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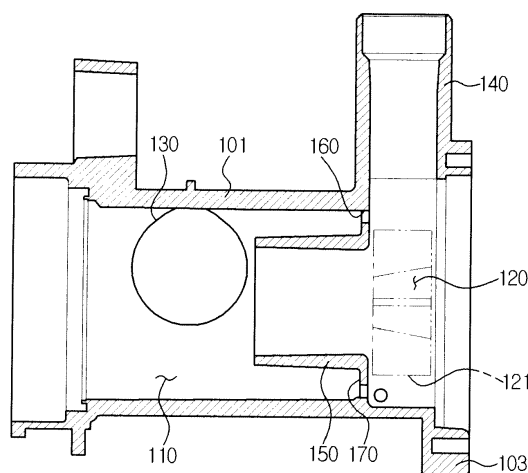
Remarks:

This application was filed on 16-10-2013 as a divisional application to the application mentioned under INID code 62.

(54) **Washing machine and drain pump thereof**

(57) Disclosed herein is washing machine comprising a body, a tub placed in the body in which wash water is stored, a first drain pipe connected to the tub to allow the wash water to be discharged from the tub, a second drain pipe to guide the wash water discharged from the tub to the outside of the body, a pump case having a wash water inlet port connected to the first drain pipe and wash water outlet port connected to the second drain pipe, a wash water inlet chamber defined in the pump case into which the wash water is introduced through the wash water inlet port, a drain pump chamber defined in the pump case in which an impeller is placed to discharge the wash water through the wash water discharge port, a partition arranged between a wash water inlet chamber and the drain pump chamber, a wash water suction port formed at the partition to allow the wash water of the wash water inlet chamber to be introduced into the drain pump chamber by suction force of the impeller, the wash water suction port protruding into the wash water inlet chamber, and an air discharge path formed at the partition to allow the air of the wash water inlet chamber to be introduced into the drain pump chamber and subsequently be discharged through the wash water outlet port, the air discharge path being located around the wash water suction port.

FIG. 3



Description

BACKGROUND

1. Field

[0001] Embodiments relate to a washing machine having a drain pump to reduce noise.

2. Description of the Related Art

[0002] Generally, a washing machine is an apparatus that washes laundry using frictional force between the laundry and wash water. One of various kinds of washing machines is a drum washing machine. Hereinafter, a drum washing machine will be described by way of example.

[0003] A conventional drum washing machine includes a tub in which wash water is stored, a rotating tub rotatably mounted in the tub, a drive device to rotate the rotating tub, a water supply device to supply wash water into the tub, and a drain pump to forcibly discharge the wash water from the tub.

[0004] The drain pump generally includes a pump case in which a filter chamber and a drain pump chamber are defined, and a pump motor coupled to the pump case. The filter chamber contains a filter to capture impurities contained in wash water, and the drain pump chamber contains an impeller to be rotated by the pump motor.

[0005] If the impeller is rotated by the pump motor, the interior wash water of the tub is introduced into the filter chamber, and then, after passing through the filter placed in the filter chamber, is suctioned into the drain pump chamber. Thereafter, the wash water is forcibly discharged from the drain pump chamber to the outside of the drain pump via rotation of the impeller.

[0006] During the above described pumping of wash water, air mixed in the wash water may be introduced into the drain pump. If the air is introduced into the drain pump, the air may deteriorate the performance of the impeller placed in the drain pump chamber, causing drain malfunction or abnormal noise generation.

SUMMARY

[0007] Therefore, it is an aspect to provide a drain pump to discharge air introduced therein to reduce noise, and a washing machine having the same.

[0008] Additional aspects will be set forth in part in the description which follows and, in part, will be obvious from the description, or may be learned by practice of the embodiments.

[0009] In accordance with one aspect, a drain pump of a washing machine includes a pump case in which a wash water inlet chamber and a drain pump chamber are defined, a wash water inlet port formed at the pump case, to allow wash water to be introduced into the wash water inlet chamber, a wash water outlet port formed at the

pump case, to allow the wash water to be discharged from the drain pump chamber, a wash water suction port arranged between the wash water inlet chamber and the drain pump chamber, and an air discharge path arranged at a distance from the wash water suction port between the wash water inlet chamber and the drain pump chamber, to allow air inside the wash water inlet chamber to be discharged through the wash water outlet port.

[0010] A partition may be arranged between the wash water inlet chamber and the drain pump chamber, and the wash water suction port and the air discharge path may be formed at the partition.

[0011] The air discharge path may be located higher than the wash water suction port.

[0012] The air discharge path may have an exit communicating with the drain pump chamber, the exit being located at a radial outward position of an impeller placed in the drain pump chamber.

[0013] A cross sectional area of the air discharge path may be smaller than a cross sectional area of the wash water suction port.

[0014] The wash water inlet port may be located higher than the wash water suction port.

[0015] An upper inner wall surface of the wash water inlet port may be connected to an upper inner wall surface of the wash water inlet chamber without a stepped portion.

[0016] The wash water outlet port may be located close to the air discharge path, to allow the air introduced into the drain pump chamber to be directly discharged through the wash water outlet port, rather than staying in the drain pump chamber.

[0017] A cross sectional area of the wash water outlet port may be smaller than a cross sectional area of the wash water suction port.

[0018] The wash water suction port may protrude from the partition into the wash water inlet chamber.

