(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 2 985 383 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
17.02.2016 Bulletin 2016/07

(51) Int Cl.:
D06F 39/08 *(2006.01)* ***D06F 37/26*** *(2006.01)*

(21) Application number: **15185732.3**

(22) Date of filing: **28.04.2011**

(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

(30) Priority: **28.04.2010 KR 20100039674**

(62) Document number(s) of the earlier application(s) in accordance with Art. 76 EPC:
11163984.5 / 2 383 382

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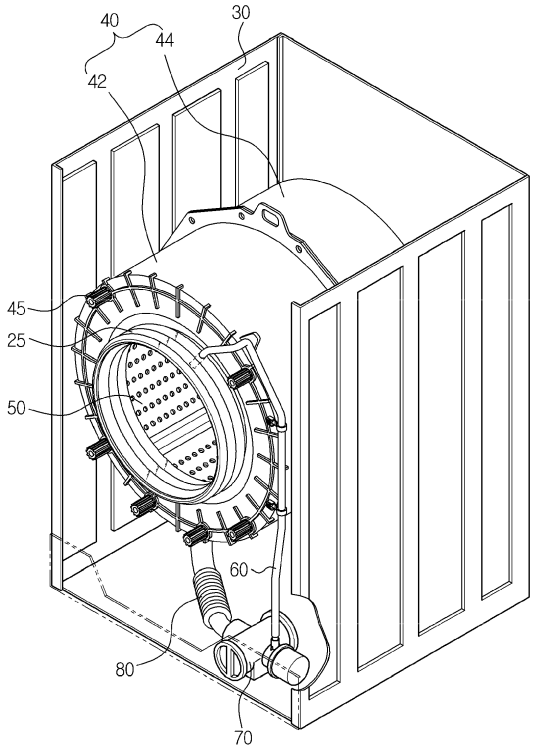
Remarks:
This application was filed on 17-09-2015 as a divisional application to the application mentioned under INID code 62.

(54) HOLDER AND WASHING MACHINE HAVING THE SAME

(57) A washing machine having a holder, which is configured to fix a hose in a simplified manner, thus achieving enhanced assembly efficiency and productivity. The washing machine includes a cabinet defining an outer appearance of the washing machine, a tub placed in the cabinet, a circulation pump placed beneath the tub, a circulation hose connected to the circulation pump and serving to supply wash water pumped by the circulation pump into the tub, and a holder provided at a position of the tub to fix the circulation hose. The holder includes at least one fixing protrusion protruding from a front surface of the tub.

FIG. 3



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Description

BACKGROUND

1. Field

[0001] Embodiments relate to a holder to fix a variety of hoses used in a washing machine and a washing machine having the same.

2. Description of the Related Art

[0002] A washing machine is designed to wash clothes using electric power. The washing machine generally includes a cabinet defining an outer appearance of the washing machine, a tub placed in the cabinet to store wash water therein, a drum rotatably placed in the tub, and a motor to rotate the drum.

[0003] If the drum is rotated by the motor after laundry and detergent-dissolved water are introduced into the drum, washing of dirty laundry is performed via friction between the laundry and the detergent-dissolved water and drum.

[0004] Hoses to discharge or circulate wash water or air are used in the washing machine. These hoses are bundled and fixed to the cabinet by use of, e.g., a hose fixing device provided at the cabinet.

SUMMARY

[0005] Therefore, it is one aspect to provide a washing machine having a hose fixing structure to prevent collision noise caused when a hose collides with other interior components of the washing machine due to rotational vibration of a drum.

[0006] It is another aspect to provide a washing machine having a hose fixing structure to stably fix a hose.

[0007] It is a further aspect to provide a washing machine to enhance assembly efficiency and productivity owing to a structure for simplified hose fixing.

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

[0009] According to the present application, a washing machine is proposed with the features of claim 1.

[0010] Advantageous embodiments are disclosed by the sub-claims.

[0011] The holder may further include a guide rib protruding from the front surface of the tub around the fixing protrusion.

[0012] The holder may further include a hook coupled with the at least one fixing protrusion.

[0013] The hook may include a coupling plate seated inside the guide rib, and a coupling loop extending from one end of the coupling plate to surround an outer peripheral surface of the circulation hose.

