



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
18.06.2014 Bulletin 2014/25

(51) Int Cl.:
A47L 15/42 (2006.01)

(21) Application number: **13197849.6**

(22) Date of filing: **17.12.2013**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME

(72) Inventors:
• **Cho, Younghong**
641-711 Gyeongnam (KR)
• **Lee, Jhehyouk**
641-711 Gyeongnam (KR)
• **Park, Jinseok**
641-711 Gyeongnam (KR)

(30) Priority: **17.12.2012 KR 20120147240**

(71) Applicant: **LG Electronics, Inc.**
Seoul, 150-721 (KR)

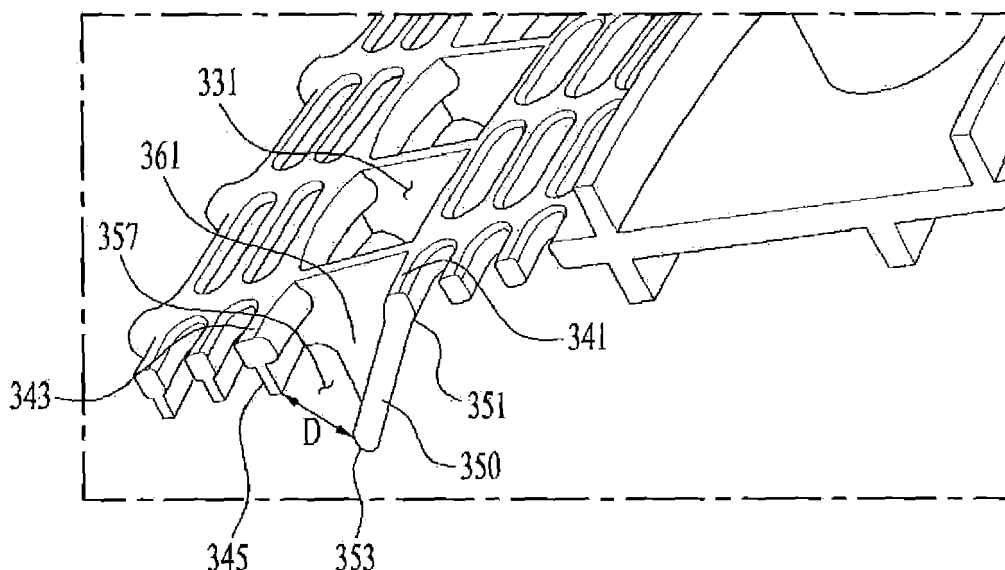
(74) Representative: **Greenaway, Martin William et al**
Kilburn & Strode LLP
20 Red Lion Street
London WC1R 4PJ (GB)

(54) **Filter housing and dishwasher including the same**

(57) A dishwasher (10) is disclosed. The dishwasher (10) includes a sump (100), a filter housing (300) coupled to an upper portion of the sump (100), and a filter (120) coupled to a central portion of the filter housing (300), wherein the filter housing (300) includes a filter coupling portion (310) having the filter (120) coupled thereto, a peripheral portion (330) arranged outside the filter cou-

pling portion (310) and provided with a recovery hole frame (341, 343, 345), wherein a recovery hole (331, 353) allowing the wash water to pass therethrough is formed inside the recovery hole frame (341, 345), and an inclined rib (350) formed at a lower surface of the peripheral portion to be inclined downward.

【Fig 6】



Description

BACKGROUND OF THE INVENTION

Field of the Invention

[0001] The present invention relates to a filter housing and a dishwasher including the same, and more particularly, to a dishwasher to wash contaminated dishes and a filter housing used in the dishwasher.

Discussion of the Related Art

[0002] In general, a dishwasher is a home appliance that washes and dries dishes mounted on an upper rack and a lower rack by spraying wash water propelled by a wash pump onto the racks through a spray nozzle. The dishwasher includes a tub forming the external appearance of the dishwasher, a dish rack provided in the tub to accommodate dishes, a spray nozzle allowing wash water to be sprayed onto the surface of a dish, and a sump mounted to the bottom surface of the tub to store wash water.

[0003] In addition, a contamination level sensor is mounted to one inside surface of the sump or to a portion such as a heater configured to heat the wash water introduced into the sump, thereby sensing a contamination level of the wash water during the washing process. When the wash water is contaminated to a level equal to or lower than a set level, the wash water may be discharged and clean wash water may be introduced.

[0004] In a typical dishwasher, food dregs remaining on the dishes are separated by the pressure of the wash water sprayed through the spray nozzle. The food dregs separated from the surface of the dishes gather on the bottom surface of the tub. A filter to filter out the dregs is mounted to the upper surface of the sump to prevent a foreign substance having a large volume from being introduced into the sump. In addition, a disposer to break the introduced dregs into small pieces is installed in the sump. Accordingly, when the wash water stored in the sump is moved to the spray nozzle, the disposer prevents the dregs from clogging the flow path of the wash water and thus obstructing spraying of the wash water.

[0005] However, a typical conventional dishwasher has a risk of causing noise and malfunction when a foreign substance having a large volume is introduced into the sump through the filter installed at the upper surface of the sump. Specifically, when foreign substances having a large volume are discharged to a drainage channel by a drainage pump, the drainage channel may be clogged by the foreign substances or malfunction of the drainage pump may occur. In addition, when the foreign substances are decomposed into small pieces by the disposer designed to break dregs introduced into the sump into small pieces, noise and vibration are generated.

SUMMARY OF THE INVENTION

[0006] Accordingly, the present invention is directed to a filter housing and a dishwasher including the same that substantially obviate one or more problems due to limitations and disadvantages of the related art.

[0007] An object of the present invention is to provide a dishwasher which reduces noise and vibration during operation and lowers the possibility of malfunction due to foreign substances, thereby achieving high reliability.

[0008] Additional advantages, objects, and features of the invention will be set forth in part in the description which follows and in part will become apparent to those having ordinary skill in the art upon examination of the following or may be learned from practice of the invention. The objectives and other advantages of the invention may be realized and attained by the structure particularly pointed out in the written description and claims hereof as well as the appended drawings.

[0009] To achieve these objects and other advantages and in accordance with the purpose of the invention, as embodied and broadly described herein, a filter housing of a dishwasher including a sump to store wash water is coupled to an upper portion of the sump and includes a filter coupling portion having a filter coupled thereto to filter out a foreign substance contained in the wash water overflowing the sump, a peripheral portion arranged outside the filter coupling portion and provided with a recovery hole frame, wherein a recovery hole allowing the wash water to pass therethrough is formed inside the recovery hole frame, and an inclined rib formed at a lower surface of the peripheral portion to be inclined downward.

[0010] The inclined rib may extend inclinedly downward from a first side of the recovery hole frame.

[0011] Preferably, the inclined rib is inclined toward a second side of the recovery hole frame facing the first side.

[0012] The inclined rib may extend inclinedly away from a center of the filter housing in a radial direction of the filter housing.

[0013] The inclined rib may be inclined in a circumferential direction of the peripheral portion.

[0014] Preferably, the inclined rib is arranged inside the peripheral portion such that the inclined rib is spaced a predetermined distance from an outer edge of the peripheral portion.