[0019] In accordance with another aspect, a washing machine includes a body, a tub placed in the body, in which wash water is stored, a first drain pipe connected to the tub to allow the wash water to be discharged from the tub, a second drain pipe to guide the wash water discharged from the tub to the outside of the body, a pump case having a wash water inlet port connected to the first drain pipe and a wash water outlet port connected to the second drain pipe, a wash water inlet chamber defined in the pump case, into which the wash water is introduced through the wash water inlet port, a drain pump chamber defined in the pump case, in which an impeller is placed to discharge the wash water through the wash water discharge port, a partition arranged between the wash water inlet chamber and the drain pump chamber, a wash water suction port formed at the partition to allow the wash water of the wash water inlet chamber to be introduced into the drain pump chamber by suction force of the impeller, the wash water suction port protruding into the wash water inlet chamber, and an air discharge path formed at the partition to allow the air of

the wash water inlet chamber to be introduced into the drain pump chamber and subsequently, be discharged through the wash water outlet port, the air discharge path being located around the wash water suction port.

[0020] The air discharge path may be located higher than the wash water suction port.

[0021] The air discharge path may have an exit communicating with the drain pump chamber, the exit being located at a radial outward position of the impeller.

[0022] An upper inner wall surface of the wash water inlet port may be connected to an upper inner wall surface of the wash water inlet chamber in a tangential direction.

[0023] The wash water outlet port may be located close to the air discharge path, to prevent the air introduced into the drain pump chamber from staying in the drain pump chamber.

[0024] In accordance with another aspect, a drain pump of a washing machine includes a pump case in which a wash water inlet chamber and a drain pump chamber are defined, a wash water suction port arranged between the wash water inlet chamber and the drain pump chamber, a wash water outlet port formed at the pump case to allow wash water to be discharged from the drain pump chamber, and a wash water inlet port formed at the pump case to allow the wash water to be introduced into the wash water inlet chamber, the center of the wash water inlet port being located higher than the center of the pump case.

[0025] The drain pump may further include a partition arranged between the wash water inlet chamber and the drain pump chamber, the wash water suction port may be formed at the partition to allow the wash water of the wash water inlet chamber to be introduced into the drain pump chamber by suction force of an impeller, and the drain pump may further include an air discharge path formed at the partition to allow air of the wash water inlet chamber to be introduced into the drain pump chamber and subsequently, be discharged through the wash water outlet port, the air discharge path being located around the wash water suction port.

[0026] In accordance with a further aspect, a washing machine includes a body, a tub placed in the body, in which wash water is stored, a first drain pipe connected to the tub to allow the wash water to be discharged from the tub, a second drain pipe to guide the wash water discharged from the tub to the outside of the body, a pump case in which a wash water inlet chamber and a drain pump chamber are defined, a wash water suction port arranged between the wash water inlet chamber and the drain pump chamber, a wash water outlet port formed at the pump case to connect the drain pump chamber and the second drain pipe to each other, and a wash water inlet port formed at the pump case to connect the first drain pipe and the wash water inlet chamber to each other, the center of the wash water inlet port being located higher than the center of the pump case.

[0027] The washing machine may further include a partition arranged between the wash water inlet chamber

and the drain pump chamber, the wash water suction port may be formed at the partition to allow the wash water of the wash water inlet chamber to be introduced into the drain pump chamber by suction force of an impeller, and the washing machine may further include an air discharge path formed at the partition to allow air of the wash water inlet chamber to be introduced into the drain pump chamber and subsequently, be discharged through the wash water outlet port, the air discharge path being located around the wash water suction port.

BRIEF DESCRIPTION OF THE DRAWINGS

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

FIG. 1 is a sectional view illustrating a general configuration of a washing machine according to an embodiment;

FIG. 2 is a perspective view illustrating a drain pump according to the embodiment;

FIG. 3 is a sectional view of the drain pump taken along the line I-I of FIG. 2;

FIG. 4 is a sectional view of the drain pump taken along the line II-II of FIG. 2;

FIG. 5 is a sectional view of the drain pump taken along the line III-III of FIG. 2; and

FIG. 6 is a view illustrating operation of the drain pump provided in the washing machine according to the embodiment.

DETAILED DESCRIPTION

[0029] Reference will now be made in detail to an embodiment, examples of which are illustrated in the accompanying drawings, wherein like reference numerals refer to like elements throughout.

[0030] FIG. 1 is a sectional view illustrating a general configuration of a washing machine according to an embodiment.

[0031] As illustrated in FIG. 1, the washing machine according to the embodiment includes a body 10 defining an external appearance of the washing machine, a tub 11 mounted in the body 10, in which wash water is stored during a washing operation, and a rotating tub 12 rotatably mounted in the tub 11.

[0032] The body 10 has an input opening 13 perforated in a front wall thereof to allow a user to put laundry into the rotating tub 12. A door 14 is provided to open or close the input opening 13.

[0033] A water supply device 20 and a detergent sup-

ply device 30 are mounted in an upper region of the body 10 to supply wash water and detergent into the tub 11. The water supply device 20 includes water supply valves 21 to control the supply of wash water, water supply pipes 22 connecting the water supply valves 21 to the detergent supply device 30, and a connecting pipe 23 to guide the wash water, having passed through the detergent supply device 30, into the tub 11.

[0034] The tub 11 is externally provided with a drive motor 41, which rotates the rotating tub 12 forwardly or reversely. A drive shaft 42 is mounted between the rotating tub 12 and the drive motor 41 to transmit rotation force of the drive motor 41 to the rotating tub 12. In addition, a bearing housing 43 is mounted to a rear wall of the tub 11 to rotatably support the drive shaft 42, and a bearing 44 is interposed between the bearing housing 43 and the drive shaft 42.

