block the connection of a circuit when overheating occurs. For example, the overheat circuit breaker 280 may be a thermal protector. A thermal protector may be a device that uses a bi-metal to automatically disconnect the circuit when overheating occurs. In addition, the overheat circuit breaker 280 may include any means for disconnecting the circuit when overheating occurs.

[0221] The temperature detector 290 may be configured to detect the temperature of the heat generator 200.

[0222] The temperature detector 290 may be disposed on a lateral surface of the heating chamber 210. Specifically, the temperature detector 290 may be disposed on an outer lateral surface of the heating chamber 210.

[0223] The temperature detector 290 may measure the temperature of the heating chamber 210. For example, the temperature detector 290 may be a thermistor.

[0224] FIG. 12 is an exploded perspective view to describe the structure of a diffuser in a mop module according to one embodiment of the present disclosure. FIG. 13 is a bottom view to describe the structure of a diffuser in a mop module according to one embodiment of the present disclosure. FIG. 14a is a cross-sectional view to describe the structure in which a drain is discharged from a diffuser of a mop module according to one embodiment of the present disclosure. FIG. 14b is a view to describe an arrangement relation among a diffuser, a rotary cleaning part and a mop in a mop module according to one embodiment of the present disclosure.

[0225] Referring to FIGS. 12 to 14b, the diffuser of the mop module according to one embodiment of the present disclosure will be described as follows.

[0226] The diffuser 300 may be connected to the heat generator 200, and configured to discharge moisture introduced from the heat generator 200 to the mop 160.

[0227] A pair of diffusers 300 may be mounted in the module housing 110 and arranged in the left-right direction. The pair of diffusers 300 arranged in the left-right direction may be formed to be symmetrical to each other (i.e., mirror image). That is, the diffusers 300 may include a first diffuser 300a configured to supply moisture to the first mop 151 and a second diffuser 300b configured to supply moisture to the second mop 152.

[0228] The diffuser 300 may be disposed under the heat generator 200, and coupled to a moisture outlet hole 213 of the heat generator 200.

[0229] The diffuser 300 may include a diffuser housing 310, a moisture supply hole 320, a guide rib 330, a diffuser cover 340 and a moisture inlet pipe 350.

[0230] The diffuser housing 310 may provide a space in which moisture can flow. The inner space of the diffuser housing 310 may be in communication with the inner space of the heat generator 200.

[0231] The diffuser housing 310 may be formed along a circumferential direction on a predetermined origin. For example, as shown in FIG. 7, when looking at the lower surface of the mop module 100, the lower surface of the

diffuser housing 310 may be formed in an arc shape with the rotation center P1 and P2 of the pair of rotary cleaning parts 140 as the origin.

[0232] At this time, the diffuser housing 310 may be formed in an arc shape having a predetermined width R2-R1. For example, the inner diameter R1 of the diffuser housing 310 is equal to or larger than the radius of the rotary cleaning part 140. In addition, the outer diameter R2 of the diffuser housing 310 is smaller than half the distance between the rotation centers P1 and P2 of the pair of rotary cleaning parts 140. With this configuration, the diffuser housing 310 may be disposed between the pair of rotary cleaning parts 141 and 142.

[0233] The diffuser housing 310 may be configured of a lower surface, and a lateral wall protruding upward from the lower surface to surround the lower surface. Accordingly, the diffuser housing 310 may have an inner space in which moisture can flow. The lower surface of the diffuser housing 310 may define the exterior of the mop module 100, together with the lower housing 111. The lower surface of the diffuser housing 310 may be disposed on the lower housing 111 and between the rotation centers P1 and P2 of the pair of the rotary cleaning parts 140.

[0234] Meanwhile, a top of the diffuser housing 310 may be open and the open top may be covered by the diffuser cover 340.

[0235] The moisture supply hole 320 may be formed in the diffuser housing 310, and configured to discharge the moisture heated in the heat generator 200 there through. Specifically, the moisture supply hole 320 may be formed on the lower surface of the diffuser housing 310, and configured to discharge moisture (i.e., water or water vapor) flowing inside the diffuser housing 310 to the outside therethrough.

[0236] At this time, the moisture supply hole 320 may be disposed spaced a preset distance apart from the rotation centers P1 and P2 of the rotary cleaning parts 140. Specifically, the distance from the rotation centers P1 and P2 to the moisture supply hole 320 may be greater than the radius R1 of the rotary cleaning part 140.

[0237] In addition, the distance from the rotation centers P1 and P2 to the moisture supply hole 320 may be smaller than the radius of the mop 150.

[0238] With this configuration, the moisture discharged through the moisture supply hole 320 may be supplied to the mop 150, not blocked by the rotary cleaning part 140.

[0239] Generally, a vacuum cleaner including the steam generator may be powered by a cord, so the steam generator may be operated continuously to supply steam.

[0240] In contrast, a cordless vacuum cleaner powered by a battery may have a limit to the time it can generate steam. accordingly, it is necessary to quickly supply the steam generated in the steam generator to the mop before the steam condenses.

[0241] To this end, the mop module 100 of the present disclosure may be arranged so that the distance between the heat generator 200 and the moisture supply hole 320

can become narrow.

[0242] That is, the moisture outlet hole 213 of the heat generator 200 may be connected to the moisture inlet pipe 350 of the diffuser 300, and the moisture supply hole 320 of the diffuser 300 may be disposed close to the moisture outlet hole 213 of the heat generator 200.

[0243] With this configuration, the moisture introduced from the heat generator 200 may quickly pass through the diffuser to be discharged through the moisture supply hole 320. Accordingly, the steam or high-temperature water generated in the heat generator 200 may be supplied to the mop 150, with minimized heat loss.

[0244] At least one moisture supply hole 320 may be formed along a circumferential direction. Specifically, the moisture supply hole 320 may be formed along the circumferential direction on a predetermined origin. For example, as shown in FIG. 7, a plurality of moisture supply hole 320 may be formed along the circumferential direction with respect to the rotation centers P1 and P2 of the rotary cleaning parts 140 as the origin.

[0245] With the above-noted configuration, the moisture discharged from the plurality of moisture supply holes 320 may be supplied to a predetermined radial position of the rotating mop 150.

[0246] Here, as it spreads along the mop 150, the moisture supplied to the mop 150 may be supplied to the entire area of the mop 150 and heat containing moisture may raise the temperature of the mop 150.

[0247] Furthermore, when the mop 150 is rotated together with the mop module 100, much moisture may be moved to the outer portion of the mop 150 with respect to the radial direction by the centrifugal force. Accordingly, the radially outer portion of the mop 150 may maintain a high moisture content and a high temperature.

[0248] The rotating mop 150 may have a greater torque as it moves radially outward from the center of rotation.

[0249] That is, according to the present disclosure, the radially outer portion of the mop 150 may have high moisture, high heat and large torque. Accordingly, the present disclosure may have an effect of maximizing the cleaning efficiency of the mop 150.

[0250] Meanwhile, in this embodiment, the moisture supply hole 320 may include three moisture supply holes 321, 322 and 323 formed at regular intervals along the circumferential direction, but is not limited thereto, and it may include all moisture supply holes formed at different intervals and the number of moisture supply holes 320 may also not limited.

[0251] Generally, if a plurality of outlet holes are formed in the diffuser, a problem might arise that the amount of water discharged from each outlet is different.

[0252] Specifically, the hydraulic pressure of moisture discharged from one outlet hole disposed adjacent to the inlet hole for introducing moisture may be higher than that of moisture discharged from another outlet hole disposed far from the inlet hole. Accordingly, a relatively large amount of moisture may be discharged from the outlet hole disposed adjacent to the position where moisture is

introduced, while a relatively small amount of moisture may be discharged from the other outlet holes.

[0253] Accordingly, the mop may could receive moisture unevenly from the moisture outlet hole. Some portions of the mop may not have enough moisture and some portions of the mop could have a low temperature.

[0254] In the diffuser having the plurality of outlet holes, there might be a problem that the cleaning performance of the mop deteriorates due to uneven moisture supply.

[0255] To solve this problem, the diffuser according to one embodiment of the present disclosure may include a plurality of moisture supply holes 320 but the diameters of the moisture supply holes 320 may be different from each other.

[0256] Specifically, the diameters of the plurality of moisture supply holes 320 may be larger as they get farther away from the point connected to the heat generator 200. For example, as shown in FIG. 13, the moisture supply holes 320 may include a first moisture supply hole 321 disposed closest to the moisture inlet hole 351 in communication with the heat generator 200; a second moisture supply hole 322 spaced a predetermined distance from the first moisture supply hole 321 in a direction away from the moisture inlet hole 351; and a third moisture supply hole 323 spaced a predetermined distance apart from the second moisture supply hole 322 in a direction away from the moisture inlet hole 351. At this time, the diameter of the second moisture supply hole 321 is greater than that of the first moisture supply hole 322. The diameter of the third moisture supply hole 323 may be greater than that of the second moisture supply hole 322.

[0257] With this configuration, in the moisture supply hole 320 located close to the moisture inlet hole 351, the flow rate of the discharged moisture may be fast but the diameter through which the moisture passes may be small. In the moisture supply hole 320 located far away from the moisture inlet hole 351, the flow rate of the discharged moisture may be relatively slow but the diameter through which the moisture passes may be large.

[0258] Accordingly, according to the present disclosure, there is an effect of making the moisture discharge amount of multiple supply holes 320 uniform.

[0259] Meanwhile, a guide rib 330 may be formed under the diffuser housing 310. The guide rib 330 may protrude downward from the edge of the lower surface of the diffuser housing 310.

[0260] The guide rib 330 may be formed along a circumferential direction. The guide rib 330 may be formed along the circumferential direction with respect to a predetermined rotation center as the origin. For example, as shown in FIG. 13, the guide rib 330 may be formed along the circumferential direction with the rotation center P1 and P2 of the rotary cleaning part 140 as the origin.

[0261] A pair of guide ribs 330 facing each other may be provided. At this time, a moisture supply hole 320 may be disposed between the pair of guide ribs 330.

[0262] Accordingly, when moisture is discharged

downward through the moisture supply hole 320, the space formed between the pair of moisture supply holes 320 may be provided with the moisture.

[0263] With this configuration, the guide ribs 330 may be configured to guide the moisture discharged from the moisture supply holes 320 to the mop 150 by blocking the moisture from escaping horizontally.

[0264] Meanwhile, the diffuser 300 may further include a drain discharge portion 311 directed downward from the diffuser housing 310.

[0265] The drain discharge portion 311 may be connected to the diffuser housing 310, and define a space in which moisture can flow. The drain discharge portion 311 may be in communication with the inner space of the diffuser housing 310.

[0266] The drain discharge portion 311 may be configured of a lower surface and a lateral wall protruding upward from the lower surface to surround the lower surface. Accordingly, the drain discharge portion 311 may have the inner space where moisture can flow. The lower surface of the drain discharge portion may define the exterior of the mop module 100 together with the lower housing 111.

[0267] At this time, the drain discharge portion 311 may be disposed between the rotation center P1 and P2 of the rotary cleaning part 140 and the diffuser housing 310. The drain discharge portion 311 may be formed along a radial direction with respect to the rotation center P1 and P2 as the origin. That is, the drain discharge portion 311 may extend radially inward from the diffuser housing 310. With this configuration, the drain discharge portion 311 may be disposed vertically above the rotary cleaning part 140.

[0268] As shown in FIG. 14a, the lower surface of the drain discharge portion 311 may be inclined downward from the lower surface of the diffuser housing 310. At this time, the drain discharge portion 311 may form a step with the lower surface of the diffuser housing 310. Then, while the mop 150 of the mop module 100 is facing the floor, the lower surface of the drain discharge portion 311 may be disposed closer to the floor than the lower surface of the diffuser housing 310.

[0269] With this configuration, a drain d generated while flowing inside the diffuser 300 may be collected in the drain discharge portion by the gravity.

[0270] Accordingly, when the diffuser 300 discharges steam to the mop 150, the present disclosure has an effect of preventing the moisture supply hole 320 from being blocked by surface tension of the drain and preventing uneven steam supply due to the blocking.

[0271] Meanwhile, a drain hole 312 may be formed in the drain discharge portion 311.

[0272] The drain hole 312 may be disposed in the direction of the rotation center P1 and P2 of the rotary cleaning part 140 in the drain discharge portion 311. At this time, the drain hole 312 may be disposed closest to the floor from the drain discharge portion 311.

[0273] Accordingly, the drain stored in the drain dis-

charge portion 311 may be flowing toward the drain hole 312 by the gravity and discharged through the drain hole 312.

[0274] The drain hole 312 may be disposed vertically above the rotary cleaning part 140. Then, the drain discharged through the drain hole 312 may be gradually moved outward from the rotation center P1 and P2 of the rotary cleaning part 140 by the centrifugal force generated by the rotary cleaning part 140, and as a result, may be supplied to the mop 150.

[0275] The diffuser cover 340 may be coupled to the diffuser housing 310, to define an inner space in which moisture can flow. The diffuser cover 340 may be coupled to the drain discharge portion 311 to define an inner space in which moisture can flow.

[0276] The diffuser cover 340 may be configured to cover a top of the diffuser housing 310. The diffuser cover 340 may cover a top of the drain discharge portion 311. For example, the diffuser cover 340 may be made of a material that can seal the diffuser housing 310. With this configuration, it is possible to prevent the steam or high-temperature water flowing inside the housing 310 from being discharged to the inside of the module housing 110.

[0277] The diffuser cover 340 may be formed in a shape that correspond to the shape of the diffuser housing 310 and the drain discharge portion 311. The diffuser cover 340 may be formed along the circumferential direction with respect to the rotation center P1 and P2 of the rotary cleaning part 140 as the origin, corresponding to the shape of the diffuser housing 310. And, one end of the diffuser cover 340 in the circumferential direction may extend radially inward, corresponding to the shape of the drain discharge portion 311.

[0278] The diffuser cover 340 may have a moisture inlet pipe 350 formed therein. For example, the moisture inlet pipe 350 may be integrally formed with the diffuser cover 340.