[0015] Preferably, the filter housing further includes a guide arranged between the recovery hole frame and a side surface of the inclined rib to guide the wash water.

[0016] Preferably, a first end of the inclined rib is coupled to a first side of the recovery hole frame, and a second end of the inclined rib positioned at a side of the inclined rib opposite to the first end is positioned at a lower portion of the recovery hole.

[0017] Preferably, the inclined rib is inclined toward a second side of the recovery hole frame facing the first side.

[0018] Preferably, the second end of the inclined rib

and the second side of the recovery hole frame are spaced a predetermined distance from each other in a horizontal direction.

[0019] In another aspect of the present invention, there is provided a dishwasher including a sump, a filter housing coupled to an upper portion of the sump, and a filter coupled to a central portion of the filter housing, wherein the filter housing includes a filter coupling portion having the filter coupled thereto, a peripheral portion arranged outside the filter coupling portion and provided with a recovery hole frame, wherein a recovery hole allowing the wash water to pass therethrough is formed inside the recovery hole frame, and an inclined rib formed at a lower surface of the peripheral portion to be inclined downward.

[0020] Herein, the inclined rib may extend inclinedly downward from a first side of the recovery hole frame, and extends inclinedly toward a second side of the recovery hole frame facing the first side.

[0021] Preferably, a first end of the inclined rib is connected to a first side of the recovery hole frame, and a second end of the inclined rib is positioned at a lower portion of the peripheral portion as a free end.

[0022] Preferably, the dishwasher further includes a drainage passage to discharge the wash water stored in the sump to an outside, wherein a distance between the second end of the inclined rib and a second side of the recovery hole frame is less than a diameter of the drainage passage.

[0023] In this case, a guide to guide the wash water is preferably provided to a side surface of the inclined rib.

[0024] Preferably, the guide arranged between the recovery hole frame and the side surface of the inclined rib.

[0025] In addition, the peripheral portion may be provided with a plurality of sections.

[0026] For example, the sections of the peripheral portion preferably include a first section surrounding at least one part of the filter coupling portion and provided with a plurality of first recovery holes, a second section surrounding at least one part of the first section and provided with a plurality of second recovery holes, and a third section surrounding at least one part of the second section and provided with a plurality of third recovery hole.

[0027] In addition, the recovery holes formed in at least two of the first, second and third sections may have different sizes.

[0028] Preferably, the dishwasher further includes a drainage passage to discharge the wash water stored in the sump to an outside, wherein a lower portion of a second side of the recovery hole frame is provided with a protruding rib extending vertically downward, wherein a distance between the second end of the inclined rib and the protruding rib is less than a diameter of the drainage passage.

[0029] It is to be understood that both the foregoing general description and the following detailed description of the present invention are exemplary and explanatory and are intended to provide further explanation of the invention as claimed.

BRIEF DESCRIPTION OF THE DRAWINGS

[0030] The accompanying drawings, which are included to provide a further understanding of the invention and are incorporated in and constitute a part of this application, illustrate embodiment(s) of the invention and together with the description serve to explain the principle of the invention. In the drawings:

FIG. 1 is a cross-sectional view illustrating a dishwasher according to one embodiment of the present invention;

FIG. 2 is an exploded perspective view illustrating a sump of a dishwasher according to one embodiment of the present invention;

FIG. 3 is a perspective view illustrating a filter housing of a dishwasher according to one embodiment of the present invention;

FIG. 4 is a plan view of the filter housing of FIG. 3;

FIG. 5 is a side view of the filter housing of FIG. 3; and
FIG. 6 is a partial cut-away perspective view of the filter housing of FIG. 3.

DETAILED DESCRIPTION OF THE INVENTION

[0031] Reference will now be made in detail to the preferred embodiments of the present invention, examples of which are illustrated in the accompanying drawings. Wherever possible, the same reference numbers will be used throughout the drawings to refer to the same or like parts.

[0032] FIG. 1 is a cross-sectional view illustrating a dishwasher according to one embodiment of the present invention.

[0033] Referring to FIG. 1, a dishwasher 10 includes a tub 11 forming the external appearance of the dishwasher and provided therein with a washing tub, a door 18 formed on the front surface of the tub 11 to open and close the washing tub, and a sump 100 formed at the center of the lower surface of the tub 11 to store wash water.

[0034] In addition, the dishwasher 10 includes a wash motor 19 attached to the lower side of the sump 100 to drive the washing pump (not shown) mounted in the sump 100, a water guide 14 serving as a passage along which the wash water pumped by the washing pump moves, a lower spray arm 16 coupled to the upper surface of the sump 100 to spray the wash water upward and/or downward in washing tub, an upper spray arm 15 attached to the upper side portion of the water guide 14 and perpendicularly extending from the water guide 14 to be positioned at the center of the washing tub, and a top nozzle 17 formed at a ceiling portion of the tub to spray the wash water vertically downward.

[0035] In addition, the dishwasher 10 includes an upper rack 12 mounted to the upper side portion of the upper spray arm 15 such that the dishes placed thereon are washed by the upper spray arm 15, and a lower rack 13

mounted to the upper side portion of the lower spray arm 16 such that the dishes placed thereon are washed by the lower spray arm 16.

[0036] Hereinafter, operation of the dishwasher 100 according to the illustrated embodiment will be described.

[0037] First, a user opens the door 18 of the dishwasher 100 and pulls out the upper rack 12 and/or the lower rack 13 from the washing tub. Then, the user places the dishes on the racks 12 and 13. Thereafter, the user closes the door 18 and applies power to the dishwasher such that the dishwasher operates.

[0038] When power is applied to the dishwasher 100 and the washing step is performed, wash water transferred from a water source flows into the sump 100. When a certain amount of wash water flows into the sump, the wash motor 19 begins to operate. Then, an impeller 130 (see FIG. 2) connected to the shaft of the wash motor 19 and provided in the washing pump rotates, thereby pumping the wash water to the lower spray arm 16 and the water guide 14.

[0039] In addition, the wash water pumped to the water guide 14 is moved to the top nozzle 17 and the upper spray arm 15, and then sprayed into the washing tub. In addition, the dishes accommodated in the racks 12 and 13 are washed by the sprayed wash water.

[0040] Herein, the top nozzle 17 sprays the wash water vertically downward, and the upper spray arm 15 sprays the wash water vertically upward. Thereby, the dishes accommodated in the upper rack 12 are washed.

[0041] In addition, the lower spray arm 16 sprays the wash water vertically upward, thereby washing the dishes accommodated in the lower rack 13. In addition, by forming spray holes in the lower surface of the upper spray arm 15, the wash water may be sprayed vertically upward and downward to wash the upper side surface of the dishes accommodated in the lower rack 13.

[0042] In addition, when the washing step is completed, foreign substances in the contaminated wash water collected in the sump 100 are filtered out by a filter (not shown). In addition, after the foreign substances are filtered out, the wash water is discharged from the dishwasher 100 through a drainage channel (not shown) by the drainage pump (not shown).