[0035] A drain pump 100 is mounted on an inner bottom surface of the body 10 to pump the wash water stored in the tub 11. The drain pump 100 is connected to the tub 11 via a first drain pipe 50. In the embodiment, the drain pump 100 serves to pump the wash water drained through the first drain pipe 50 to forcibly discharge the wash water to the outside of the body 10.

[0036] FIG. 2 is a perspective view illustrating the drain pump according to the embodiment, FIG. 3 is a sectional view of the drain pump taken along the line I-I of FIG. 2, FIG. 4 is a sectional view of the drain pump taken along the line II-II of FIG. 2, and FIG. 5 is a sectional view of the drain pump taken along the line III-III of FIG. 2. In FIG. 3, a pump filter mounted in a wash water inlet chamber is not illustrated.

[0037] As illustrated in FIGS. 2 to 5, the drain pump 100 includes a pump case 101 in which a wash water inlet chamber 110 and a drain pump chamber 120 are defined, and a pump filter 102 mounted in the wash water inlet chamber 110.

[0038] The pump case 101 has a cylindrical shape and is provided with a bracket 103 to couple the pump case 101 to the body 10. Both ends of the cylindrical pump case 101 are open. The pump filter 102 and an impeller 121 that will be described hereinafter are coupled respectively to both the open ends of the cylindrical pump case 101. The cylindrical pump case 101 is coupled to the body 10 such that a peripheral portion of the cylindrical pump case 101 faces the bottom surface of the body 10.

[0039] The wash water inlet chamber 110 is defined in the pump case 101. During operation of the drain pump 100, the wash water stored in the tub 11 is introduced into the wash water inlet chamber 110 through the first drain pipe 50.

[0040] The drain pump 100 further includes a wash water inlet port 130 provided at a lateral position of a peripheral surface of the pump case 101. The wash water inlet port 130 internally communicates with the wash water inlet chamber 110 and is externally connected to the first drain pipe 50. The wash water having passed through the first drain pipe 50 is introduced into the wash water

inlet chamber 110 through the wash water inlet port 130. The wash water inlet port 130 may have a circular shape, and may protrude outward from the pump case 101 for connection with the first drain pipe 50. In this case, the wash water inlet port 130 may protrude parallel to the bottom surface of the body 10.

[0041] In this case, the center of the wash water inlet port 130 is located higher than the center of the pump case 101. This serves to minimize the amount of air to be suctioned into the drain pump chamber 120 along with the wash water. The air moves upward of the wash water within the wash water inlet chamber 110 because the air is lighter than the wash water and during this movement, may be suctioned into the drain pump chamber 120. However, highly positioning the wash water inlet port 130 may reduce the above described movement path, thereby minimizing the amount of air to be suctioned into the drain pump chamber 120 and preventing generation of noise due to movement of the wash water.

[0042] An upper inner wall surface of the wash water inlet port 130 may be connected in a tangential direction to an upper inner wall surface of the wash water inlet chamber 110 without a stepped portion. That is, this tangential arrangement of the wash water inlet port 130 and the wash water inlet chamber 110 may be effective in collecting the air in an upper region of the wash water inlet chamber 110 and reducing generation of noise due to movement of the wash water.

[0043] The wash water inlet port 130 is located higher than a wash water suction port 150 that will be described hereinafter. The air introduced along with the wash water is located above the wash water and therefore, positioning the wash water inlet port 130 higher than the wash water suction port 150 may minimize the amount of air to be introduced, along with the wash water, into the drain pump chamber 120 through the wash water suction port 150.

[0044] The drain pump chamber 120 is adapted to suction the wash water introduced into the wash water inlet chamber 110 and discharge the wash water to the outside of the body 10. The wash water inlet chamber 110 and the drain pump chamber 120 may be neighbor to each other in a longitudinal direction within the cylindrical pump case 101.

[0045] The impeller 121 is mounted in the drain pump chamber 120 and serves to forcibly suction the wash water from the wash water inlet chamber 110 and discharge the wash water from the drain pump chamber 120. A pumping motor 122 is connected to the impeller 121. As the impeller 121 is rotated by the pumping motor 122, The impeller 121 suctions the interior wash water of the wash water inlet chamber 110 in a lateral direction and discharges the wash water in a radial direction.

[0046] The drain pump 100 further includes a wash water outlet port 140 provided at an upper position of the peripheral surface of the pump case 101. The wash water outlet port 140 internally communicates with the drain pump chamber 120 and is externally connected to a sec-

ond drain pipe 60. All the wash water suctioned into the drain pump chamber 120 and the air directed into the drain pump chamber 120 through an air discharge path 160 that will be described hereinafter are discharged out of the body 10 through the wash water outlet port 140 and the second drain pipe 60. The wash water outlet port 140 may be oriented perpendicular to the bottom surface of the body 10. In this case, the wash water inlet port 130 provided at the lateral position of the pump case 101 and the wash water outlet port 140 provided at the upper position of the pump case 101 are perpendicular to each other. The wash water outlet port 140 may have a circular shape, and may protrude outward from the pump case 101 for connection with the second drain pipe 60.

[0047] The air is introduced into the drain pump chamber 120 through the air discharge path 160. The wash water outlet port 140 is located close to the air discharge path 160, to allow the air having passed through the air discharge path 160 to be directly discharged rather than staying in the drain pump chamber 120. The wash water outlet port 140 may be located at a distance of 10 mm or less from the air discharge path 160.