[0279] The moisture inlet pipe 350 may extend upward from the diffuser cover 340. As one example, in the state where the mop 150 of the mop module 100 is placed to face the floor surface, the moisture inlet pipe 350 may extend upward along a direction perpendicular to the floor surface in the diffuser cover 340. As another example, the moisture inlet pipe 350 may inclinedly extend upward at a predetermined angle from the diffuser cover 340.

[0280] The moisture inlet pipe 350 may be coupled to the moisture outlet hole 213 of the heat generator 200. For example, the moisture inlet pipe 350 may be formed in a cylindrical shape connected to the diffuser cover 340. Accordingly, the moisture outlet hole 213 may be insertedly coupled to the moisture inlet pipe 350.

[0281] A moisture inlet hole 351 may be formed in the moisture inlet pipe 350. That is, the moisture inlet pipe 350 may be formed in a hollow tube shape, and a space in which moisture can flow may be formed inside the moisture inlet pipe 350.

[0282] The moisture inlet pipe 350 may be made of a

material that can seal the moisture outlet hole 213. With this configuration, it is possible to prevent the steam or high-temperature water introduced into the diffuser housing 310 from being discharged into the module housing 110.

[0283] Meanwhile, FIG. 15 is a bottom view to describe a mop module according to a second embodiment of the present disclosure. FIG. 16 is a perspective view to describe the structure of a diffuser in the mop module according to the second embodiment. FIG. 17 is a cross-sectional view to describe flow path diameter variation inside the diffuser in the mop module according to the second embodiment of the present disclosure.

[0284] Referring to FIGS. 15 to 17, the diffuser of the mop module according to the second embodiment of the present disclosure will be described as follows.

[0285] The diffuser 1300 according to the second embodiment may include a diffuser housing 1310, a moisture supply hole 1320, a sealing gasket 1330, a diffuser cover 1340, and a moisture inlet pipe 1350.

[0286] Meanwhile, to avoid repeated description, the structure and effect of the diffuser 300 according to the above embodiment are the same as the those of the diffuser according to this second embodiment not specifically described in this embodiment, and thus they are omitted.

[0287] In this embodiment, the moisture supply hole 1320 may be spaced a predetermined distance apart from the rotation center P1 and P2 of the rotary cleaning part 1140. Specifically, the distance from the rotation center (P1 and P2) to the moisture supply hole 1320 may be greater than the radius R1 of the rotary cleaning part 140.

[0288] In addition, the distance from the rotation center P1 and P2 to the moisture supply hole 1320 may be smaller than the radius of the mop 150.

[0289] With this configuration, the moisture discharged from the moisture supply hole 1320 may not be blocked by the rotary cleaning part 140 but directly supplied to the mop 150.

[0290] At least one moisture supply hole 1320 may be formed along a circumferential direction. A plurality of moisture supply holes 1320 may be formed along the circumferential direction with respect to the rotation center P1 and P2 of the rotary cleaning part 1140 as the origin. As one example, the plurality of moisture supply holes 1320 may be formed to have a predetermined radius with the rotation center P1 and P2 of the rotary cleaning part 140 as the origin. As another example, the plurality of moisture supply holes 1320 may be disposed within a predetermined radius range with the rotation center P1 and P2 of the rotary cleaning part 140 as the origin.

[0291] With this configuration, the moisture discharged from the plurality of moisture supply holes 1320 may be supplied to predetermined radial positions of the rotating mop 150.

[0292] Meanwhile, the sealing gasket 1330 may be

connected to the diffuser housing 1310. For example, the sealing gasket 1330 may be integrally formed with the diffuser housing 1310.

[0293] The sealing gasket 1330 may be formed of a material that can block passage of moisture.

[0294] The sealing gasket 1330 may be connected to the diffuser housing 1310, and specifically, it may be formed in a ring shape. Accordingly, looking at the lower surface of the module housing, the sealing gasket 1330 and the diffuser housing 1310 may be exposed in a ring shape.

[0295] With this configuration, there is an effect of blocking the moisture scattering as the mop 150 rotates from flowing into the module housing 110.

[0296] The diffuser cover 1340 may be coupled to the diffuser housing 1310 to form an inner space in which moisture can flow.

[0297] The diffuser cover 1340 may include a cover body 1341. The cover body 1341 may be coupled to an upper portion of the diffuser housing 1310.

[0298] The cover body 1341 may cover the upper portion of the diffuser housing 1310. For example, the cover body 1341 may be made of a material that can seal the diffuser housing 1310. With this configuration, it is possible to prevent steam or high-temperature water flowing inside the diffuser housing 1310 from being discharged into the module housing 110.

[0299] The cover body 1341 may be formed to correspond to the shape of the diffuser housing 1310. The cover body 1341 may be formed along the circumferential direction with the rotation center P1 and P2 of the rotary cleaning part 140 as the origin, corresponding to the shape of the diffuser housing 1310.

[0300] Meanwhile, in the diffuser in which the plurality of outlet holes are formed, as flowing inside the diffuser, moisture may be discharged through the outlet holes and then the flow rate thereof may be reduced, and as the moisture flowing away from the point where the moisture is introduced, the flow rate may decrease.

[0301] Accordingly, the farther away from the point of moisture inflow, the less the flow amount of moisture discharged through the outlet holes may be.

[0302] To solve the disadvantage, in this embodiment, the inner space where moisture flows may become narrower as getting farther away from the point connected to the heat generator 1200.

[0303] More specifically, the diffuser cover 1340 may further include a flow rate adjustment part 1342.

[0304] The flow rate adjustment part 1342 may protrude toward the diffuser housing 1310 from the cover body 1341. The flow rate adjustment part 1342 may protrude downward from the cover body 1341.

[0305] The protruding height of the flow rate adjustment part 1342 may vary based on the distance from the point connected to the heat generator 1200. Specifically, the protruding height of the flow rate adjustment part 1342 may increase as moving away from the point connected to the heat generator 1200. As one example, the

flow rate adjustment part 14342 may protrude downward from the point where the moisture inlet hole 1351 is formed. That is, the flow rate adjustment part 1342 may be formed in a shape in which the downwardly protruding height gradually increases from the point where the moisture inlet hole 1351 is formed (see FIG. 17).

[0306] With this configuration, the diffuser 1300 may have a narrower space where moisture flows as it moves farther from the point communicating with the moisture inlet hole 1351. For example, the inner space of the diffuser 1300 may become lower as getting farther from the point communicating with the moisture inlet hole 1351. That is, referring to FIG. 17, the height of the inner space formed in the diffuser 1300 may be greater at the point H1 connected to the moisture inlet hole 1351 than at the point H2 connected to the moisture supply hole 1320 located farthest from the moisture inlet hole 1351 ($H1 > H2$).

[0307] With this configuration, the diffuser 1300 may have an effect of increasing the moisture flow rate as moving farther from the point communicating with the moisture inlet hole 1351.

[0308] According to the present disclosure, there is an effect of making the flow rate of moisture discharged from the plurality of moisture supply holes 1320 uniform, and making the amount uniform.

[0309] A moisture inlet pipe 1350 may be formed in the diffuser cover 1340. For example, the moisture inlet pipe 1350 may be integrally formed with the diffuser cover 1340.

[0310] The moisture inlet pipe 1350 may extend upwardly from the diffuser cover 1340. As one example, the moisture inlet pipe 1350 may extend upwardly at a predetermined angle from the diffuser cover 1340. As another example, the moisture inlet pipe 1350 may extend upwardly along a direction perpendicular to the ground.

[0311] The moisture inlet pipe 1350 may be coupled to the moisture outlet hole 1214 of the heat generator 1200. For example, the moisture inlet pipe 1350 may be formed in a cylindrical shape connected to the diffuser cover 1340. Accordingly, the moisture outlet hole 1213 may be insertedly coupled to the moisture inlet pipe 1350.

[0312] A moisture inlet hole 1351 may be formed in the moisture inlet pipe 1350. That is, the moisture inlet pipe 1350 may be formed in shape of a hollow pipe and an inner space may be formed therein so that moisture can flow in the inner space.

[0313] The moisture inlet pipe 1350 may be made of a material that can seal the moisture outlet hole 1213. With this configuration, it is possible to prevent steam or high-temperature water introduced to the diffuser housing 1310 from leaking into the module housing 110.

[0314] Meanwhile, FIG. 18 is a bottom view to describe a mop module according to a third embodiment of the present disclosure. FIG. 19 is a plane view to describe the structure of a diffuser in the mop module according to the third embodiment. FIG. 20 is a bottom view to describe to

the structure of the diffuser in the mop module according to the second embodiment. FIG. 21 is a cross-sectional view to describe an inner structure of the diffuser in the mop module according to the third embodiment of the present disclosure. FIG. 22 is a cross-sectional view to describe the inner structure of the diffuser according to the third embodiment of the present disclosure

[0315] Referring to FIGS. 18 to 22, the diffuser according to the third embodiment of the present disclosure will be described.

[0316] The diffuser 2300 according to the third embodiment may include a diffuser housing 2310, a moisture supply hole 2320, a sealing gasket 2330, a diffuser cover 2340, a moisture inlet pipe 2350, a guide pole 2360, and a guide inclined surface 2370.

[0317] Meanwhile, to avoid repeated description, the structure and effect of the diffuser 300 according to the above embodiment are the same as the those of the diffuser according to this second embodiment not specifically described in this embodiment, and thus they are omitted.

[0318] The diffuser housing 2310 may provide a space in which moisture can flow. The inner space of the diffuser housing 2310 may be configured to communicate with the inner space of the heat generator 200.

[0319] The diffuser housing 2310 may include a guide protrusion 2311 and a drainage surface 2312.

[0320] The guide protrusion 2311 may protrude from a lower surface of the diffuser housing 2310. The guide protrusion 2311 may be formed by a step formed at a predetermined height from the lower surface of the diffuser housing 2310.

[0321] The drainage surface 2312 may mean an inclined surface inclined downwardly at a predetermined angle from the guide protrusion 2311. Specifically, the drainage surface 2312 may be inclined downwardly toward the moisture supply hole 2320.

[0322] With this configuration, moisture introduced to the diffuser housing 2310 may flow to the moisture supply hole 2320 along the guide protrusion 2311 and the drainage surface 2312.

[0323] The moisture supply hole 2320 may be formed by the diffuser housing 2310, and configured to discharge moisture heated in the heat generator 200 therethrough. Specifically, the moisture supply hole 2320 may be formed on the lower surface of the diffuser housing 2310, and configured to discharge the moisture (i.e., water or water vapor) flowing inside the diffuser housing 2310 to the outside therethrough.

[0324] As shown in FIG. 20, the moisture supply hole 2320 may be formed in a shape of a long hole along the circumference with the rotation center P1 and P2 of the rotary cleaning part 140 as the origin.

[0325] With this configuration, the moisture discharged from the plurality of moisture supply holes 320 may be supplied to constant radial positions of the rotating mop 150.

[0326] Generally, during the process of discharging

steam through the outlet hole of the diffuser, some of the steam may condense to form a drain, and the drain could obstacle the discharge of steam as it is discharged through the outlet.

[0327] Specifically, the drain generated during the process of discharging steam might momentarily block the outlet hole, and the flow rate and pressure of the steam discharged through the outlet hole might decrease.

[0328] Due to that, problems occur that the flow rate and pressure of the steam discharged through the outlet hole become uneven and that the moisture supplied to the mop could become uneven.

[0329] To solve them, the moisture supply hole 2320 may be formed with different radial widths.

[0330] As one example, the moisture supply hole 2320 may be formed as a long hole formed along the circumferential direction with the rotation center P1 and P2 of the rotary cleaning part 140 as the origin, but the radial width may be formed to gradually widen from the front to the rear of the mop module.

[0331] As another example, the moisture supply hole 2320 may be formed as a long hole along a circumferential direction with the rotation center P1 and P2 as the origin, but the radial width may be formed to gradually widen from the outer portion to the inner portion with respect to the left-right direction of the mop module.

[0332] As a further example, the moisture supply hole 2320 may be formed as a long hole along a circumferential direction with the rotation center P1 and P2 as the origin, but the radial width may be formed to gradually widen along the rotational direction of the rotary cleaning part 140.

[0333] That is, the moisture supply holes 2320 may be formed along the circumferential direction, but they may include a first hole 2321 formed along the circumferential direction with the radial width that gradually increases from one side of the circumferential direction to the other side; and a second hole 2322 formed in the shape of a circular hole connected to the other side of the first hole 2321, with a diameter that is larger than the width of the first hole 2321.

[0334] With this configuration, even if drain is located on the moisture supply hole 2320, at least some area of the moisture supply hole 2320 may be open to gas can pass therethrough. Accordingly, steam can be discharged through the open space, and at least predetermined amount of drain may be discharged together with the steam by the hydraulic pressure of the steam, thereby making an effect of reducing the difference in the hydraulic pressure and flow amount of the discharged steam.

[0335] Furthermore, in this embodiment, the width of the moisture supply hole 2320 may be formed to be different, so that a small-sized drain can be quickly discharged through the area of the moisture supply hole 2320 with the large width.

[0336] Accordingly, there is an effect of making the moisture discharge amount of the moisture supply hole 2320 uniform.

[0337] Meanwhile, the sealing gasket 2330 may be connected to the diffuser housing 2310. For example, the sealing gasket 2330 may be integrally formed with the diffuser housing 2310.

[0338] The sealing gasket 2330 may be made of a material that can block the passage of moisture.

[0339] The sealing gasket 2330 may be connected to the diffuser housing 2310, and formed in a ring shape overall. Accordingly, when looking at the lower surface of the module housing 110, the sealing gasket 2330 and the diffuser housing 2310 may be exposed in a ring shape.

[0340] With this configuration, there is an effect of blocking the moisture scattered while the mop 150 is rotating from being introduced to the module housing 110.

[0341] Meanwhile, the pair of diffuser housing 2310 and the sealing gasket 2330 may be connected to each other through a connection part 2380. Due to that, the diffuser 2300 and the module housing 110 may be coupled to each other easily.

[0342] The diffuser cover 2340 may be coupled to the diffuser housing 2310 to define a space in which moisture flows.