[0043] In addition, once the wash water is discharged, clean wash water is introduced into the sump 100 through an introduction hole, and the sprayed through the spray arms 15 and 16 as in the washing step. Then, the dishes are rinsed in the rinsing step by the sprayed clean wash water. When the rinsing step is completed, the dishes undergoes the drying step, and thereby the washing operation is completed.

[0044] FIG. 2 is an exploded perspective view illustrating a sump of a dishwasher according to one embodiment of the present invention.

[0045] Referring to FIG. 2, the sump 100 includes a sump housing 110 to store wash water therein, a filter housing 300 to cover the upper portion of the sump housing 110, and a soil chamber 200 seated in the sump housing

110 to guide flow of the wash water.

[0046] Specifically, the filter housing 300 covers the upper surface of the sump housing 110, and is inserted into a groove formed at the center of the lower surface of the tub 11. Additionally, a filter 120 to filter out dirt contained in the wash water is coupled to the filter housing 300. In addition, a plurality of recovery holes 331, 333 and 335 allowing the wash water to drop into the sump 100 during the washing step is formed around the edge portion of the filter housing 300. In addition, the recovery holes 331, 333 and 335 may be formed in various shapes such as a circle or a slot.

[0047] The filter 120 coupled to the filter housing 300 is provided with a filter mesh 121 having fine holes which are closely formed. The wash water introduced into the soil chamber 200 overflows through the filter mesh 121, while foreign substances contained in the wash water are filtered out. The overflowing wash water is again in-

troduced into the sump 100 through the filter mesh 121. In addition, as shown in FIG. 3, a lower spray arm connection pipe 322 connected to the lower spray arm 16 may be mounted to the central portion of the filter housing 300, and a water guide connection pipe 324 connected to an end of the water guide 14 may be formed at the edge of the filter housing 300 in a protruding manner. A connection part 122 communicating with the lower spray arm connection pipe 322 may be provided to the center of the filter 120.

[0048] In addition, the soil chamber 200 is installed at the lower side of the filter housing 300. The soil chamber 200 includes an upper chamber 220 having a flow passage allowing the wash water to move to the lower spray arm connection pipe 322 or the water guide connection pipe 324 therethrough, and a lower chamber 210 to which a washing pump for pumping the wash water is mounted. In addition, the impeller 130 for pumping the wash water is mounted between the upper chamber 220 and the lower chamber 210. In addition, the impeller 130 rotates, being connected to a motor shaft extending from a washing pump motor, which is mounted to the lower surface of the sump housing 110.

[0049] The sump housing 110 includes a wash water storage part 114 having a bottom recessed to a predetermined depth to store the wash water, a drain pump case 111 formed on the outer circumferential surface of the sump housing 110 to discharge the wash water stored in the wash water storage part 114 to the outside of the wash water storage part 114, and a drain pump guide pipe 115 to guide the food dregs stored in the soil chamber 200 such that the food dregs move to the drain pump case 111. The drain pump guide pipe 115 is connected to the drainage channel (not shown). The wash water stored in the sump may be discharged from the dishwasher through the drainage channel.

[0050] Specifically, a heater 140 to heat the wash water is mounted to the bottom surface of the wash water storage part 114. In addition, a disposer 150 may be mounted

to the bottom surface. The disposer 150 is connected to the motor shaft passing through the bottom surface of the sump housing 110 so as to break the food dregs into small pieces by rotating. In addition, a flow path switching valve 112 is mounted to an edge of one side of the sump housing 110 to direct the wash water pumped out of the soil chamber 200 to the lower spray arm 16 or the water guide 14. In addition, a contamination level sensor 113 to measure the level of contamination of the wash water in the washing and rinsing processes is mounted at a position spaced a predetermined distance from the flow path switching valve 112.

[0051] Hereinafter, operation of the sump 100 configured as above and flow of the wash water will be described.

[0052] First, when the dishwasher 10 starts to operate, wash water flows into the sump housing 110. In addition, when power is applied to the heater 140, the heater 140 heats the wash water. In addition, when the above processes are completed, a motor 19 mounted to the lower surface of the sump housing 110 begins to operate. Thereby, the disposer 150 and the impeller 130 connected to the shaft of the motor 19 rotate. In addition, while rotating, the impeller 130 pumps the wash water stored in the wash water storage part 114. In addition, the pumped wash water moves along the flow passages formed in the lower chamber 210 and the upper chamber 220. In addition, the direction of movement of the wash water is determined by the flow path switching valve 112. The wash water whose flow direction is set by the flow path switching valve 112 is moved to the lower spray arm connection pipe 322 or the water guide connection pipe 324 formed in the filter housing 300. Finally, the wash water is moved to the lower spray arm 16 or the upper spray arm 15, and the top nozzle 17 and sprayed into the tub 11.

[0053] In the case that foreign substances having a large volume is present among the foreign substances stuck to the dishes, noise and vibration may be generated by the foreign substances having the large volume. Accordingly, the filter housing 300 is provided with a recovery hole to prevent introduction of foreign substances having a large volume into the sump 100. At this time, simply reducing the size of the recovery hole to filter out only foreign substances with a large volume may decrease the inflow rate of the wash water, resulting in extended time for washing. Increasing the size of the recovery hole may make filtering of foreign substances with a large volume difficult. Particularly, such foreign substances as a toothpick having a narrow cross section and an oblong shape may be easily introduced through the recovery hole even if the size of recovery hole is reduced.

[0054] According to an embodiment of the present invention, a inclined rib 350 is provided to the lower portion of the filter housing 300 to maintain a size of the recovery hole equal to or greater than a certain size to secure an inflow rate of the wash water and filter out foreign substances having a large volume.

[0055] Hereinafter, the filter housing 300 and the inclined rib 350 of a dishwasher according to one embodiment of the present invention will be described in detail with reference to FIGs. 3 to 6.

[0056] Referring to FIG. 3, the filter housing 300 includes a filter coupling portion 310 to which the filter 120 is coupled, and a peripheral portion 330 having recovery holes 331, 333 and 335 through which the wash water passes.

[0057] The filter 120 to filter out foreign substances contained in the overflowing wash water is coupled to the filter coupling portion 310. The filter 120 is provided with a filter mesh 121 through which the wash water passes. The filter coupling portion 310 is located at the central portion of the filter housing 300, and the peripheral portion 330 is arranged at the periphery of the filter housing 300. Herein, the filter housing 300 may be formed in a circular shape corresponding to the shape of the sump housing 110. In this case, the filter coupling portion 310 and the peripheral portion 330 may be concentrically arranged and formed in the shape of a circle. That is, the filter coupling portion 310 is arranged at the central portion of the circular filter housing 300, and the peripheral portion 330 may be formed in an annular shape along the outer side of the filter coupling portion 310. Preferably, the filter coupling portion 310 and the peripheral portion 330 may be integrally formed and manufactured through injection molding of a plastic resin using a mold.

[0058] The lower spray arm connection pipe 322 is provided at the center of the filter coupling portion 310. Additionally, the water guide connection pipe 324 may be provided at the peripheral portion 330. The water guide connection pipe 324 may be provided to one side of the filter housing 300, spaced a predetermined distance from the lower spray arm connection pipe 322.