[0014] The coupling plate may include a coupling boss protruding from a front surface thereof, and a coupling hole may penetrate the center of the coupling boss such that the at least one coupling protrusion is inserted into the coupling hole.

[0015] A pressure member to press the circulation hose may be coupled to the front surface of the tub.

[0016] The pressure member may include an accommodation portion to receive the coupling loop and a part of the circulation hose therein.

[0017] The accommodation portion may include a pressure plane to press the circulation hose toward the front surface or lateral surface of the tub.

[0018] The holder may further include a fixing plate coupled with the at least one fixing protrusion, and the fixing plate may include a first close-contact portion surrounding an outer peripheral surface of the circulation hose to allow the circulation hose to come into close contact with the front surface of the tub, and a second close-contact portion bent from either end of the first close-contact portion to come into close contact at a surface thereof with the front surface of the tub. The fixing protrusion may include an expanded anti-separation portion provided at a distal end thereof and configured to be tapered away from the front surface of the tub.

[0019] The second close-contact portion may be provided with a fastening hole for fastening with the at least one fixing protrusion.

[0020] The tub may include a seating recess to allow the circulation hose to be seated in the front surface of the tub.

[0021] The tub may include at least one protruding rib provided at a lateral surface thereof, and the at least one protruding rib includes a supporting plane to support the circulation hose.

[0022] In accordance with another aspect, a washing machine includes a cabinet, a tub placed in the cabinet, a circulation pump placed beneath the tub, and a circulation hose connected to the circulation pump and serving to supply wash water, pumped by the circulation pump, into the tub, wherein the tub includes a seating recess to allow the hose to be seated in a front surface of the tub, and a pressure member to press the hose seated in the seating recess is coupled to the front surface of the tub.

[0023] The pressure member may be a weight-balance.

[0024] The pressure member may include an accommodation portion to receive a part of the hose therein.

[0025] The accommodation portion may include a pressure plane to press the hose to allow the hose to come into close contact with the seating recess.

[0026] In accordance with another aspect, a washing machine includes a cabinet defining an outer appearance of the washing machine, a tub placed in the cabinet, a circulation pump placed beneath the tub, a connection hose connected to the circulation pump and serving to supply wash water, pumped by the circulation pump, into the tub, a circulation hose having one end connected to the connection hose and serving to provide the wash

water moving in the connection hose with air, and a holder provided at a position of the tub to fix the circulation hose, wherein the holder includes: at least one fixing protrusion protruding from a front surface of the tub; a guide rib protruding from the front surface of the tub around the fixing protrusion; and a hook coupled with the at least one fixing protrusion.

[0027] In accordance with a further aspect, a holder provided at a tub to fix a hose used in a drum washing machine, includes at least one fixing protrusion protruding from a front surface of the tub, a guide rib protruding from the front surface of the tub around the fixing protrusion, and a hook coupled with the at least one fixing protrusion.

[0028] The hook may include a coupling plate seated inside the guide rib, and a coupling loop extending from one end of the coupling plate to surround an outer peripheral surface of the circulation hose.

[0029] The coupling plate may include a coupling boss protruding from a front surface thereof, and a coupling hole may penetrate the center of the coupling boss such that the at least one coupling protrusion is inserted into the coupling hole.

BRIEF DESCRIPTION OF THE DRAWINGS

[0030] These and/or other aspects of the invention will become apparent and more readily appreciated from the following description of the embodiments, taken in conjunction with the accompanying drawings of which:

FIG. 1 is a perspective view illustrating an outer appearance of a drum washing machine using a holder according to an exemplary embodiment;

FIG. 2 is a perspective view illustrating the interior of the drum washing machine illustrated in FIG. 1 in the case where air moves in a circulation hose;

FIG. 3 is a perspective view illustrating the interior of the drum washing machine illustrated in FIG. 1 in the case where wash water moves in the circulation hose;

FIG. 4 is an enlarged perspective view of the portion 'A' of FIG. 2;

FIG. 5 is a perspective view illustrating a coupling relation between the circulation hose of FIG. 4 and a holder according to one embodiment;

FIG. 6 is a perspective view illustrating a coupling relation between the circulation hose and a holder according to another embodiment;

FIG. 7 is a perspective view illustrating a coupling relation between the circulation hose and a holder according to another embodiment;