[0343] The diffuser cover 2340 may be coupled to an upper portion of the diffuser housing 2310.

[0344] The diffuser cover 2340 may be configured to cover the upper portion of the diffuser housing 2310. For example, the diffuser cover 2340 may be made of a material that can seal the diffuser housing 2310. With this configuration, it is possible to prevent the steam or high-temperature water flowing within the diffuser housing 2310 from leaking into the module housing 110.

[0345] The diffuser cover 2340 may be formed to correspond to the shape of the diffuser housing 2310. The diffuser cover 2340 may be formed along a circumferential surface with the rotation center P1 and P2 of the rotary cleaning part 2140 as the origin, corresponding to the shape of the diffuser housing 2310.

[0346] A moisture inlet pipe 2350 may be formed in the diffuser cover 2340. For example, the moisture inlet pipe 2350 may be integrally formed with the diffuser cover 2340.

[0347] The moisture inlet pipe 2350 may extend upwardly from the diffuser cover 2340. As one example, the moisture inlet pipe 2350 may extend to be inclined upward at a predetermined angle from the diffuser cover 2340. As another example, the moisture inlet pipe 2350 may extend upwardly from the diffuser cover 2340 along a perpendicular direction with respect to the ground.

[0348] The moisture inlet pipe 2350 may be coupled to the moisture outlet hole 213 of the heat generator 200. For example, the moisture inlet pipe 2350 may be formed in a cylindrical shape connected to the diffuser cover 2340. Accordingly, the moisture outlet hole 213 may be insertedly coupled to the moisture inlet pipe 2350.

[0349] A moisture inlet hole 2351 may be formed in the moisture inlet pipe 2350. That is, the moisture inlet pipe 2350 may be formed in a hollow pipe shape, and have a

space in which moisture can flow.

[0350] The moisture inlet pipe 2350 may be made of a material that can seal the moisture outlet hole 213. With this configuration, it is possible to prevent the steam or high-temperature water introduced to the diffuser housing 2310 from leaking into the module housing 110.

[0351] In general, a water film may be formed by the surface tension of water or water vapor in the heat generator. Such a water film can obstacle the discharge of steam as it is discharged through the outlet hole.

[0352] Specifically, the water film may obstacle the moisture supplied to the diffuser from the heat generator, and deteriorate the flow amount and pressure of the steam introduced through the outlet hole. In addition, if the water film is destroyed by the pressure of the steam flowing in the heat generator, the flow and pressure of the steam flowing into the diffuser may increase instantaneously.

[0353] Accordingly, the flow and pressure of the steam introduced into the diffuser might be ununiform, which could cause a problem of making the moisture supplied to the mop ununiform.

[0354] To solve this, the diffuser 2300 according to this embodiment may further include a guide pole 2360.

[0355] The guide pole 2360 may protrude from the diffuser housing 2310 toward the heat generator 200. Specifically, the guide pole 2360 may protrude upwardly from the guide protrusion 2311 of the diffuser housing 2310.

[0356] At this time, the guide pole 2360 may protrude to the height that allows it to be inserted into the moisture outlet hole 213 of the heat generator 200. Due to this configuration, the guide pole 2360 may destroy the water film that might be formed on the moisture outlet hole 213.

[0357] For example, the guide pole 2360 may be formed in a cone shape. That is, the guide pole 2360 may protrude in the cone shape, but an inclined surface 2361 having a predetermined angle may be formed on an upper portion. At this time, an upper end of the inclined surface 2361 may be the upper end of the guide pole 2360 but the lower end of the inclined surface 2361 may be disposed closer to the moisture supply hole 2320 than the upper end. Accordingly, a drain may be generated in the water film destroyed by the guide pole 2360, and the drain can flow down along the inclined surface 2361 toward the moisture outlet hole 213. Then, the guide pole 2360 may guide the direction of the drain flow.

[0358] Meanwhile, the diffuser 2300 according to this embodiment may further include a guide inclined surface 2370.

[0359] The guide inclined surface 2370 may be configured to guide the moisture introduced from the heat generator 200 to the moisture supply hole 2320.

[0360] The guide inclined surface 2370 may protrude toward the heat generator 200 from the diffuser housing 2310. Specifically, the guide inclined surface 2370 may protrude from the lower surface toward the upper surface of the diffuser housing 2310.

[0361] The guide inclined surface 2370 may be disposed between the guide protrusion 2311 and the moisture supply hole 2320. With this configuration, the moisture flowing along the guide protrusion 2311 may be guided to the moisture supply hole 2320 by the guide inclined surface 2370.

[0362] The guide inclined surface 2370 may be formed to have a slope of a predetermined angle. The guide inclined surface 2370 may be formed along a circumferential direction with the rotation center P1 and P2 of the rotary cleaning part 140 as the origin, but it may have a circumferential-direction side that is formed higher than the other side. That is, the guide inclined surface 2370 may be inclined to become close to the ground from the circumferential one side toward the other circumferential side. The second hole 2322 of the moisture supply hole 2320 may be disposed on the other circumferential side of the guide inclined surface 2370.

[0363] With this configuration, the drain formed by destroying the water film or during the flow process may flow toward the second hole 2322 with the largest diameter along the guide inclined surface 2370. Accordingly, the drain may pass through the second hole 2322, without blocking the moisture supply hole 2320, or gas can pass through the first hole 2321 even if the drain blocks the second hole 2322, thereby causing an effect of stable steam discharge.

[0364] Meanwhile, FIG. 23 shows a bottom view to describe a mop module according to a fourth embodiment of the present disclosure. FIG. 24 shows a diagram to describe a flow rate adjustment part in the mop module according to the fourth embodiment.

[0365] Referring to FIGS. 23 and 24, the diffuser according to the fourth embodiment will be described as follows.

[0366] The diffuser 3300 according to this embodiment may include a diffuser housing 3310, a moisture supply hole 3320, a sealing gasket 3330, a diffuser cover 3340, and a moisture inlet pipe 3350

[0367] Meanwhile, to avoid repeated description, the structure and effect of the diffuser 300 according to the above embodiment are the same as the those of the diffuser according to this second embodiment not specifically described in this embodiment, and thus they are omitted.

[0368] In the diffuser 3300 according to this embodiment, a plurality of moisture supply holes 3320 may be formed and each moisture supply hole 3320 may have a different diameter.

[0369] Specifically, the plurality of moisture supply holes 3320 may have the diameters that become larger as getting farther from the point connected to the heat generator 3200.

[0370] With this configuration, in one moisture supply hole 3320 disposed closer to the moisture inlet hole 3351, the flow rate of the discharged moisture may be fast but the diameter through which the moisture passes may be small. In contrast, in the other moisture supply hole 3320

disposed farther from the moisture inlet hole 3351, the flow rate may be relatively slow but the diameter may be relatively large.

[0371] Accordingly, the present disclosure may have an effect of making the flow amount of the moisture discharged from the plurality of moisture supply holes 3320 uniform.

[0372] In addition, in the diffuser 3300 according to this embodiment, an inner space where moisture flows may become narrower as getting farther away from the point connected to the heat generator 3200.

[0373] Specifically, the diffuser cover 3340 may further include a flow rate adjustment part 3342.

[0374] The flow rate adjustment part 3342 may protrude toward the diffuser housing 3310 from the cover body 3341. The flow rate adjustment part 3342 may protrudingly extend downward from the cover body 3341.

[0375] The flow rate adjustment part 3342 may have different protruding heights based on the distance from the point connected to the heat generator 3200. Specifically, the protruding height of the flow chart adjustment part 3342 may become greater as it getting farther away from the point connected to the heat generator 3200. As one example, the flow rate adjustment part 3342 may protrude downward from the point where the moisture inlet hole 3351 is formed. That is, the flow rate adjustment part 3342 may be formed in a shape in which the downwardly protruding height gradually increases from the point where the moisture inlet hole 3351 is formed.

[0376] With this configuration, in the diffuser 3300, the inner space where moisture can flow may become narrower as the diffuser 3300 is getting farther away from the point connected with the moisture inlet hole 3351. For example, the inner space of the diffuser 3300 may have the height that gradually becomes lower as getting farther away from the point connected to the moisture inlet hole 3351.

[0377] In addition, the diffuser 3300 may have an effect of increasing the moisture flow rate as it is getting farther away from the point connected to the moisture inlet hole 3351.

[0378] Accordingly, in the present disclosure, the flow rate of the moisture discharged from the plurality of moisture supply holes 3320 may be uniform, and the amount of the moisture discharged from the plurality of moisture supply holes 3320 may be also uniform.

[0379] Meanwhile, FIG. 25 shows a bottom view to describe a mop module according to a fifth embodiment of the present disclosure.

[0380] Referring to FIG. 25, the diffuser according to the fifth embodiment will be described as follows.

[0381] The diffuser 4300 according to this embodiment may include a diffuser housing 4310, a moisture supply hole 4320, a sealing gasket 4330, a diffuser cover 4340, and a moisture inlet pipe 4350.

[0382] Meanwhile, to avoid repeated description, the structure and effect of the diffuser 3300 according to the fourth embodiment are the same as the those of the

diffuser according to this second embodiment not specifically described in this embodiment, and thus they are omitted.

[0383] In the diffuser 4300 according to this embodiment, a plurality of moisture supply holes 4320 may be formed and each moisture supply hole 4320 may have a different diameter.

[0384] At this time, at least one of the plural moisture supply holes 4320 may be formed along the circumferential direction, but the radial width thereof may gradually increase from the circumferential one side to the other circumferential side.

[0385] With this configuration, even if a drain is located on the moisture supply hole 4320, at least some area of the moisture supply hole 4320 may be open so that gas can pass therethrough. Accordingly, steam can pass through the opened space and at least some portion of the drain may be discharged together, thereby providing an effect of reducing the differences in the hydraulic pressure and flow amount of the discharged steam.

[0386] In addition, in the diffuser 4300 according to this embodiment, the inner space where moisture can flow may become narrower as getting farther away from the point connected to the heat generator 4200.

[0387] Specifically, the diffuser cover 4340 may further include a flow rate adjustment part 4342.

[0388] The flow rate adjustment part 4342 may protrude toward the diffuser housing 4310 from the cover body 4341. The flow rate adjustment part 4342 may protrudingly extend downward from the cover body 4341.

[0389] The flow rate adjustment part 4342 may have the protruding height that varies based on the distance from the point connected to the heat generator 4200. Specifically, the flow rate adjustment part 4342 may be the protruding height that gradually increases as getting farther away from the point connected to the heat generator 4200. As one example, the flow rate adjustment part 4342 may protrude downward from the point where the moisture inlet hole 4351 is formed. That is, the flow rate adjustment part 4342 may be formed in a shape in which the downwardly protruding height gradually increases from the point where the moisture inlet hole 4351 is formed.

[0390] Meanwhile, referring to FIG. 1, the vacuum cleaner 1 according to the present disclosure may include an extension pipe 400.

[0391] The extension pipe 400 may be coupled to the cleaner body 500 and the mop module 100.

[0392] For example, the extension pipe 400 may be formed in a cylindrical shape. Accordingly, an internal space of the extension pipe 400 may be in communication with the internal space of the mop module 100. Also, the extension pipe 400 may be in communication with a suction path formed in a suction part 120 of the cleaner body 500.

[0393] When suction power is generated by the suction motor (not shown), suction power may be provided to the mop module 100 through the suction part 120 and the

extension pipe 400. Accordingly, external dust and air may be sucked into the cleaner body 500 through the mop module 100 and the extension pipe 400. The dust and air sucked in through the mop module 100 may pass through the extension pipe 400 and then may be introduced into the cleaner body 500.

[0394] Meanwhile, wires may be embedded in the extension pipe 400. Accordingly, the cleaner body 500 and the mop module 100 may be electrically connected to each other through the extension pipe 400.

[0395] Referring to FIG. 1, the vacuum cleaner 1 according to the present disclosure may include the cleaner body 500.

[0396] The cleaner body 500 may include a suction motor, a dust bin and a battery. The cleaner body 500 may be supplied power from the battery to operate the suction motor, and may generate suction power by using the operation of the suction motor.

[0397] A suction path may be formed in the cleaner body 500 so that air and dust introduced from the mop module 100 can flow therethrough.

[0398] The cleaner body 500 may include at least one cyclone part that separates dust sucked therein by applying the principle of a dust collector using centrifugal force. Accordingly, while the air is flowing spirally, dust may be separated from the air introduced through the suction path.

[0399] The cleaner body 500 may include the dust bin to store the dust separated from the air sucked through the cyclone flow.

[0400] The battery may supply power to the mop module 100. At this time, the battery may supply power to the driving motor 170 of the mop module 100. In addition, the battery may supply power to a water pump 133 of the mop module 100.

[0401] Referring to FIGS. 1 and 2, the vacuum cleaner according to the present disclosure may include an auxiliary battery housing 600.

[0402] The auxiliary battery housing 600 may be coupled to the mop module 100 or the extension pipe 400. An auxiliary battery 700 may be detachably mounted to the auxiliary battery housing 600. As one example, the auxiliary battery housing 600 may be coupled to the connection pipe 180 of the mop module 100, and configured to detachably accommodate the auxiliary battery 700 therein.

[0403] The auxiliary battery housing 600 may be configured to electrically connect the auxiliary battery 700 to the heat generator 200. With this configuration, it is possible to supply electric energy of the auxiliary battery 700 to the heat generator 200 requiring high power supply.

[0404] Alternatively, the auxiliary battery housing 600 may be configured to directly connect the battery (not shown) provided in the cleaner body 500 to the auxiliary battery 700. With this configuration, when a high power supply is required such as when the heat generator 200 is in operation, power can be supplied stably.

[0405] Alternatively, the auxiliary battery housing 600 may be configured to connect the battery provided in the cleaner body 500 and the auxiliary battery 700 to each other in parallel. With this configuration, the usage time of the vacuum cleaner 1 can be extended.

[0406] Referring to FIGS. 1 and 2, the vacuum cleaner 1 according to the present disclosure may include an auxiliary battery 700.

[0407] The auxiliary battery 700 may be configured to store electric energy therein. For example, the auxiliary battery 700 may be a secondary battery.