[0059] In addition, a fastening hole 303 is preferably formed in the filter coupling portion 310 such that the filter 120 is coupled to the filter coupling portion 310 through a fastening member (not shown). A plurality of fastening holes 303 may be provided, and each of the fastening holes may be formed by providing a boss 301 and forming threads therein. By coupling the fastening member to the fastening hole 303, the filter may be coupled to the filter coupling portion 310 of the filter housing 300.

[0060] Additionally, the filter coupling portion 310 is provided with an overflow hole 305. The contaminated wash water may flow over the lower chamber 210 of the soil chamber 200 to the upper portion of the soil chamber through the overflow hole 305, and then flow into the recovery holes 331, 333 and 335 formed in the peripheral portion 330 via the filter coupled to the filter coupling portion 310.

[0061] The peripheral portion 330 is arranged along the outer circumference of the filter coupling portion 310, and generally has an annular shape. The peripheral portion 330 is arranged outside the filter coupling portion 310. Additionally, the recovery holes 331, 333 and 335 through which the wash water passes are formed in the

peripheral portion 330. More specifically, as shown in FIG. 4, the peripheral portion 330 is provided with recovery hole frames 341, 343, 345 and 347 having the recovery hole 331 formed inside. The shape of recovery hole frame may change to correspond to the shape of the recovery hole. In this embodiment, the recovery hole 331 is illustrated as having a quadrangular shape (more specifically, a trapezoidal shape), the recovery holes 333 and 335 are illustrated as having an oblong shape. However, embodiments of the present invention are not limited thereto.

[0062] The peripheral portion 330 may be provided with the water guide connection pipe 324 connected to the water guide 14.

[0063] The peripheral portion 330 may be configured with a plate extending outward from the filter coupling portion 310 in a radial direction.

[0064] The peripheral portion 330 is provided with at least one recovery hole formed in the radial direction. Preferably, a plurality of recovery holes 331, 333 and 335 are formed. The recovery holes 331, 333 and 335 are disposed in the circumferential direction of the peripheral portion 330.

[0065] Referring to FIG. 4, the recovery hole 331 may be formed by the recovery hole frames 341, 343, 345 and 347. That is, the recovery hole frames 341, 343, 345 and 347 are provided outside the recovery hole 331 such that the open recovery hole 331 is formed inside the frames.

[0066] Meanwhile, the recovery holes 331, 333 and 335 may have different sizes. The peripheral portion 330 may include a plurality of sections surrounding at least one part of the filter coupling portion 310. Herein, at least two of the sections may have recovery holes of different sizes.

[0067] In this embodiment, the peripheral portion 330 may have three sections I, II and III arranged in the radial direction. That is, the peripheral portion 330 may include a first section I, a second section II surrounding the first section I, and a third section III surrounding the second section II. Additionally, the recovery holes 331, 333 and 335 with different sizes may be formed in the first to third sections I, II and III. However, embodiments of the present invention are not limited thereto. Recovery holes with different sizes may be formed in at least two of the first to third sections I, II and III, or recovery holes with the same size may be formed in the first to third sections I, II and III.

[0068] Referring to FIG. 3, the first section I surrounds the filter coupling portion 310 and is provided with a plurality of first recovery holes 335. That is, the first section I is arranged outside the filter coupling portion 310 and formed to surround at least one part of the filter coupling portion 310. The first recovery holes 335 are formed in the first section I and disposed in a circumferential direction of the first section I. Referring to FIG. 3, the first recovery holes 335 may be formed on three lines formed in the circumferential direction.

[0069] The second section II is arranged outside the first section I and formed to surround at least a part of the first section I. A plurality of second recovery holes 331 is formed in the second section II. The second recovery holes 331 are disposed in the circumferential direction of the second section II.

[0070] The third section III is arranged outside the second section II and formed to surround at least one part of the second section II. A plurality of third recovery holes 333 is formed in the third section III. The third recovery holes 333 are disposed in the circumferential direction of the third section III. Referring to FIG. 3, the third recovery holes 333 may be formed on three lines disposed in the circumferential direction.

[0071] According to one embodiment of the present invention, the filter housing 300 is preferably provided with the inclined rib 350.

[0072] The inclined rib 350 is formed on the lower surface of the peripheral portion 330 to be inclined downward. Preferably, the inclined rib 350 is formed at one side of the recovery holes 331, 333 and 335 to be inclined downward. In other words, the inclined rib 350 is located in a plane different from the plane where the recovery holes are formed. Specifically, the inclined rib 350 is located in a plane inclined downward with respect to the plane where the recovery holes are formed.

[0073] Referring to FIGs. 5 and 6, the inclined rib 350 may extend inclinedly downward from a first side 341 of the recovery hole frames 341, 343, 345 and 347 having the recovery hole 331 formed at the inner side thereof. That is, a first end 351 of the inclined rib 350 is combined with the first side 341 of the recovery hole frames. At this time, the inclined rib 350 is preferably integrated with the first side 341 of the recovery hole frames.

[0074] The inclined rib 350 may be provided with an inclined surface right at the first side 341 of the recovery hole frames 341, 343, 345 and 347, or via an extension extending vertically downward a predetermined distance from the first side 341 of the recovery hole frames.

[0075] The inclined rib 350 may be inclined toward a second side 343 facing the first side 341 of the recovery hole frames. That is, one end of the inclined rib 350 is combined with the first side 341 of the recovery hole frames, and the other end thereof is located to face toward the second side 343 of the recovery hole frame.

[0076] Preferably, the direction of inclination of the inclined rib 350 does not coincide with the direction in which the wash water flow into the recovery holes.

[0077] The wash water sprayed from the spray arm drops to the lower surface of the tub 11 and then flows into the sump 100 located at the central portion of the lower surface of the tub 11. At this time, the wash water moves inward from the outer side of the filter housing 300, flowing into the recovery holes. Accordingly, the inclined rib 350 is preferably inclined in a direction that does not coincide with the direction of inward movement of the wash water from the outer side of the filter housing 300. For example, in the case that a toothpick is con-

tained in the wash water, the wash water drops to the lower surface of the tub and flows to the central portion of the lower surface of the tub, thereby being introduced into the recovery holes. The toothpick contained in the wash water also moves along the flow of the wash water. At this time, the toothpick is filtered out by the inclined rib 350 inclined in a direction not coinciding with the direction of movement of the toothpick (i.e., the direction of movement of the wash water), thereby being prevented from being introduced into the recovery holes.

[0078] In this embodiment, the slant of the inclined rib 350 is formed outward at the inner side of the filter housing 300. That is, when the filter housing 300 has a circular shape, the inclined rib 350 may have a slope inclinedly extending from the outer side of the filter housing 300 toward the center thereof in the radial direction. In other words, the inclined rib 350 may be inclined as it extends away from the center of the filter housing 300 in the radial direction. in the case that the inclined rib 350 extends inclinedly away from the center of the filter housing 300 in the radial direction as above, the inflow direction of the wash water is opposite to the direction of inclination of the inclined rib 350.