[0048] To allow the air to be moved from the wash water inlet chamber 110 to the drain pump chamber 120 under a pressure difference, the wash water passing through the wash water outlet port 140 may have a higher velocity than that of the wash water passing through the wash water suction port 150. If the area of an exit is smaller than the area of an entrance, the velocity of a fluid at the exit may be increased. Since the wash water suction port 150 corresponds to the entrance of the drain pump chamber 120 and the wash water outlet port 140 corresponds to the exit of the drain pump chamber 120, the velocity of the wash water passing through the wash water outlet port 140 may be increased if the area of the wash water outlet port 140 is smaller than the area of the wash water suction port 150. Accordingly, the area of the wash water outlet port 140 may be smaller than the area of the wash water suction port 150.

[0049] The wash water suction port 150 is located between the wash water inlet chamber 110 and the drain pump chamber 120. The wash water inlet chamber 110 and the drain pump chamber 120 are arranged side by side within the pump case 101 and communicate with each other through the wash water suction port 150. If the drain pump 100 is operated, the wash water introduced into the wash water inlet chamber 110 is suctioned into the drain pump chamber 120 through the wash water suction port 150.

[0050] The air discharge path 160 is located between the wash water inlet chamber 110 and the drain pump chamber 120, to allow the air inside the wash water inlet chamber 110 to be discharged through the wash water outlet port 140. A conventional drain pump uses an additional air discharge pipe, and this increases the number of places that necessitate leakage management and an additional operation of connecting the air discharge pipe to the drain pump and the tub increases the number of

overall processes. In the drain pump 100 according to the embodiment, the air discharge path 160 substitutes for the air discharge pipe, allowing the air introduced into the wash water inlet chamber 110 during pumping of the wash water to be directed into the drain pump chamber 120 and consequently, be discharged out of the drain pump 100.

[0051] One end of the air discharge path 160 communicates with the wash water inlet chamber 110 and the other end communicates with the drain pump chamber 120. The air discharge path 160 may have a constant cross sectional area from one end to the other end thereof. The air inside the wash water inlet chamber 110 is directed into the drain pump chamber 120 through the air discharge path 160, and then, is discharged to the outside of the body 10 through the wash water outlet port 140 and the second drain pipe 60. Differently from the wash water that is suctioned into the drain pump chamber 120 by rotation force of the impeller 121, the air is directed into the drain pump chamber 120 under a pressure difference between one end and the other end of the air discharge path 160.

[0052] The air discharge path 160 may be located to communicate the wash water inlet chamber 110 and the drain pump chamber 120 with each other at a position as high as possible, and at least, may be located higher than the wash water suction port 150.

[0053] The air discharge path 160 has an exit communicating with the drain pump chamber 120, and the exit of the air discharge path 160 is located at a radial outward position of the impeller 121. This may serve to prevent the air directed into the drain pump chamber 120 from coming into direct contact with the impeller 121, thereby preventing deterioration in the rotation efficiency of the impeller 121 and generation of noise.

[0054] In addition, to minimize the amount of wash water to be directed from the wash water inlet chamber 110 into the drain pump chamber 120 through the air discharge path 160 and also, to prevent the wash water, which is moving at a high velocity toward the wash water outlet port 140, from moving backward into the wash water inlet chamber 110 through the air discharge path 160, the air discharge path 160 may have a smaller cross sectional area than those of the wash water suction port 150 and the wash water outlet port 140.

[0055] The drain pump 100 may further include a partition 170 placed between the wash water inlet chamber 110 and the drain pump chamber 120. The wash water suction port 150 and the air discharge path 160 are formed at the partition 170. The wash water suction port 150 may protrude from the partition 170 into the wash water inlet chamber 110 to define a protruding entrance. If the protruding entrance of the wash water suction port 150 is located close to the wash water inlet port 130, the wash water introduced through the wash water inlet port 130 may be directly suctioned into the drain pump chamber 120 through the protruding entrance of the wash water suction port 150 without undergoing unnecessary

movement in the wash water inlet chamber 110. In addition, the protruding entrance of the wash water suction port 150 may define an air accommodation space between the upper inner wall surface of the wash water inlet chamber 110 and an outer peripheral surface of the wash water suction port 150, thereby minimizing the amount of air to be suctioned into the drain pump chamber 120 through the wash water suction port 150.

[0056] The pump filter 102 includes a head portion 102a coupled to the pump case 101, and a filter portion (not shown) placed in the wash water inlet chamber 110 to capture impurities contained in the wash water introduced into the wash water inlet chamber 110. A periphery of the head portion 102a is fastened to the pump case 101 by screws, and a grip 102b is provided at a front surface of the head portion 102a to allow a user to grip and rotate the head portion 102a.

[0057] FIG. 6 is a view illustrating operation of the drain pump in the washing machine according to the embodiment. Hereinafter, operation of the pump according to the embodiment will be described with reference to FIG. 6. The impeller 121 mounted in the drain pump chamber 120 is driven when draining the wash water. If the impeller 121 is rotated, the interior wash water of the tub 11 is introduced into the wash water inlet chamber 110 through the first drain pipe 50 and the wash water inlet port 130, and then, is suctioned into the drain pump chamber 120 through the wash water suction port 150. Subsequently, by operation of the impeller 121, the wash water suctioned into the drain pump chamber 120 is forcibly directed to the wash water outlet port 140 and is discharged to the outside through the second drain pipe 60 (FIG. 2).