[0408] The auxiliary battery 700 may supply power to the mop module 100. Specifically, the auxiliary battery 700 may supply power to the heat generator 200. At this time, the auxiliary battery 700 and the heat generator 200 may be electrically connected to each other.

[0409] Although the present invention has been described with reference to the exemplified drawings, it is to be understood that the present invention is not limited to the embodiments and drawings disclosed in this specification, and those skilled in the art will appreciate that various modifications are possible without departing from the scope and spirit of the present invention.

[0410] Further, although the operating effects according to the configuration of the present invention are not explicitly described while describing an embodiment of the present invention, it should be appreciated that predictable effects are also to be recognized by the configuration.

Claims

1. A mop module of a vacuum cleaner configured to perform cleaning by wiping out foreign substances from the floor surface, the mop module comprising:

a module housing;
 a water tank disposed above the module housing and configured to store water therein;
 at least one rotary cleaning part disposed under the module housing, the rotary cleaning part to which a mop is coupled;
 a heat generator configured to heat water supplied from the water tank; and
 a diffuser provided under the heat generator and configured to supply moisture heated in the heat generator to the mop,
 wherein the diffuser comprises,
 a diffuser housing coupled to the module housing; and
 a moisture supply hole formed in the diffuser housing, the moisture supply hole through which the moisture heated in the heat generator is discharged, and
 the moisture supply hole is provided along a circumferential direction in plural, and the plurality of moisture supply holes have different

diameters, respectively.

2. The mop module of the vacuum cleaner of claim 1, wherein the diffuser is connected to the heat generator, and the plurality of moisture supply holes have diameters that gradually increase as getting farther away from a point connected to the heat generator.
3. The mop module of the vacuum cleaner of claim 1, wherein the diffuser further comprises, a guide rib protruding formed downward from the diffuser housing and formed along a circumferential direction.
4. The mop module of the vacuum cleaner of claim 1, wherein the diffuser further comprises, a drain discharge portion downward from the diffuser housing.
5. The mop module of the vacuum cleaner of claim 1, wherein the diffuser is connected to the heat generator, and has an inner space where moisture flows, which becomes narrower as getting farther away from a point connected to the heat generator.
6. The mop module of the vacuum cleaner of claim 1, wherein the diffuser further comprises, a diffuser cover coupled to the diffuser housing and forming a space in which moisture flows.
7. The mop module of the vacuum cleaner of claim 6, wherein the diffuser cover comprises,
 a cover body covering the diffuser housing; and
 a flow rate adjustment part protruding toward the diffuser housing from the cover body.
8. The mop module of the vacuum cleaner of claim 7, wherein the diffuser is connected to the heat generator, and the flow rate adjustment part has a protruding height that varies based on the distance from a point connected to the heat generator.
9. The mop module of the vacuum cleaner of claim 7, wherein the diffuser is connected to the heat generator, and the flow rate adjustment part has a protruding height that increases as getting farther away from a point connected to the heat generator.
10. The mop module of the vacuum cleaner of claim 1, wherein the moisture supply hole is formed along a circumferential direction in a shape of a long hole.
11. The mop module of the vacuum cleaner of claim 10, wherein the diffuser is connected to the heat generator, and

the moisture supply hole is formed along a circumferential direction, with a radial diameter that increases gradually.

12. The mop module of the vacuum cleaner of claim 10, 5
wherein the diffuser further comprises,
a guide pole protruding toward the heat generator
from the diffuser housing and configured to eliminate
a water film generated in the heat generator. 10
13. The mop module of the vacuum cleaner of claim 10,
wherein the diffuser further comprises,
a guide inclined surface configured to guide moisture
introduced from the heat generator to the moisture
supply hole. 15

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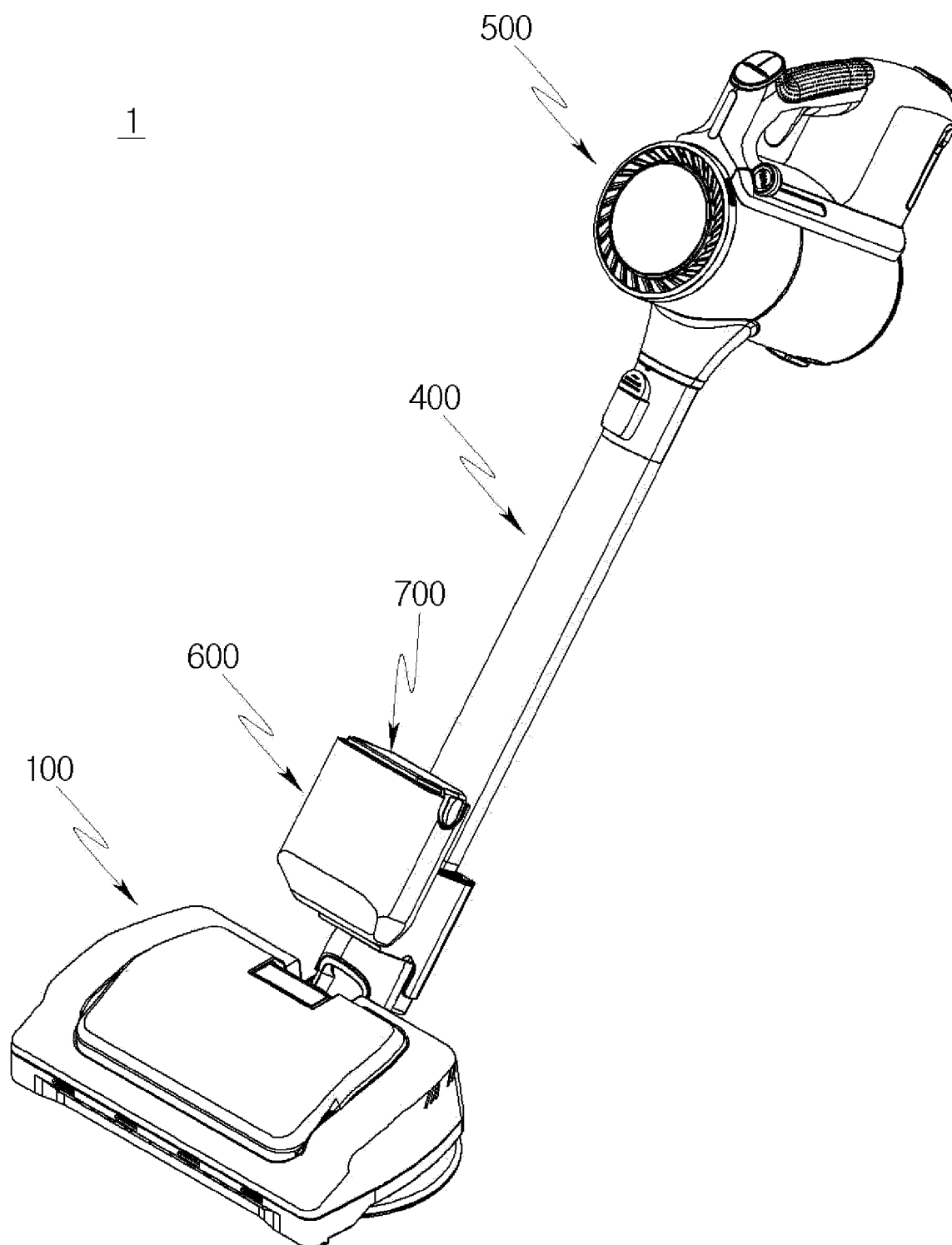
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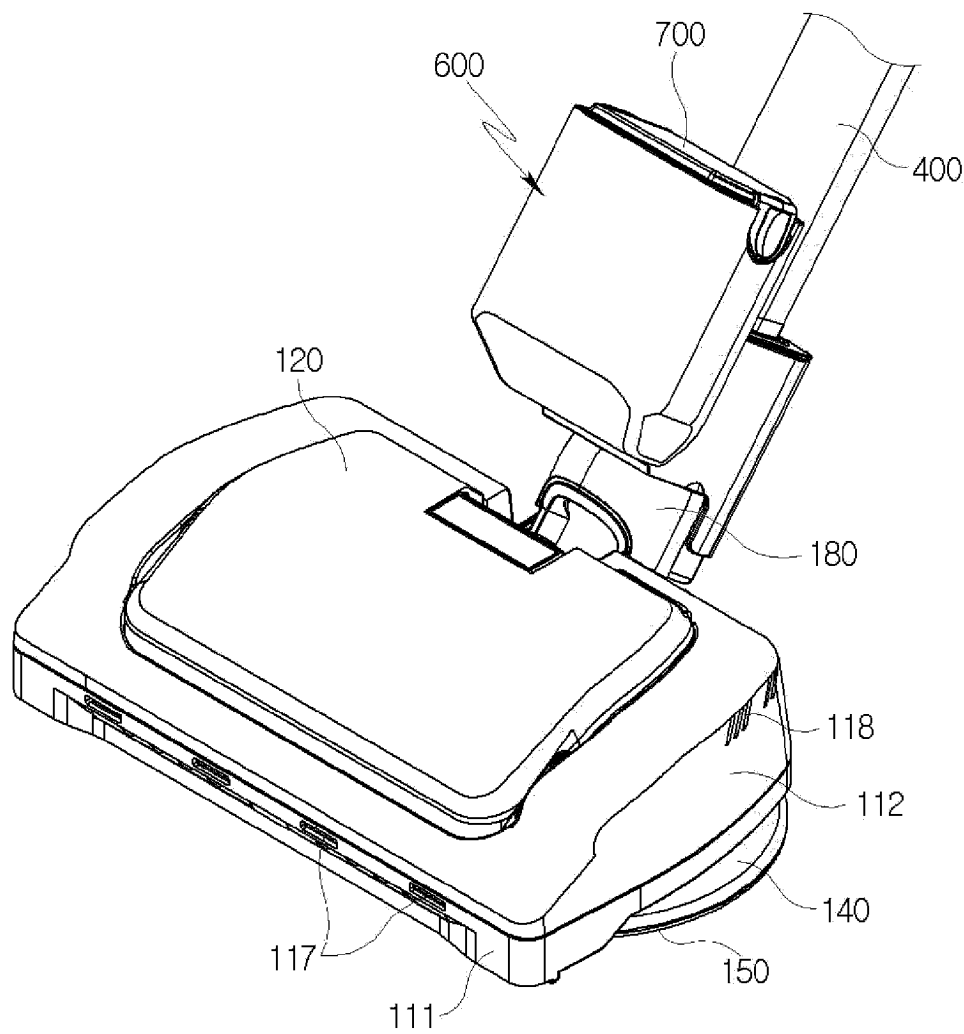
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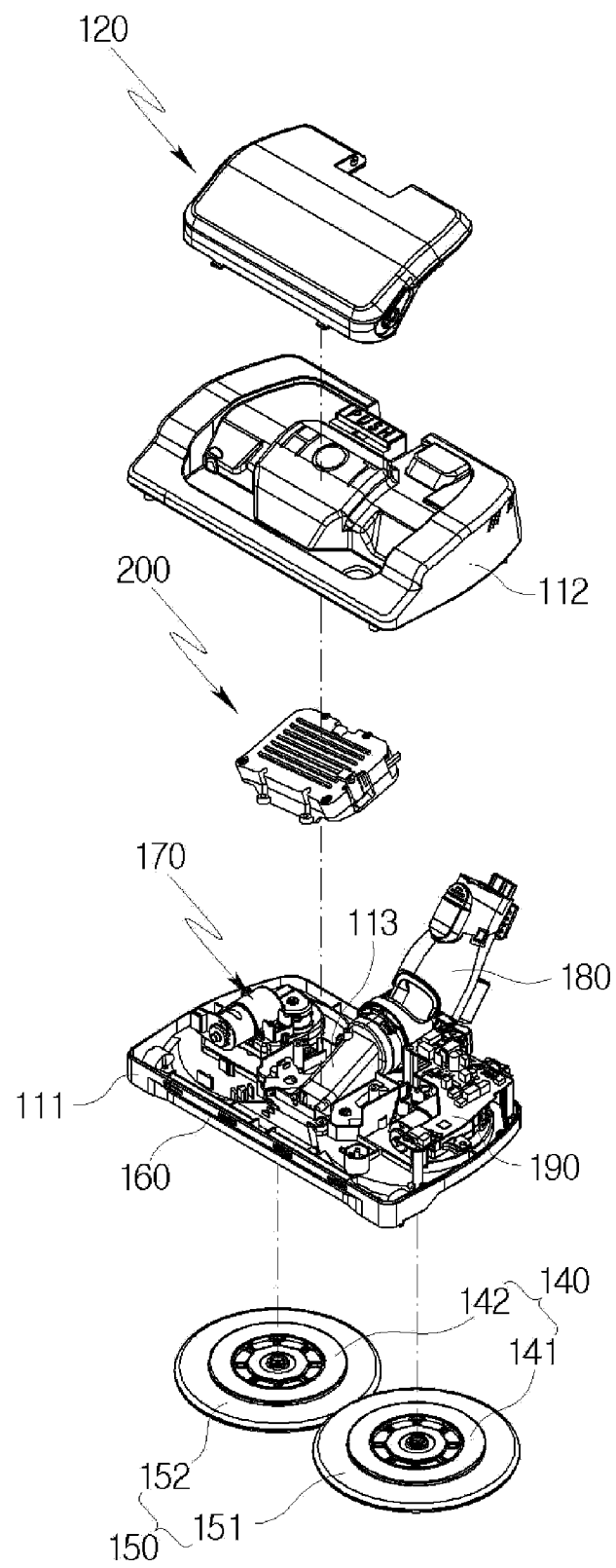
【 FIG. 1 】