[0079] In the case that the first side 341 of the recovery hole frames is provided to the inner side of the filter housing 300, and the second side 343 is provided to the outer side of the filter housing 300, one end 351 of the inclined rib 350 is coupled to the one side 341 of the recovery hole frames, and the other end 353 thereof is positioned to be inclined toward the second side 343 of the recovery hole frames.

[0080] Although not shown in the figures, the inclined rib 350 may be inclined in the circumferential direction of the peripheral portion 330. That is, the inclined rib 350 may be inclined toward the third side 345 and fourth side 347 arranged between the first side 341 of the recovery hole frames and the second side 343. Alternatively, it may extend inclinedly from the fourth side 347 to the third side 345.

[0081] In the illustrated embodiment, the inclined rib 350 extends inclinedly from the inner side of the filter housing 300 to the outer side thereof, or in the radial direction of the filter housing 300. However, the inclined rib 350 may be inclined in a direction other than the radial direction of inward extension from the outer side of the filter housing 300 into which the wash water flows.

[0082] Meanwhile, referring to FIGs. 5 and 6, the side surface of the inclined rib 350 is provided with a guide 361. The guide 361 is provided to the side surface of the inclined rib 350 to guide the wash water. More specifically, the guide 361 is provided between the recovery hole frames and the side surface of the inclined rib 350.

[0083] In the case that the first end 351 of the inclined rib 350 is combined with the first side 341 of the recovery hole frames, the guide 361 may be provided between the third side 345 or the fourth side 347 of the recovery hole frames and the side surface of the inclined rib 350. At this time, the third side 345 or the fourth side 347 of the

recovery hole frames is a recovery hole frame adjacent to the first side 341 of the recovery hole frames combined with the one end 351 of the inclined rib 350. Preferably, the inclined rib 350 is provided between the third side 345 and the fourth side 347 of the recovery hole frames and between both side surfaces of the inclined rib 350. Preferably, the guide 361, the inclined rib 350 and the recovery hole frames 341, 343, 345 and 347 are integrated with each other.

[0084] When the triangular space arranged at the lower portion of the recovery hole 331 and including the inclined rib 350 and the guide 361 is defined as a slope, the upper surface of the slope is open as the recovery hole 331. In addition, the side surface of the slope is closed by the guide 361, and the inclined surface of the slope is closed by the inclined rib 350. Additionally, the surface 357 facing the inclined surface is open. That is, the open surface 357 is formed at the position opposite to the inclined surface. The wash water introduced into the recovery hole 331 may flow along the inclined rib 350 and drop to the sump housing 110 through the open surface 357.

[0085] The open surface 357 refers to the space between the second end 353 of the inclined rib 350 and the second side 343 of the recovery hole frames. The second end 353 of the inclined rib 35 is a free end that corresponds to the other end facing the first end 351 combined with the first side 341 of the recovery hole frames. Additionally, the second side 343 of the recovery hole frame corresponds to an frame facing the first side 341.

[0086] Meanwhile, the second end 353 of the inclined rib 35 is located at the lower portion of the recovery hole 331. That is, the second end 353 of the inclined rib 35 is preferably positioned to be within the recovery hole 331. That is, referring to FIG. 4, when the filter housing 300 is viewed from the top, the second end 353 of the inclined rib 35 is spaced a predetermined distance from the second side 343 of the recovery hole frame. The second end 353 of the inclined rib 35 and the second side 343 of the recovery hole frame are spaced a predetermined distance A in a horizontal direction. Accordingly, the wash water can drop directly into the space between the second end 353 of the inclined rib 35 and the second side 343 of the recovery hole frame, and therefore the inflow rate of the wash water may be increased. In other words, since the inclined rib 350 is not positioned below a portion of the space of the recovery hole 331, the wash water introduced into the recovery hole 331 may flow directly into the sump housing 110 without passing the inclined rib 350.

[0087] Meanwhile, the distance D between the second end 353 of the inclined rib 35 and the second side 343 of the recovery hole frame is preferably less than the diameter of the drainage channel. In the case that the distance D is greater than the diameter of the drainage channel, foreign substances having a size greater than the diameter of the drainage channel may be introduced into the sump. The foreign substances introduced into the sump are discharged into the drainage channel. At

this time, the foreign substances having a size greater than the diameter of drainage channel may clog the drainage channel. Accordingly, the distance between the second end 353 of the inclined rib 35 and the second side 343 of the recovery hole frame is preferably less than the diameter of the drainage channel. In the case that a protruding rib 345 extending vertically downward from the lower portion of the second side 343 of the recovery hole frame is formed as shown in FIG. 6, the protruding rib 345 is arranged such that the distance D between the second end 353 of the inclined rib 35 and the protruding rib 345 is less than the diameter of the drainage channel.

[0088] Preferably, the inclined rib 350 is arranged at the inner position of the filter housing 300 spaced a predetermined distance from the outer edge of the filter housing 300. That is, the inclined rib 350 is positioned inside the peripheral portion 330 at a predetermined distance from the outer edge of the peripheral portion 330.

[0089] The sump housing 110 is provided at the lower portion of the filter housing 330 and coupled to the filter housing 300, and thus it may be interfered by the inclined rib 350. Accordingly, by arranging the inclined rib 350 inside the filter housing 300 to be spaced a predetermined distance from the outer edge of the filter housing 300, interference with the sump housing 110 may be prevented.

[0090] Preferably, the inclined rib 350 is arranged at the lower portion of the second recovery hole 331 located in the second section II of the peripheral portion 330. As described above, the second section II is arranged between the third section III positioned at the outermost edge of the peripheral portion 330 and the first section I adjacent to the filter coupling portion 310. Accordingly, by forming the inclined rib 350 at the lower portion of the second recovery hole 331, interference with the sump housing 110 of the sump may be prevented. In the case that the inclined rib 350 is located in the first section I, it may interfere with the lower chamber 210 of the soil chamber 200. Accordingly, the inclined rib 350 is preferably arranged at the lower portion of the second recovery hole 331 formed in the second section.

[0091] However, the inclined rib 350 does not need to be positioned in the second section II. The inclined rib 350 only needs to be arranged at a position where it does not interfere with the thickness of the upper edge of the sump housing 110.

[0092] As apparent from the above description, the present invention has effects as follows.

[0093] According to embodiments of the present invention, noise and vibration generated by introduction of a foreign substance having a large volume into a sump during operation of a dishwasher may be reduced.

[0094] In addition, a drainage pump or a disposer in the dishwasher according to embodiments of the present invention has a lowered possibility of malfunction caused by foreign substances.

[0095] It will be apparent to those skilled in the art that various modifications and variations can be made in the

present invention without departing from the spirit or scope of the inventions. Thus, it is intended that the present invention covers the modifications and variations of this invention provided they come within the scope of the appended claims and their equivalents.