[0058] During the pumping of the wash water, the air mixed in the wash water is introduced into the wash water inlet chamber 110. Since the air is lighter than the wash water, the air is located in the upper region of the wash water inlet chamber 110. In this way, the air is located at one side of the air discharge path 160 communicating with the wash water inlet chamber 110, whereas the wash water moves at a high velocity toward the wash water outlet port 140 at the other side of the air discharge path 160 communicating with the drain pump chamber 120. Since one side of the air discharge path 160 has a higher pressure than the other end of the air discharge path 160, the air is directed into the drain pump chamber 120 through the air discharge path 160. Thereby, the air is discharged to the outside of the washing machine through the wash water outlet port 140 and the second drain pipe 60 along with the wash water.

[0059] As is apparent from the above description, in a drain pump of a washing machine according to an embodiment, a wash water inlet port of the drain pump is located higher than the center of a pump case of the drain pump such that air is located in an upper region of the drain pump. This may effectively prevent the air from being suctioned toward the impeller. In particular, the drain pump is configured such that wash water is introduced in a tangential direction of an upper inner surface of the

drain pump. This may reduce generation of noise due to movement of the wash water within the drain pump.

[0060] Further, the drain pump may discharge the air, introduced into the drain pump during pumping of the wash water, to the outside without using a separate air discharge pipe or hose. This may minimize the number of pipes to be connected to the drain pump and consequently, reduce the number of places that necessitate leakage management. Furthermore, it may be possible to omit an operation of connecting the separate air discharge pipe or hose to the pump and a tub of the washing machine.

[0061] Although a few embodiments have been shown and described, it would be appreciated by those skilled in the art that changes may be made in these embodiments without departing from the principles and spirit of the invention, the scope of which is defined in the claims and their equivalents.

Claims

1. A washing machine comprising:

- a body (10);
- a tub (11) placed in the body (10), in which wash water is stored;
- a first drain pipe (50) connected to the tub (11) to allow the wash water to be discharged from the tub;
- a second drain pipe (60) to guide the wash water discharged from the tub (11) to the outside of the body (10);
- a pump case (101) having a wash water inlet port (130) connected to the first drain pipe (50) and a wash water outlet port (140) connected to the second drain pipe (60);
- a wash water inlet chamber (110) defined in the pump case (101), into which the wash water is introduced through the wash water inlet port (130);
- a drain pump chamber (120) defined in the pump case (101), in which an impeller (121) is placed to discharge the wash water through the wash water discharge port (140);
- a partition (170) arranged between the wash water inlet chamber (110) and the drain pump chamber (120);
- a wash water suction port (150) formed at the partition (170) to allow the wash water of the wash water inlet chamber to be introduced into the drain pump chamber by suction force of the impeller, the wash water suction port (150) protruding into the wash water inlet chamber (110); and
- an air discharge path (160) formed at the partition (170) to allow the air of the wash water inlet chamber (110) to be introduced into the drain

- pump chamber (120) and subsequently,
be discharged through the wash water outlet
port (140), the air discharge path (160) being
located around the wash water suction port
(150). 5
2. The washing machine according to claim 1, wherein
the air discharge path (160) has an exit communi-
cating with the drain pump chamber (120), the exit
being located at a radial outward position of the im-
peller (121). 10
3. The washing machine according to claim 1, wherein
a cross sectional area of the air discharge path (160)
is smaller than a cross sectional area of the wash
water suction port (150). 15
4. The washing machine according to claim 1, wherein
an upper inner wall surface of the wash water inlet
port (130) is connected to an upper inner wall surface
of the wash water inlet chamber (110) in a tangential
direction. 20
5. The washing machine according to claim 1, wherein
the wash water outlet port (140) is located close to
the air discharge path (160), to prevent the air intro-
duced into the drain pump chamber (120) from stay-
ing in the drain pump chamber. 25
6. A washing machine comprising: 30
- a body (10);
a tub (11) placed in the body, in which wash
water is stored;
a first drain pipe (50) connected to the tub (11) 35
to allow the wash water to be discharged from
the tub;
a second drain pipe (60) to guide the wash water
discharged from the tub (11) to the outside of
the body (10); 40
a pump case (101) in which a wash water inlet
chamber (110) and a drain pump chamber (120)
are defined;
a wash water suction port (150) arranged be-
tween the wash water inlet chamber (110) and 45
the drain pump chamber (120);
a wash water outlet port (140) formed at the
pump case (101) to connect the drain pump
chamber (120) and the second drain pipe (60)
to each other; and 50
a wash water inlet port (130) formed at the pump
case (101) to connect the first drain pipe (50)
and the wash water inlet chamber (110) to each
other, the center of the wash water inlet port be-
ing located higher than the center of the pump
case. 55
7. The washing machine according to claim 6, wherein
- an upper inner wall surface of the wash water inlet
port (130) is connected to an upper inner wall surface
of the wash water inlet chamber (110) in a tangential
direction.
8. The washing machine according to claim 6, further
comprising:
- a partition (170) arranged between the wash wa-
ter inlet chamber (110) and the drain pump
chamber (120).