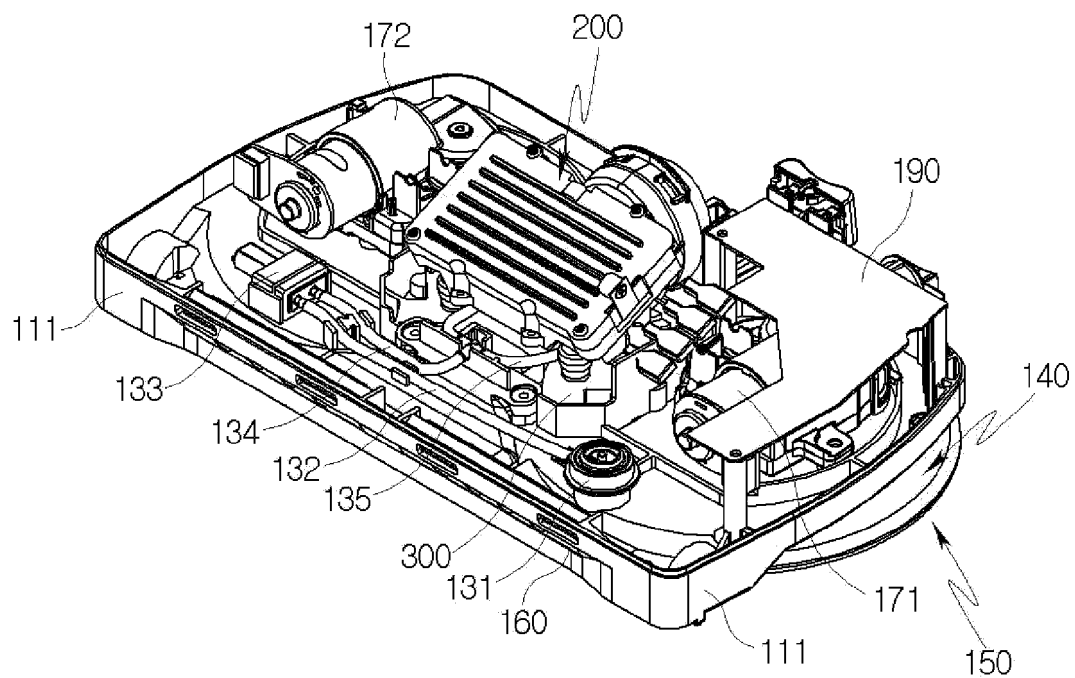
【 FIG. 2】



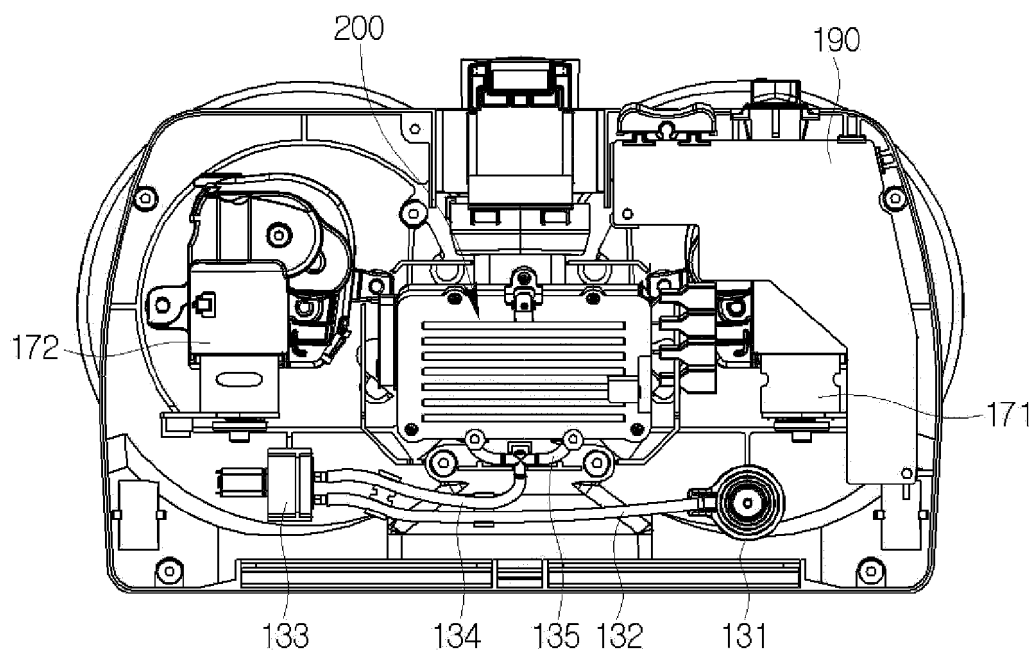
【 FIG. 3】



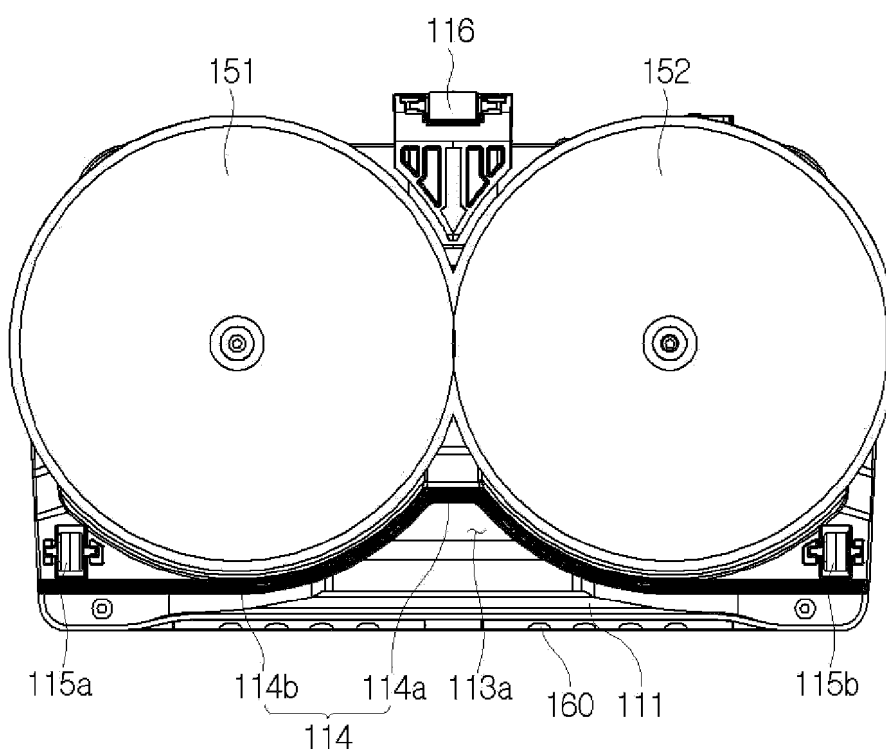
【 FIG. 4】



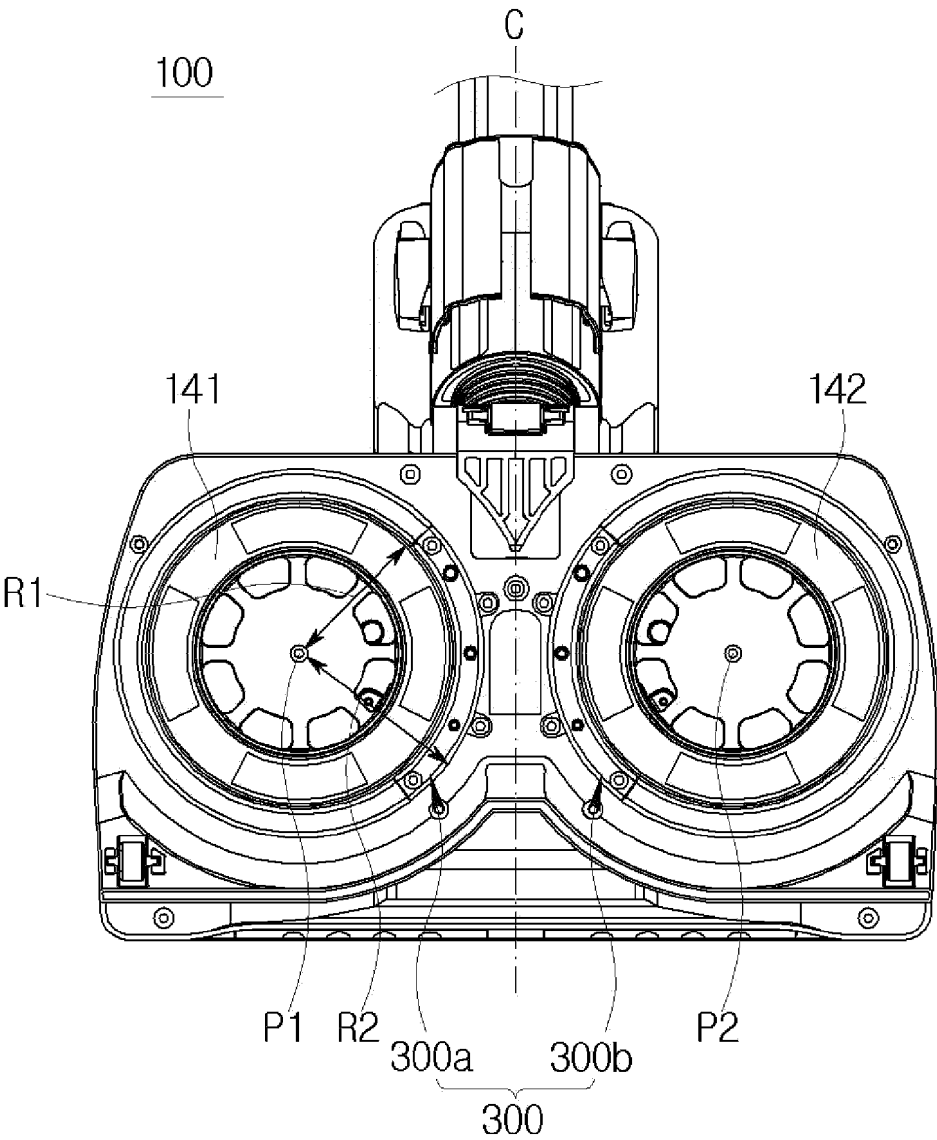
【 FIG. 5】



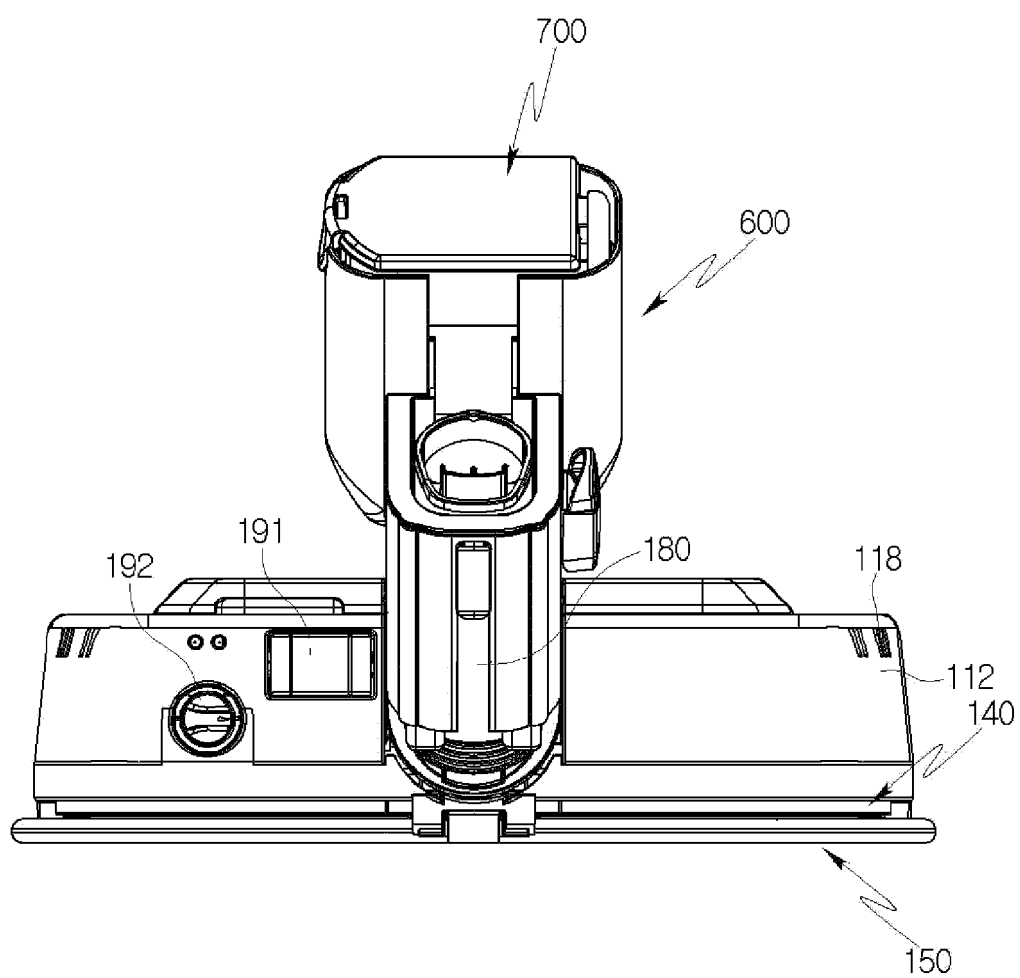
【 FIG. 6】



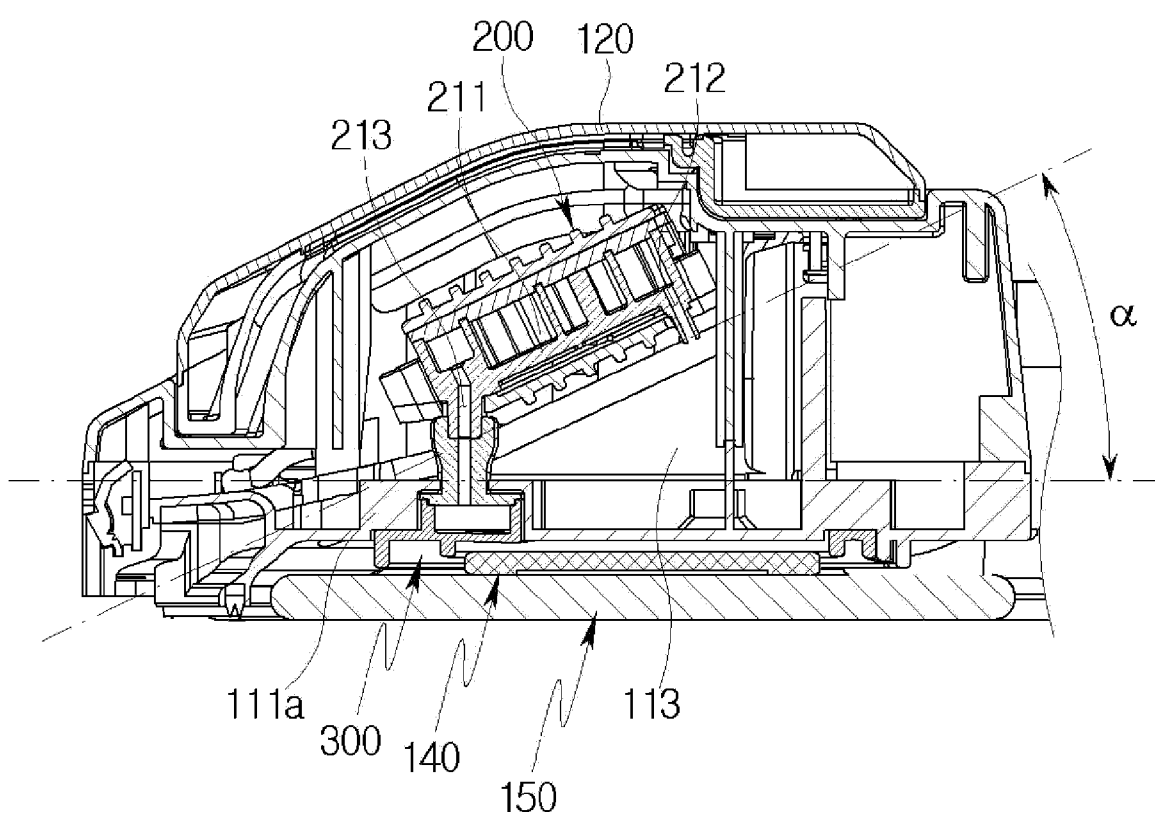
【 FIG. 7】



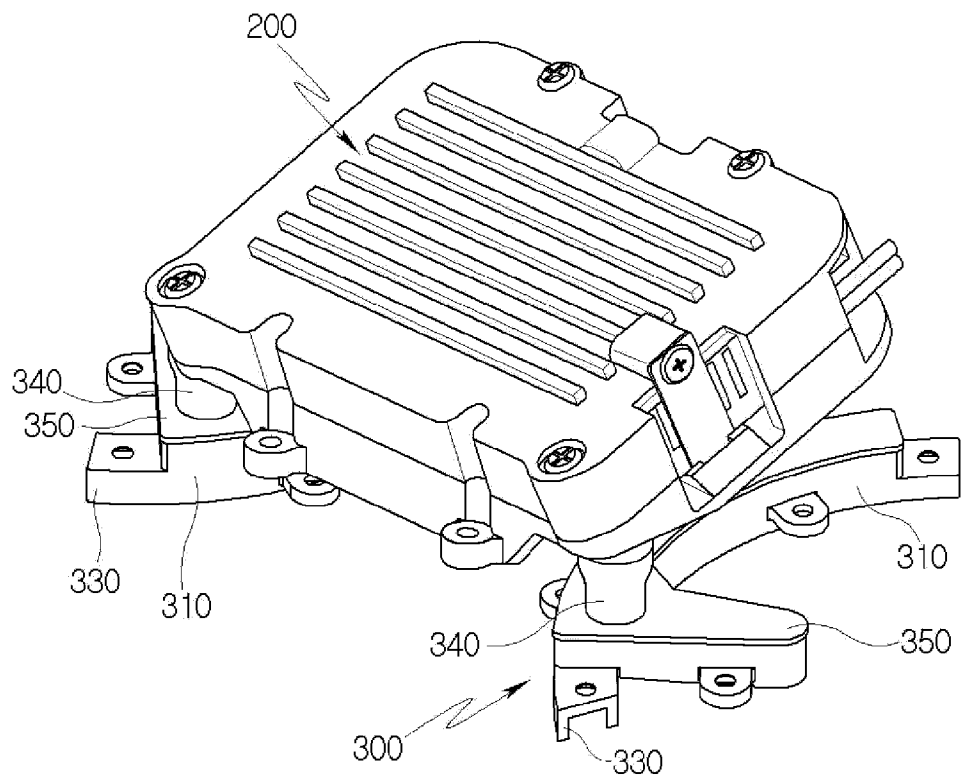
【 FIG. 8】



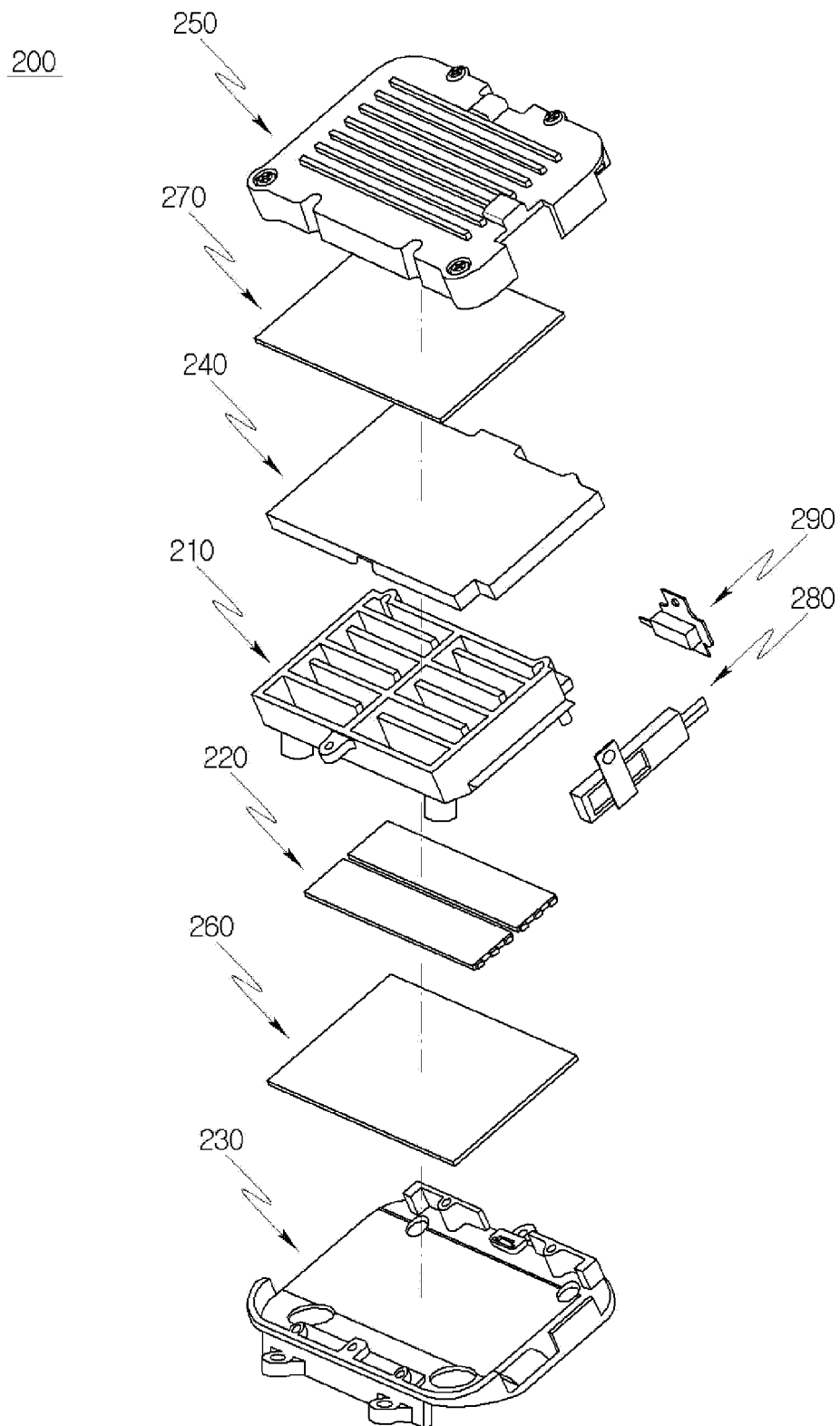
【 FIG. 9】



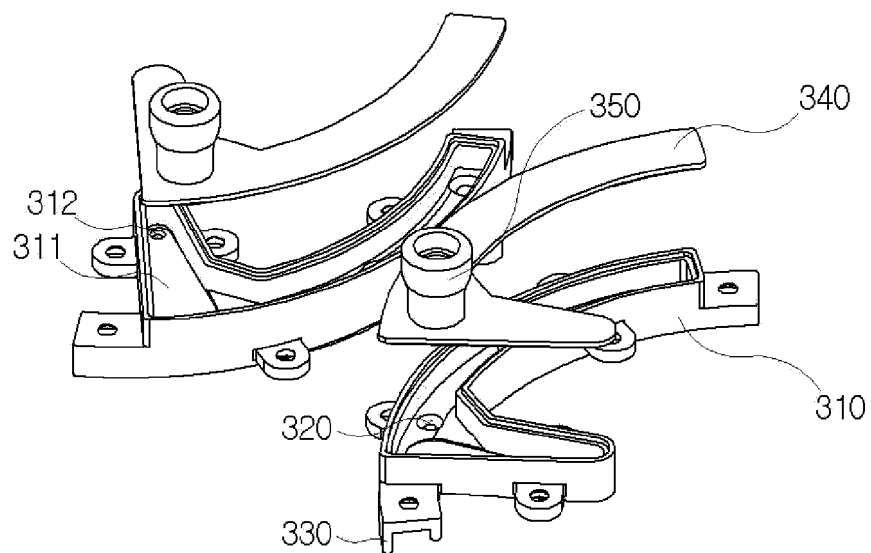
【 FIG. 10】



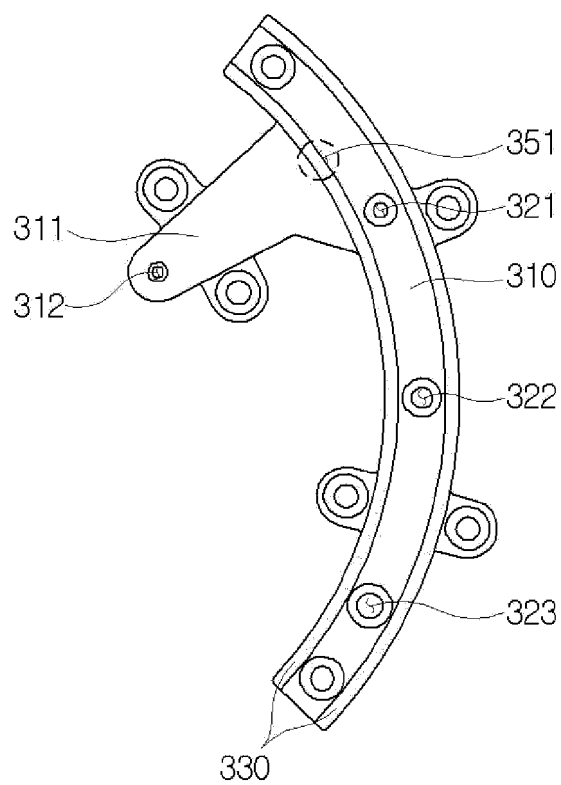
【 FIG. 11 】



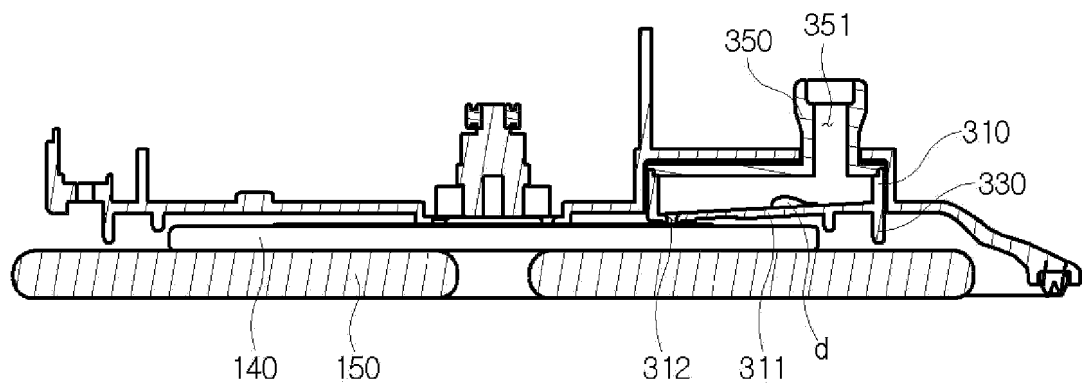
【 FIG. 12】



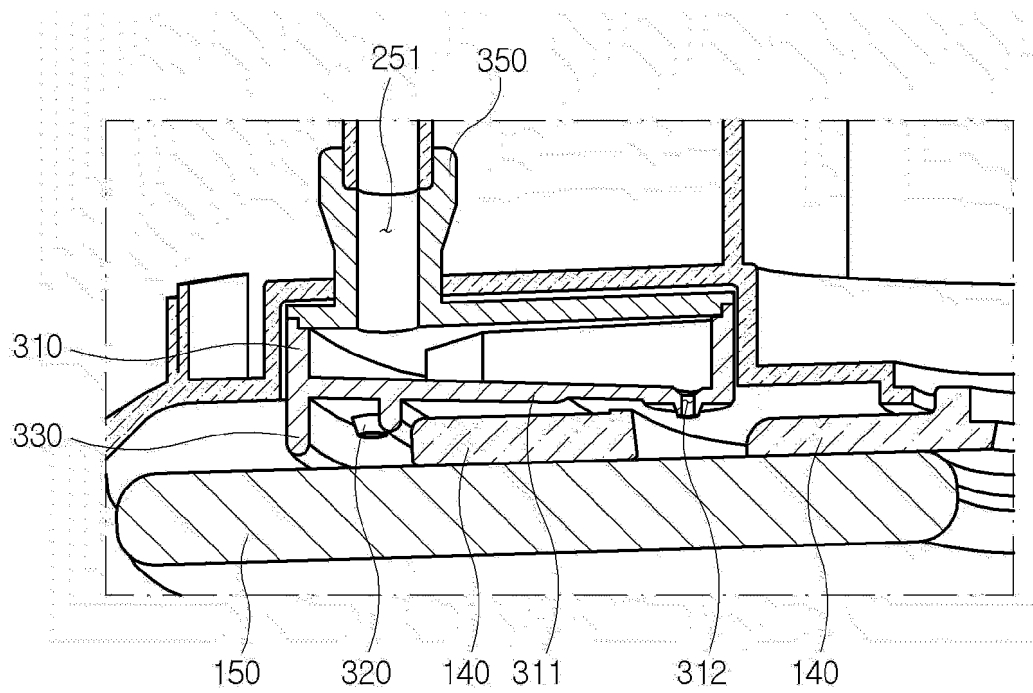
【 FIG. 13】



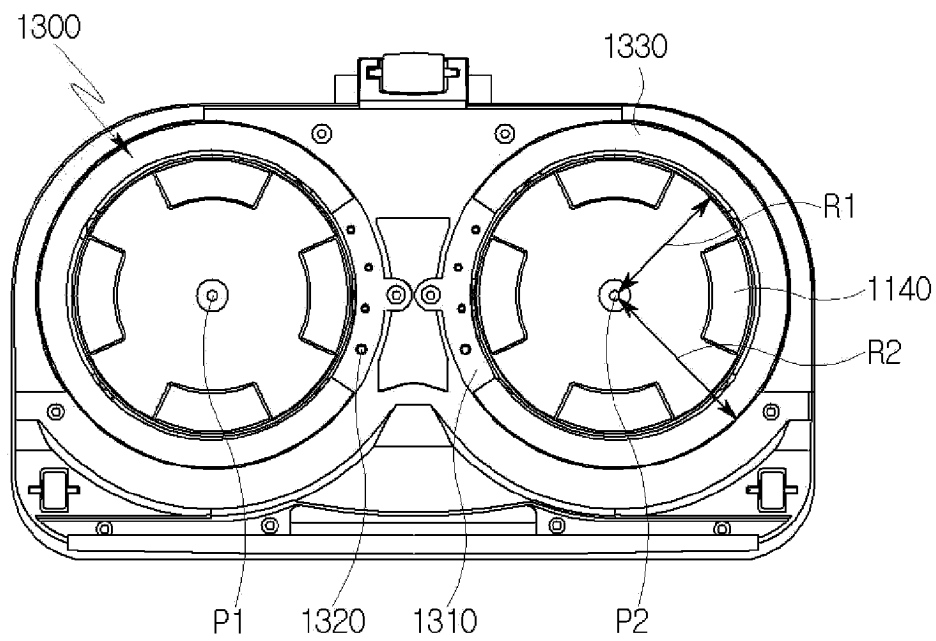
【 FIG. 14a】



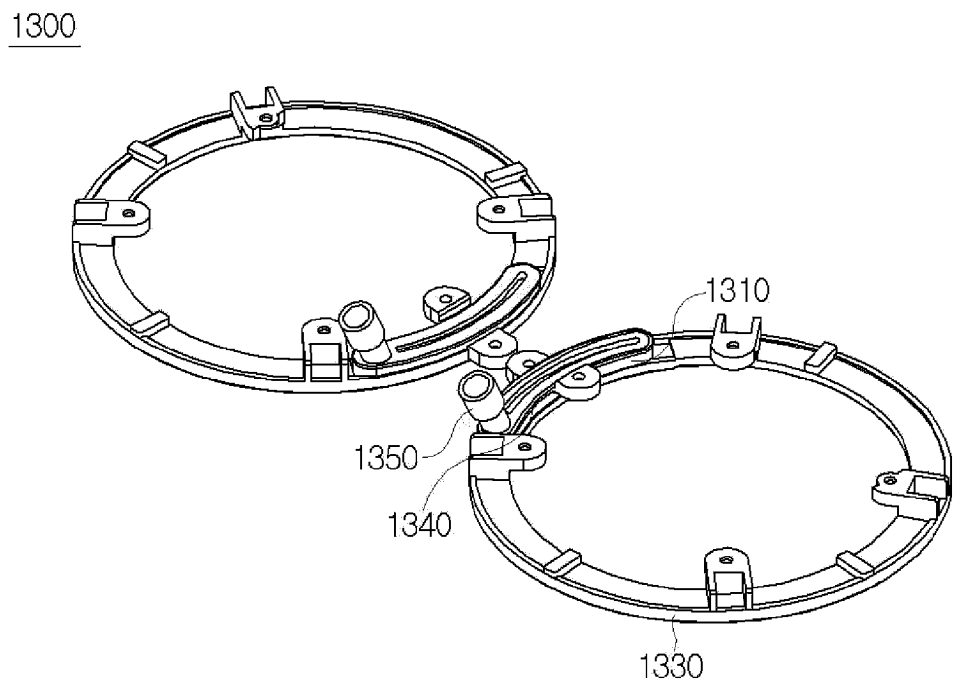
【 FIG. 14b】



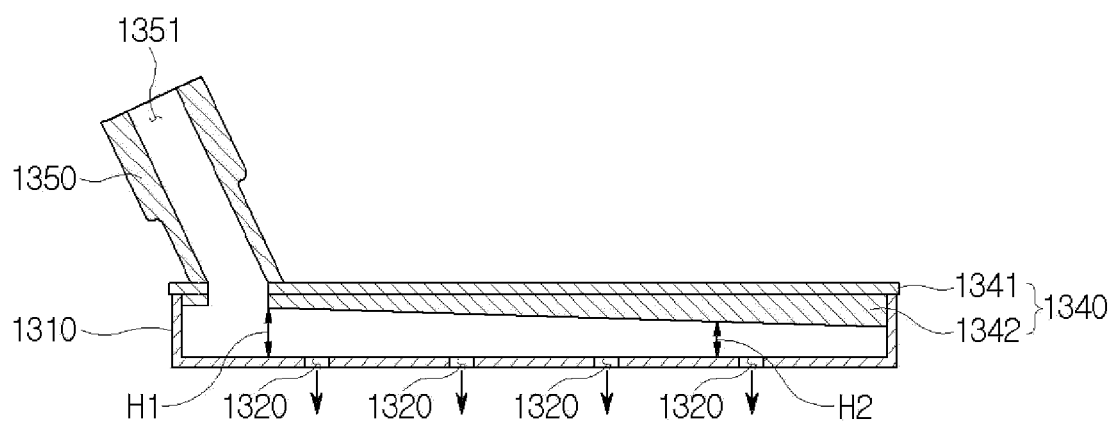
【 FIG. 15】