Claims

1. A dishwasher comprising a sump, a filter housing coupled to an upper portion of the sump, and a filter coupled to a central portion of the filter housing, wherein the filter housing comprises:
 - a filter coupling portion having the filter coupled thereto;
 - a peripheral portion arranged outside the filter coupling portion and provided with a recovery hole frame, wherein a recovery hole arranged to allow wash water to pass therethrough is formed inside the recovery hole frame; and
 - an inclined rib formed at a lower surface of the peripheral portion to be inclined downward.
2. The dishwasher according to claim 1, wherein the inclined rib extends inclinedly downward from a first side of the recovery hole frame.
3. The dishwasher according to claim 2, wherein the inclined rib is inclined toward a second side of the recovery hole frame facing the first side.
4. The dishwasher according to claim 3, wherein the inclined rib extends inclinedly away from a center of the filter housing in a radial direction of the filter housing.
5. The dishwasher according to claim 3, wherein the inclined rib is inclined in a circumferential direction of the peripheral portion.
6. The dishwasher according to any one of claims 1 to 5, wherein the inclined rib is arranged inside the peripheral portion such that the inclined rib is spaced a predetermined distance from an outer edge of the peripheral portion.
7. The dishwasher according to any preceding claim, further comprising a guide arranged between the recovery hole frame and a side surface of the inclined rib to guide wash water.
8. The dishwasher according to any preceding claim, wherein a first end of the inclined rib is coupled to a first side of the recovery hole frame, and a second end of the inclined rib positioned at a side of the inclined rib opposite to the first end is positioned at

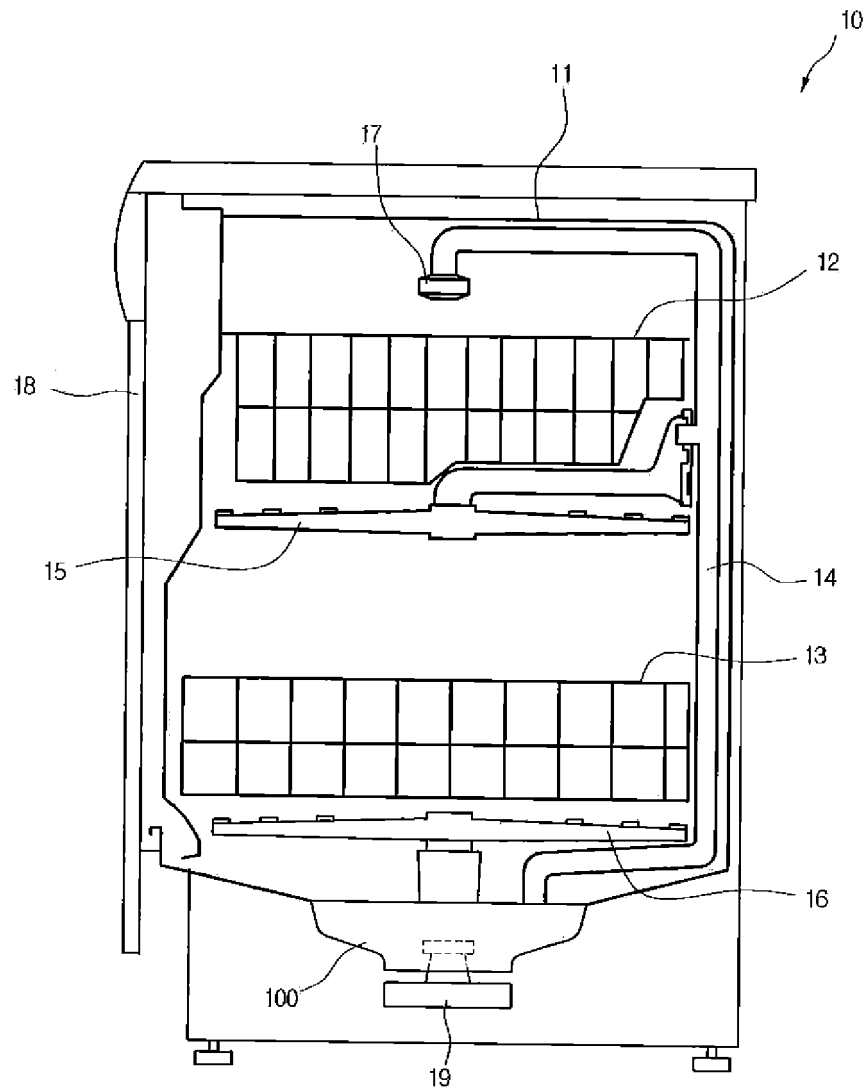
a lower portion of the recovery hole.

9. The dishwasher according to claim 8, wherein the second end of the inclined rib and a second side of the recovery hole frame facing the first side are spaced a predetermined distance from each other in a horizontal direction. 5
10. The dishwasher according to any preceding claim, wherein the peripheral portion is provided with a plurality of sections. 10
11. The dishwasher according to claim 10, wherein the sections of the peripheral portion comprise a first section surrounding at least one part of the filter coupling portion and provided with a plurality of first recovery holes, a second section surrounding at least one part of the first section and provided with a plurality of second recovery holes, and a third section surrounding at least one part of the second section and provided with a plurality of third recovery hole. 15
20
12. The dishwasher according to claim 11, wherein the recovery holes formed in at least two of the first, second and third sections have different sizes. 25
13. The dishwasher according to claim 9, further comprising a drainage passage to discharge wash water stored in the sump to an outside, wherein a distance between the second end of the inclined rib and a second side of the recovery hole frame is less than a diameter of the drainage passage. 30
14. The dishwasher according to claim 9, wherein a lower portion of the second side of the recovery hole frame is provided with a protruding rib extending vertically downward. 35
15. The dishwasher according to claim 14, further comprising a drainage passage to discharge the wash water stored in the sump to an outside, wherein a distance between the second end of the inclined rib and the protruding rib is less than a diameter of the drainage passage. 40
45