FIG. 1

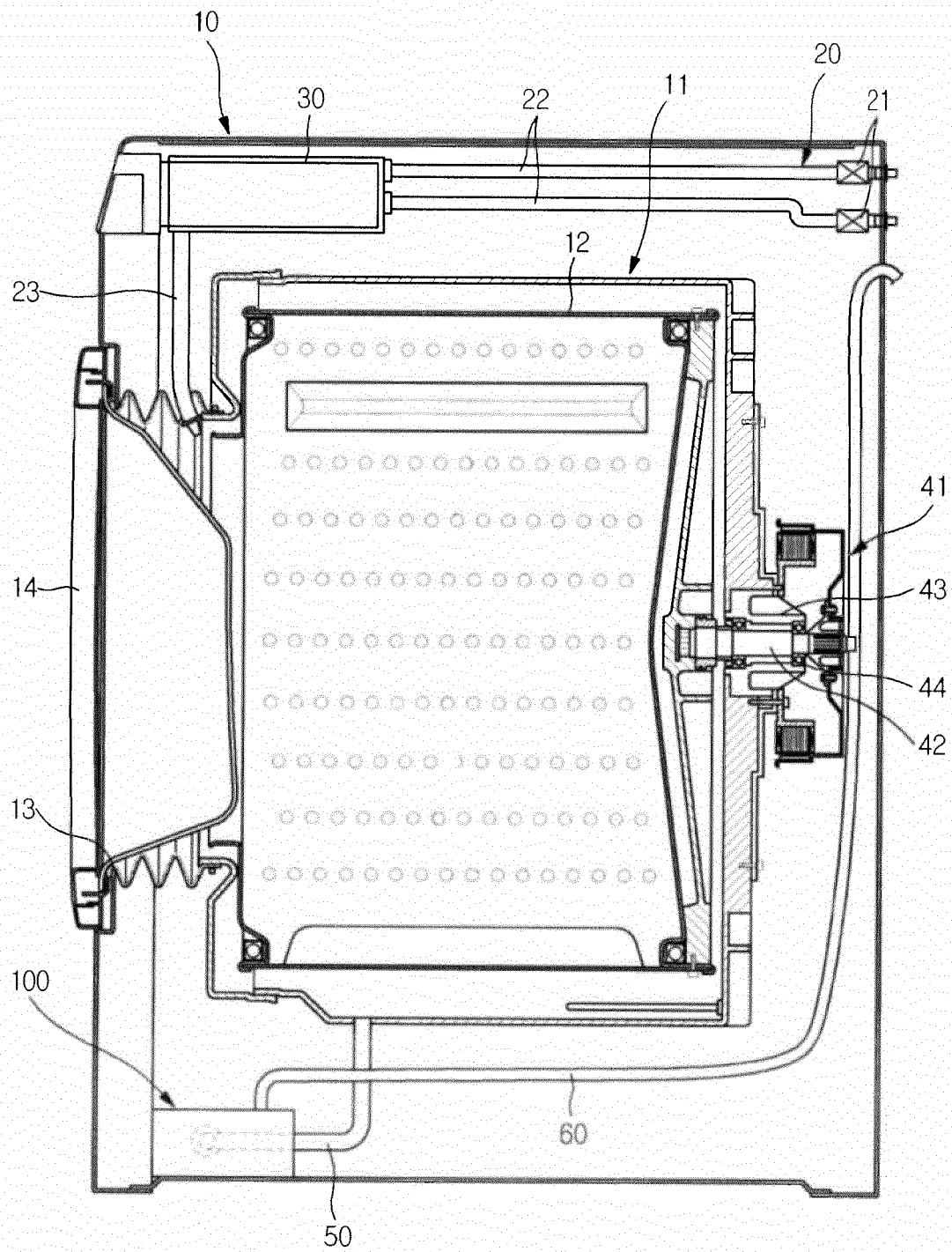


FIG. 2

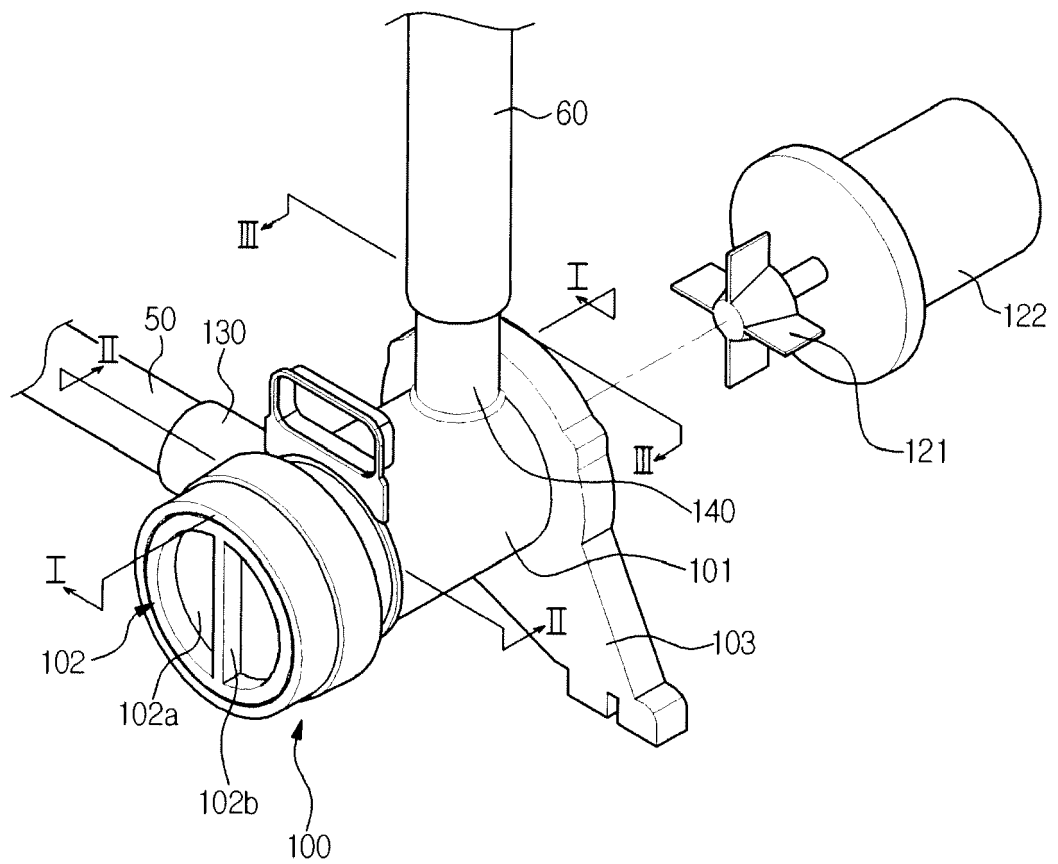


FIG. 3

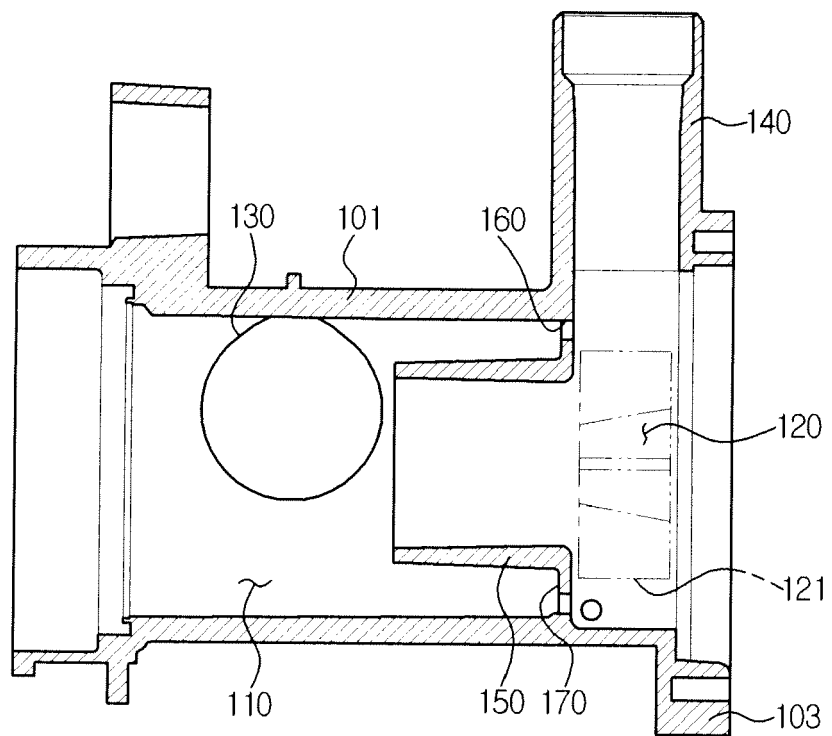


FIG. 4

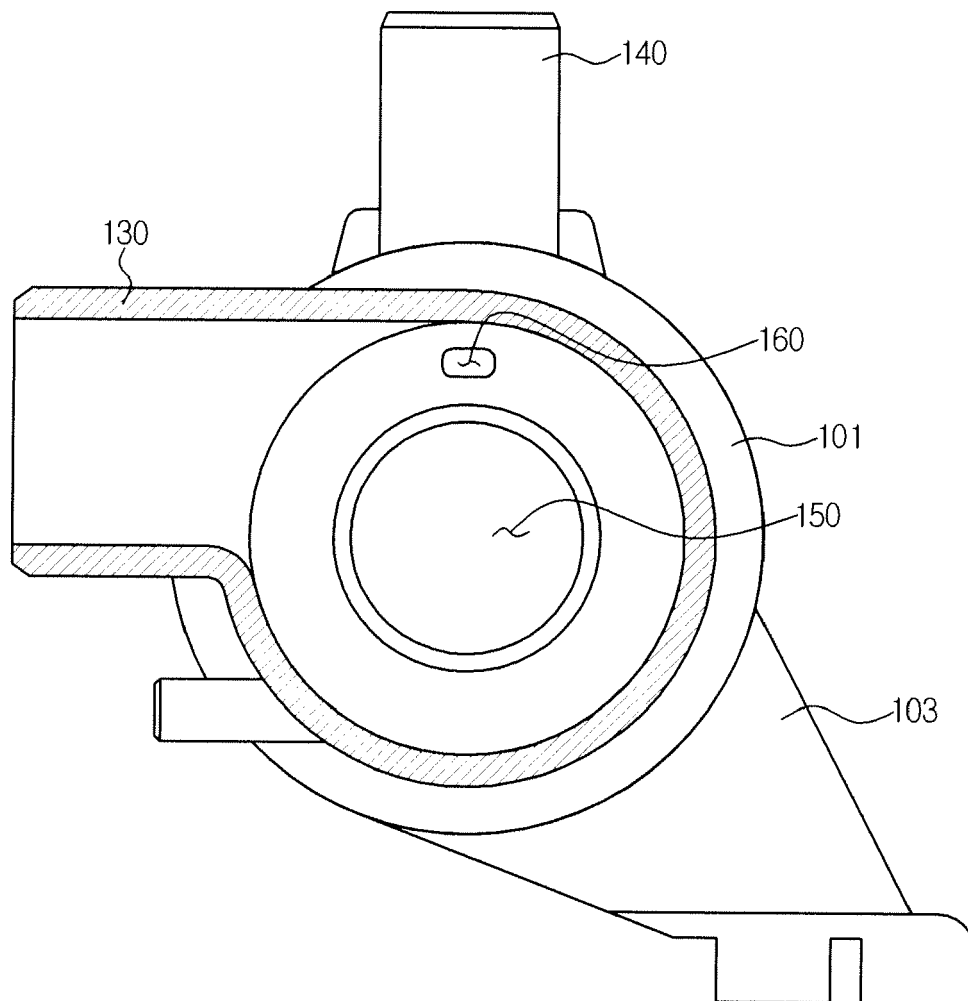


FIG. 5