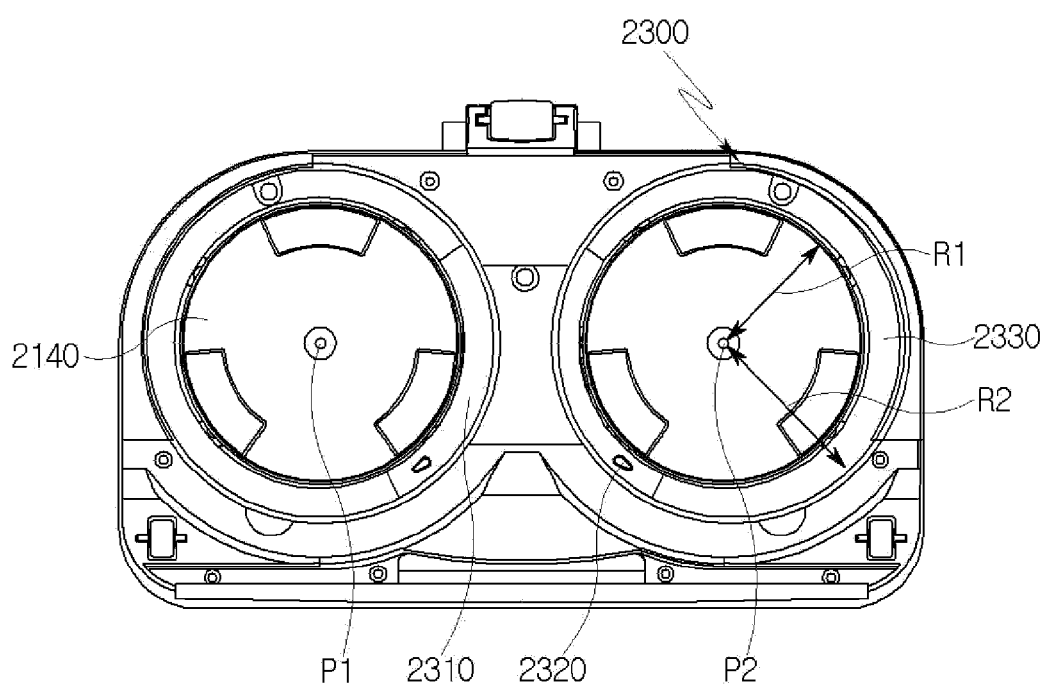
【 FIG. 16】



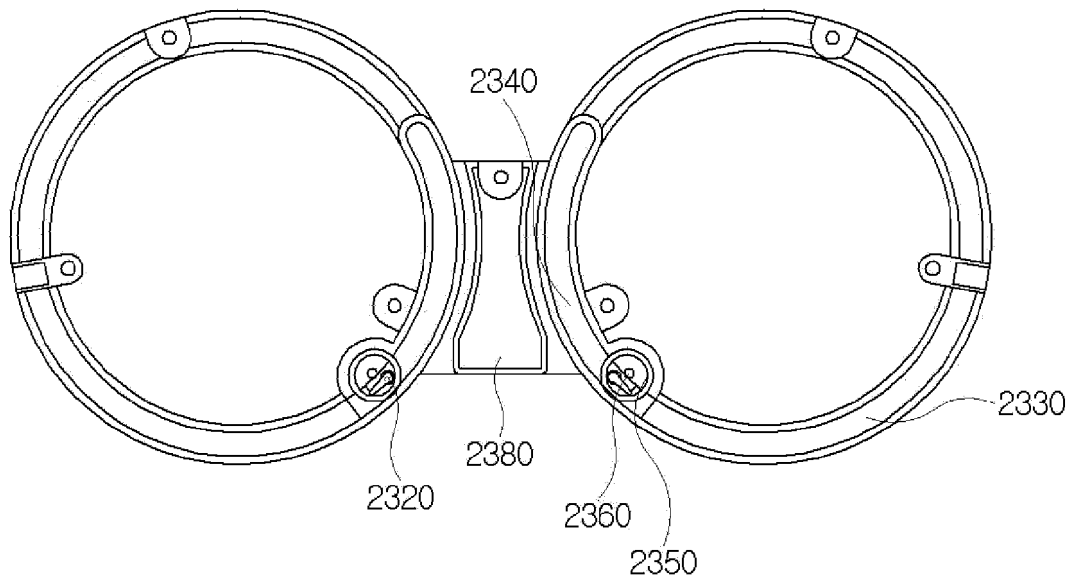
【 FIG. 17】



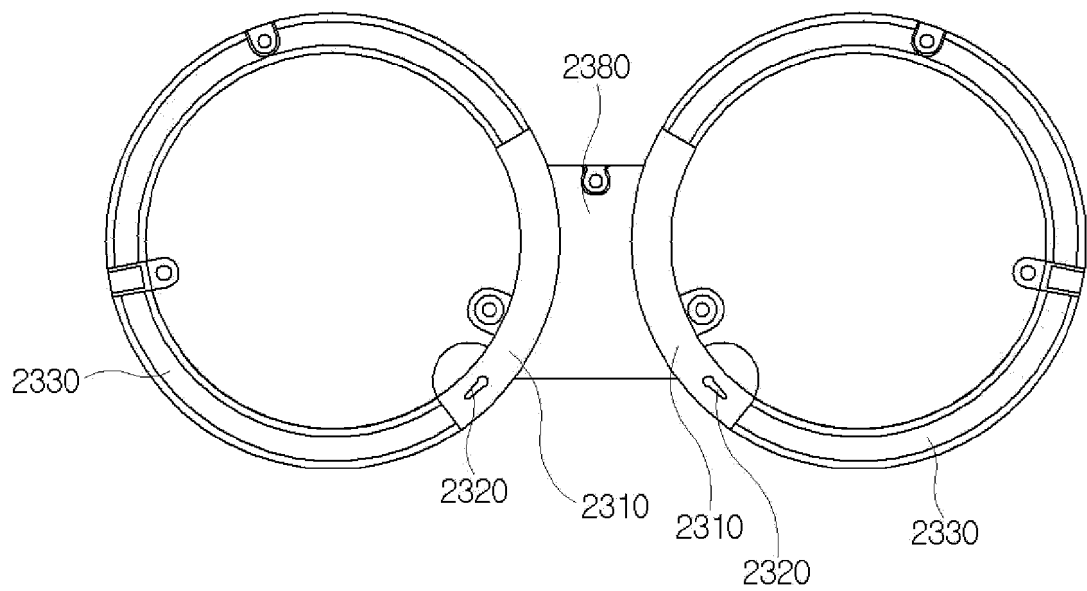
【 FIG. 18】



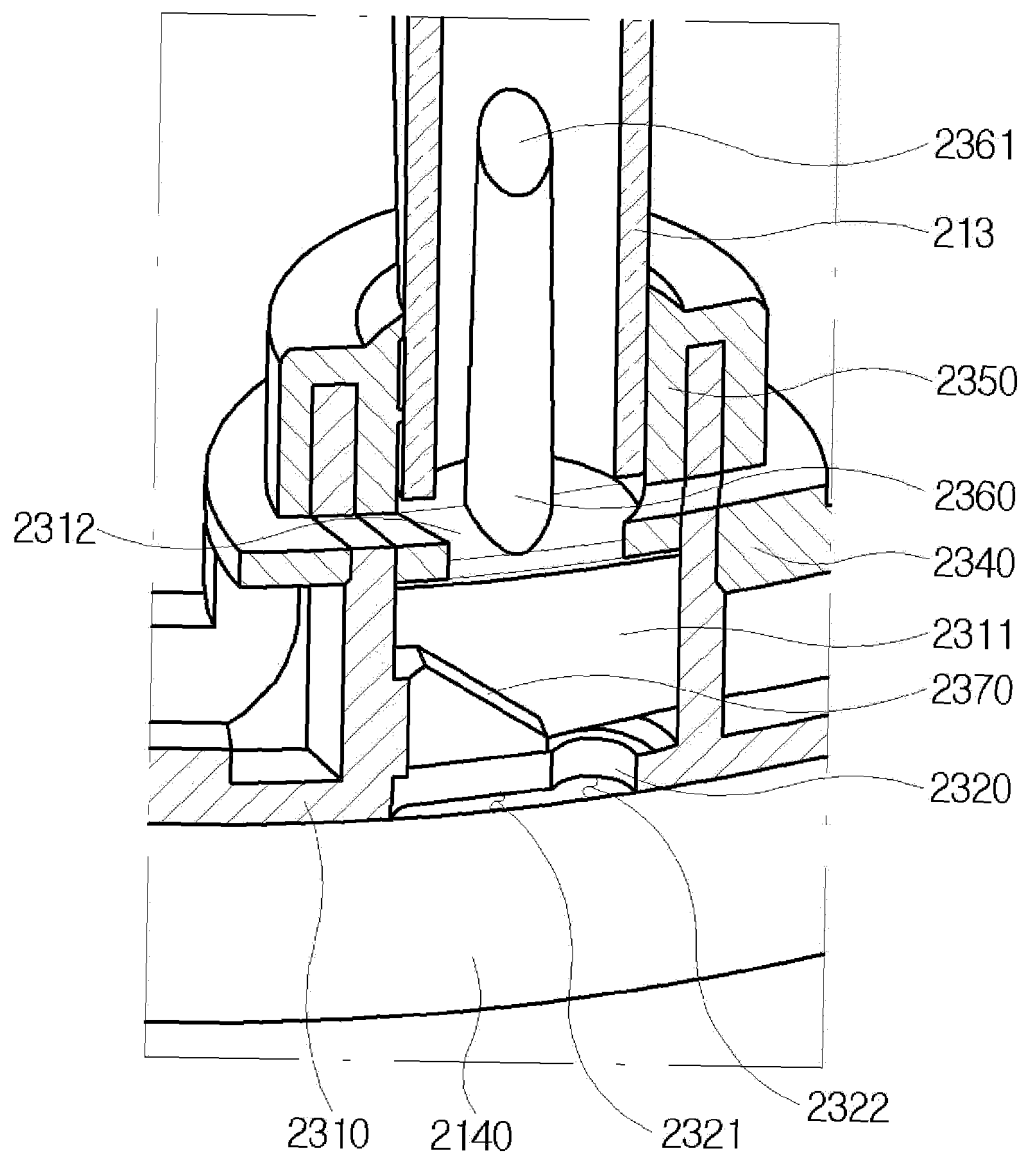
【 FIG. 19】



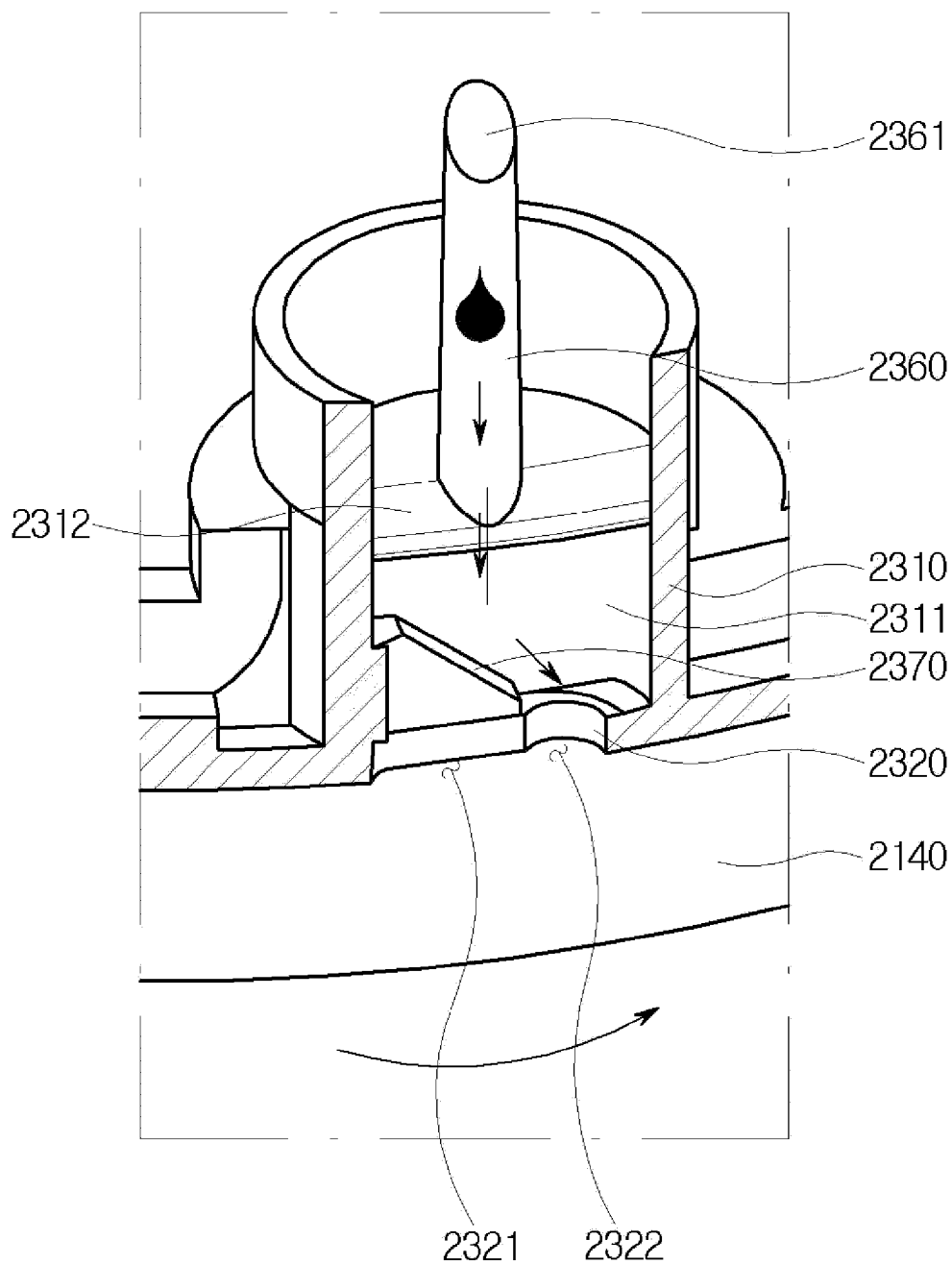
【 FIG. 20】



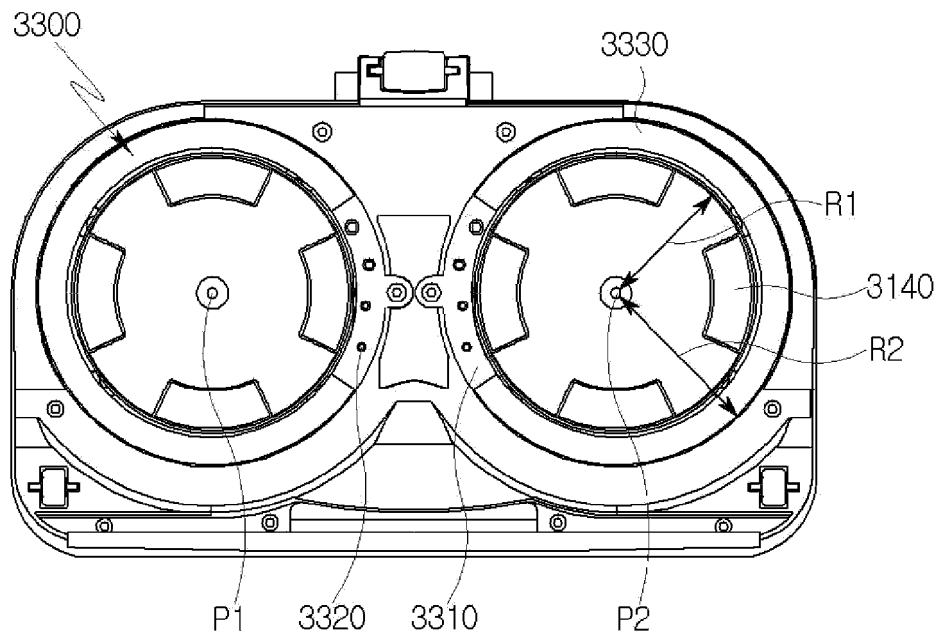
【 FIG. 21】



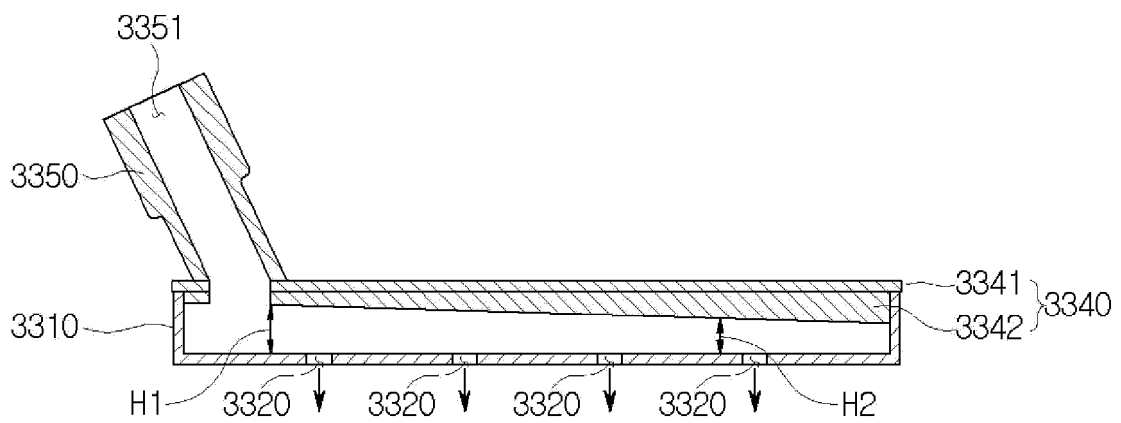
【 FIG. 22】



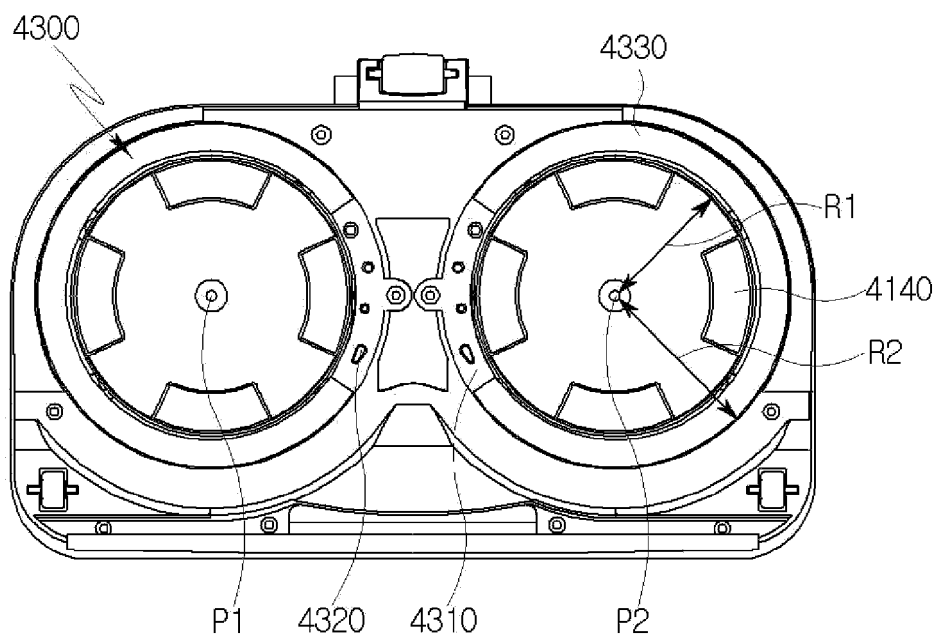
【 FIG. 23】



【 FIG. 24】



【 FIG. 25】



INTERNATIONAL SEARCH REPORT

International application No.

PCT/KR2023/005937

A. CLASSIFICATION OF SUBJECT MATTER

A47L 11/40(2006.01);i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

A47L 11/40(2006.01); A47L 11/20(2006.01); A47L 11/34(2006.01); A61L 2/20(2006.01); D06B 1/00(2006.01)