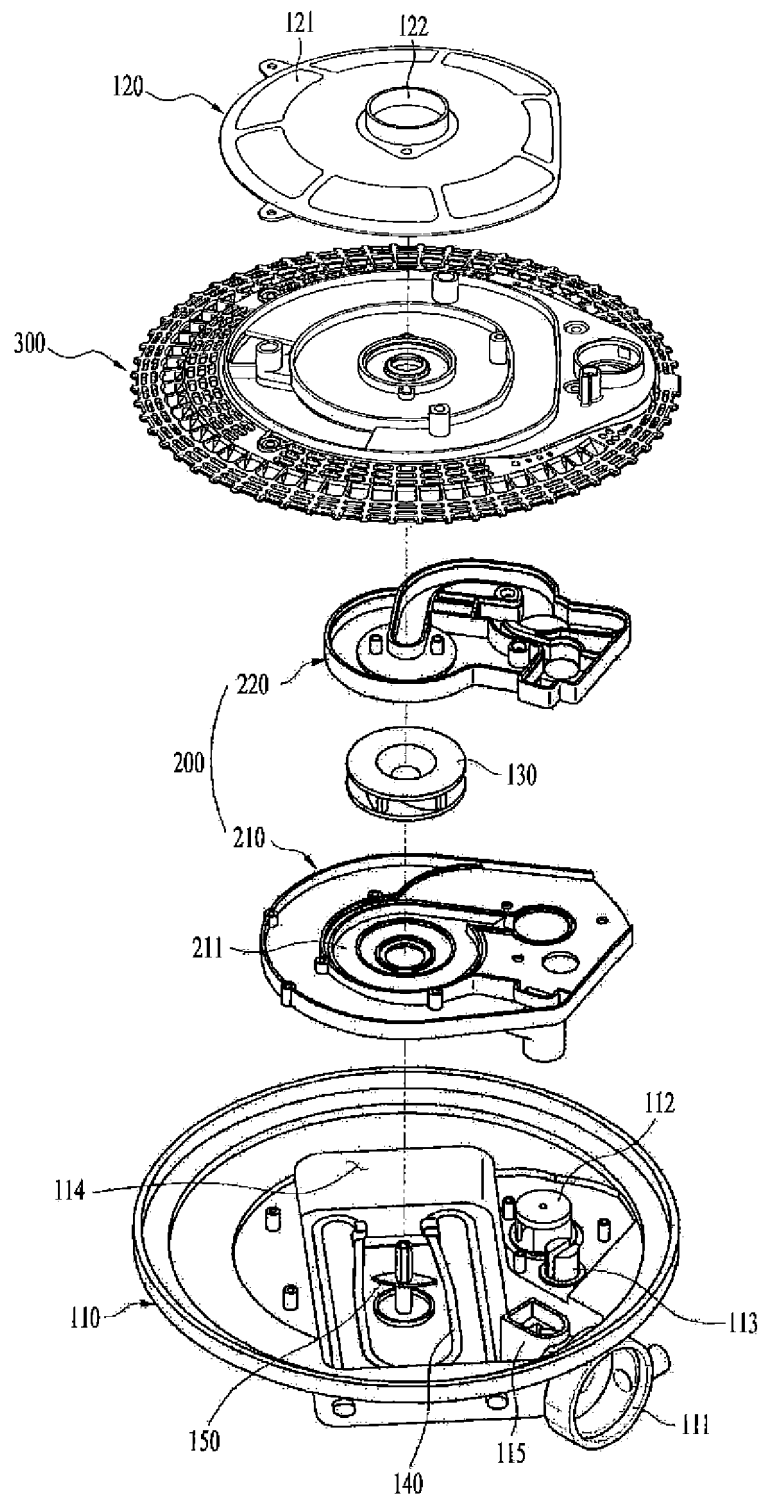
50

55

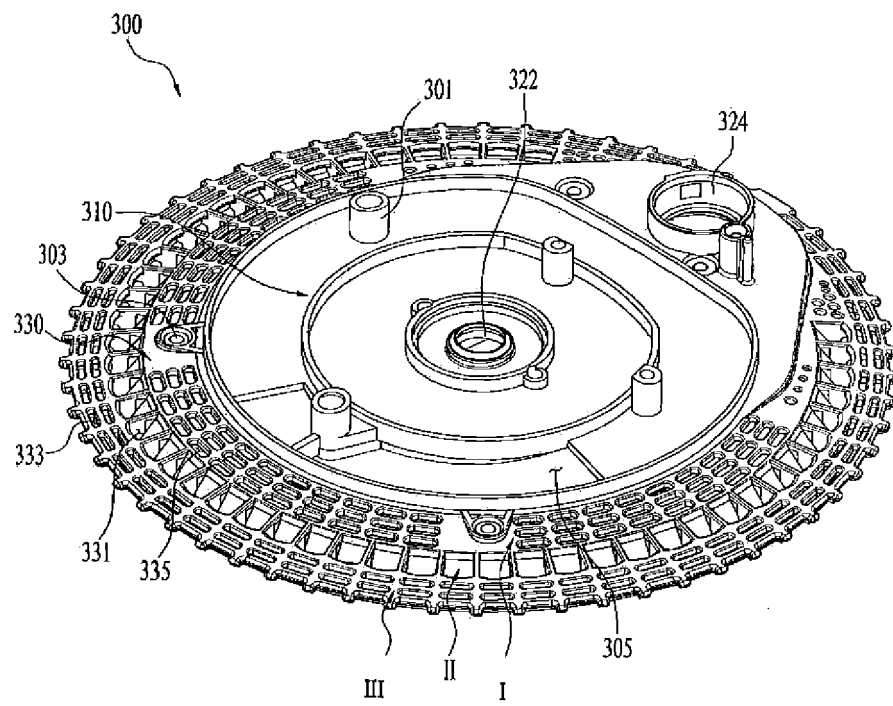
【 Fig 1】



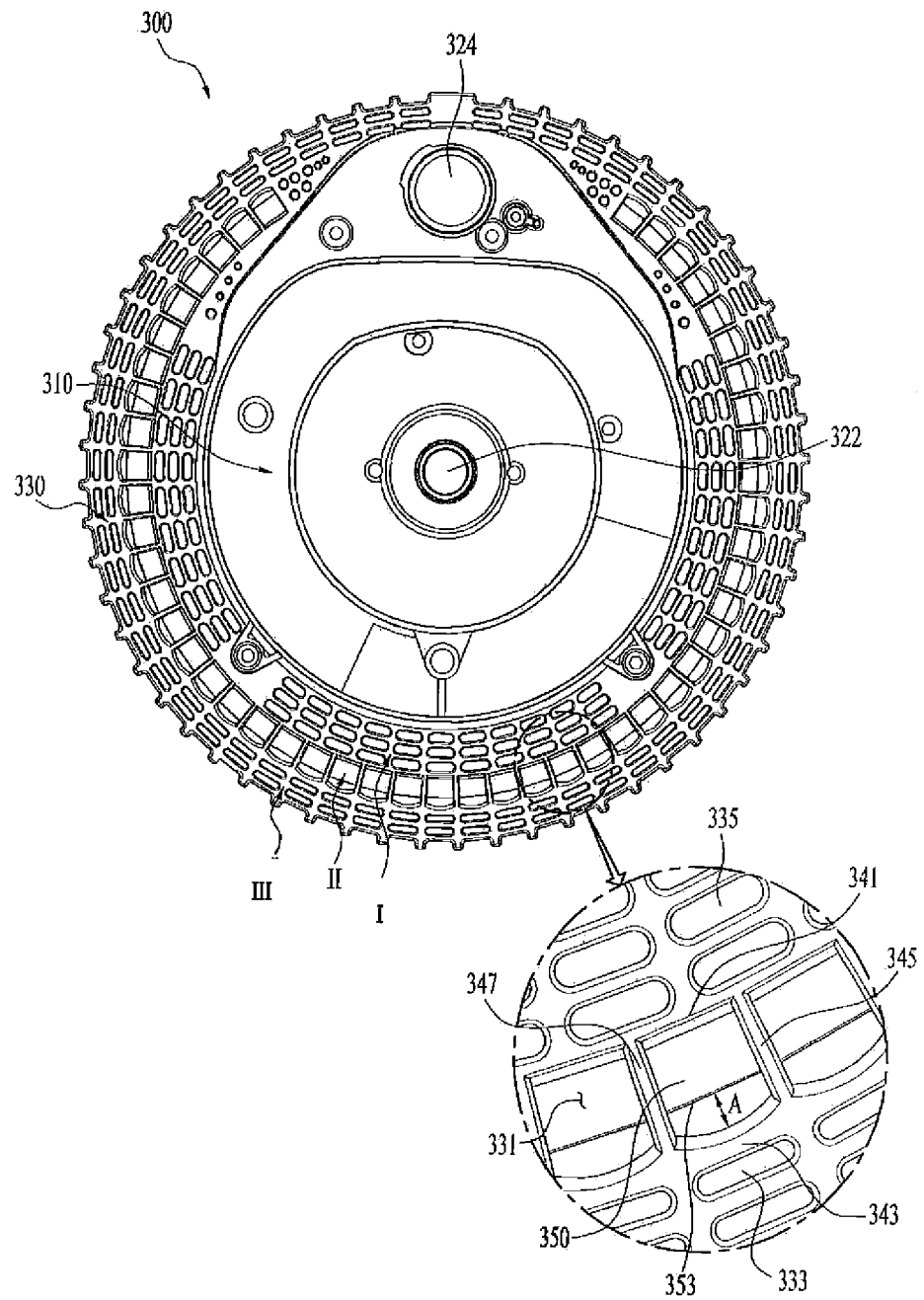
【 Fig 2】



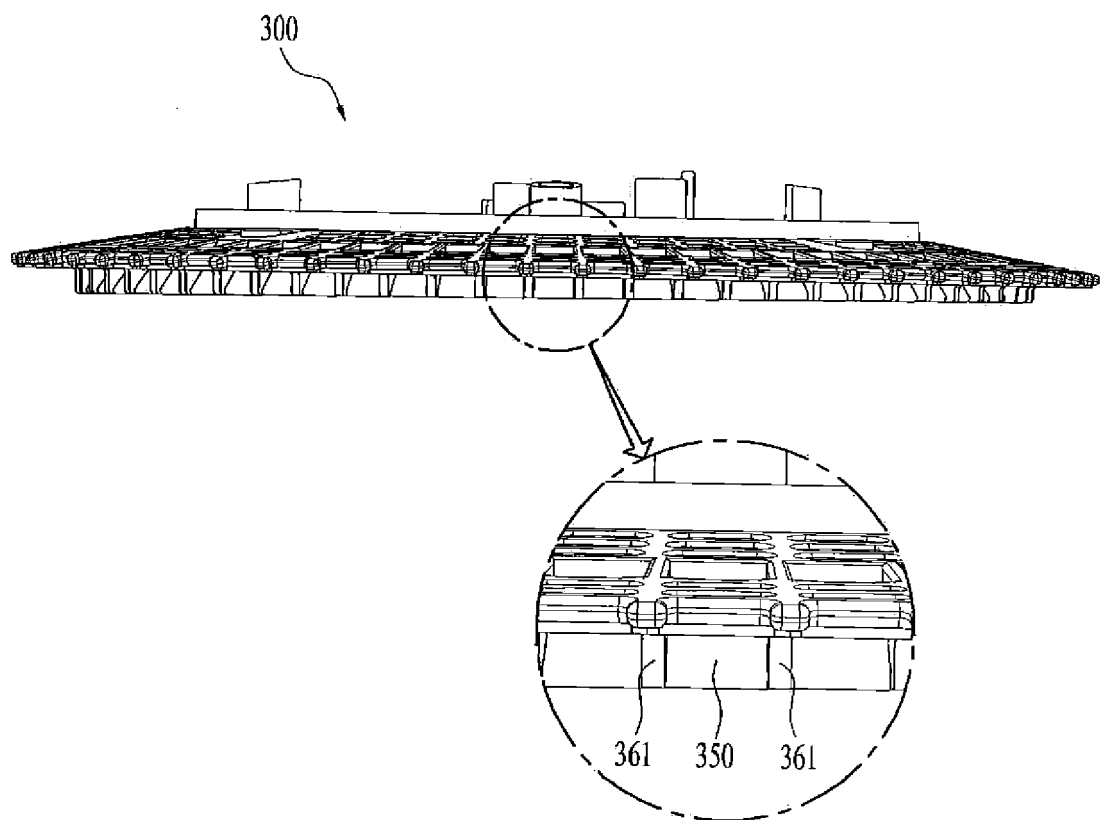
【 Fig 3】



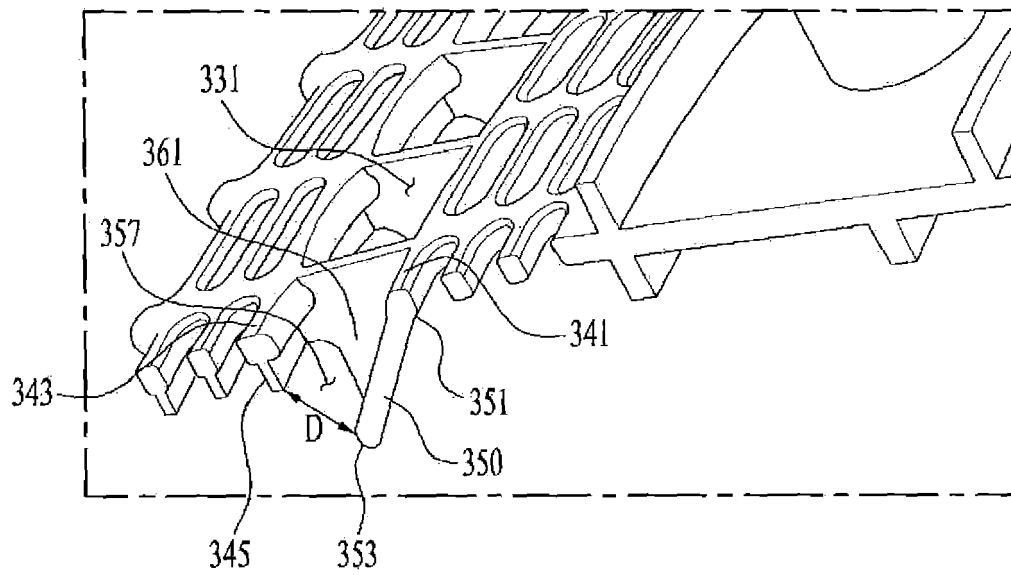
【 Fig 4】



【 Fig 5】



【Fig 6】





EUROPEAN SEARCH REPORT

Application Number
EP 13 19 7849

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	US 2006/249184 A1 (CHUNG YANG H [KR] ET AL CHUNG YANG HOON [KR] ET AL) 9 November 2006 (2006-11-09) * the whole document *	1-15	INV. A47L15/42
A	DE 10 2007 046072 A1 (LG ELECTRONICS INC [KR]) 17 April 2008 (2008-04-17) * the whole document *	1-15	
			TECHNICAL FIELDS SEARCHED (IPC)
			A47L
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 29 January 2014	Examiner Jezierski, Krzysztof
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

2
EPO FORM 1503 03/02 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 13 19 7849

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

29-01-2014

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2006249184 A1	09-11-2006	KR 20060115480 A US 2006249184 A1	09-11-2006 09-11-2006
DE 102007046072 A1	17-04-2008	NONE	

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82