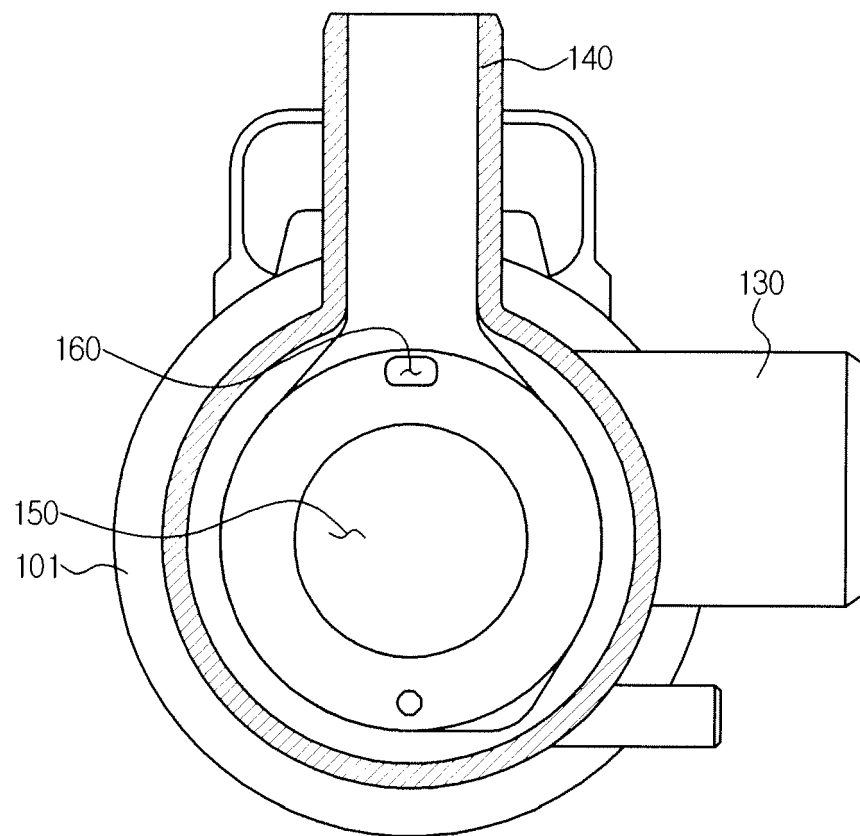
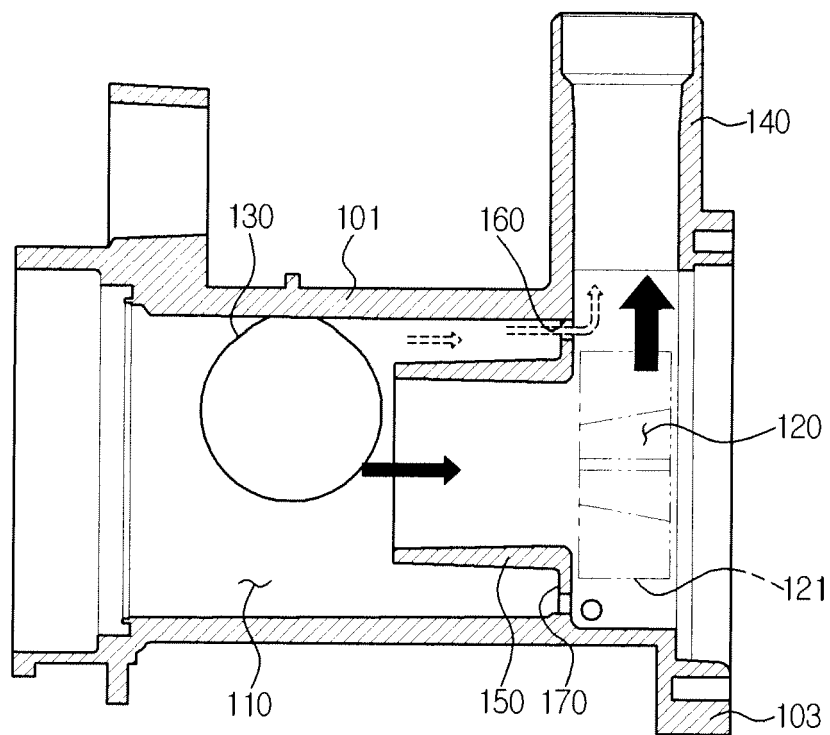


FIG. 6





EUROPEAN SEARCH REPORT

Application Number
EP 13 18 8968

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 3 314 255 A (NEUMANN GERHARD W ET AL) 18 April 1967 (1967-04-18) * the whole document *	6-8	INV. D06F39/08
A	DE 94 06 463 U1 (BOSCH SIEMENS HAUSGERAETE [DE]) 16 June 1994 (1994-06-16) * the whole document *	6-8	
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