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean utility models and applications for utility models: IPC as above

Japanese utility models and applications for utility models: IPC as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKOMPASS (KIPO internal) & keywords: 물걸레(mop), 탱크(tank), 노즐(nozzle), 디퓨저(diffuser), 커버(cover), 히트 제너레이터(heat generator), 스팀(steam), 원주 방향(circumferential direction), 경사(incline)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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A		4,12
Y	KR 10-1796646 B1 (SHIN IL INDUSTRIAL CO., LTD.) 10 November 2017 (2017-11-10) See paragraph [0039] and figures 1-3, 8-9, 11 and 13-14.	1-3,5-11,13
Y	KR 10-2007-0091419 A (DAEWOO ELECTRONICS CORPORATION) 11 September 2007 (2007-09-11) See paragraph [0082] and figure 4.	2,5,7-9,11
Y	US 2010-0186463 A1 (VRDOLJAK et al.) 29 July 2010 (2010-07-29) See paragraph [0040] and figure 6.	3

☒ Further documents are listed in the continuation of Box C.☒ See patent family annex.

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“&” document member of the same patent family

Date of the actual completion of the international search

07 September 2023

Date of mailing of the international search report

08 September 2023

Name and mailing address of the ISA/KR

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Telephone No.

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/KR2023/005937

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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Information on patent family members

International application No.

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- KR 1668046 B1 **[0016]**