FIG. 8 is a perspective view illustrating a coupling relation between the circulation hose and a holder according to a further embodiment;

FIG. 9 is a perspective view illustrating the interior of the drum washing machine, in a state in which a pressure member is coupled to a tub to which the holder has been mounted;

FIG. 10 is a sectional view taken along the line I-I of FIG. 9 in the case where the holder of FIG. 5 is used;

FIG. 11 is a sectional view taken along the line I-I of FIG. 9 in the case where a pressure member is used instead of a fixing plate of the holder; and

FIG. 12 is an enlarged perspective view of the portion 'B' of FIG. 2.

DETAILED DESCRIPTION

[0031] Reference will now be made in detail to the embodiments, examples of which are illustrated in the accompanying drawings, wherein like reference numerals refer to like elements throughout.

[0032] FIG. 1 is a perspective view illustrating an outer appearance of a drum washing machine using a holder according to an exemplary embodiment, FIG. 2 is a perspective view illustrating the interior of the drum washing machine illustrated in FIG. 1 in the case where air moves in a circulation hose, and FIG. 3 is a perspective view illustrating the interior of the drum washing machine illustrated in FIG. 1 in the case where wash water moves in the circulation hose.

[0033] As illustrated in FIGS. 1 to 3, the drum washing machine 10 includes a cabinet 30 defining an outer appearance of the washing machine 10, a tub 40 placed in the cabinet 30, a drum 50 rotatably placed in the tub 40, and a motor (not shown) to drive the drum 50.

[0034] The cabinet 30 has an opening (not shown) perforated in a front surface thereof such that laundry is put into the drum 50 through the opening. A door 20 is coupled to the front surface of the cabinet 30 to open or close the opening (not shown).

[0035] The tub 40 has a plurality of fastening bosses 45 protruding from a front surface thereof. These fastening bosses 45 are used for fastening with a pressure member (500 or 600, see FIGS. 9 to 11).

[0036] A circulation pump 70 is arranged beneath the tub 40.

[0037] The circulation pump 70 serves to pump wash water directed from a water supply hose 80 connected to the tub 40, to return the wash water into the tub 40 through a connection hose 90 (see FIG. 2) or through a circulation hose 60 (see FIG. 3).

[0038] The circulation hose 60 illustrated in FIG. 2 serves to provide the wash water to be returned into the tub 40 through the connection hose 90 with air. One end

of the circulation hose 60 is connected to a connection pipe 75 and the other end of the circulation hose 60 is connected to the tub 40.

[0039] Air present in the tub 40 moves to a lower end of the tub 40 through the circulation hose 60 to thereby be introduced into the connection pipe 75. Then, the air introduced into the connection pipe 75 is mixed with the wash water moving in the connection hose 90, thereby being introduced into the tub 40.

[0040] As the mixture of wash water and air is introduced into the tub 40, bubbles are generated within the drum 50, enhancing the washing ability of the drum washing machine 1.

[0041] The circulation hose 60 illustrated in FIG. 3 is directly connected to the pump 70 and serves to supply wash water into the tub 40.

[0042] Once wash water is introduced into the pump 70 through the water supply hose 80 connected to the tub 40, the wash water is again injected into the tub 40 through the circulation hose 60 via pumping of the pump 70. Although FIG. 3 illustrates a diaphragm 25 as having an injection hole by way of example, the injection hole may be formed in the tub 40.

[0043] The above described circulation of wash water may allow detergent to be uniformly distributed in the wash water, thus enhancing the washing ability of the drum washing machine 1 and reducing the amount of wash water used during washing.

[0044] The above described circulation hose 60 is fixed to a position of the tub 40 by use of a holder 100, 200, 300 or 400, so as to be kept stationary without movement during rotation of the drum 50.

[0045] In addition, the above described circulation hose 60 is made of synthetic rubber, polyurethane, etc., and thus, may be deformed to have various shapes.

[0046] Accordingly, even if the circulation hose 60 is bent by a predetermined curvature in the course of being fixed to a position of the tub 40 by use of the holder 100, 200, 300 or 400, or being directly connected to the tub 40 or the circulation pump 70, it may be possible to prevent permanent folding or breakage of the circulation hose 60. Furthermore, even if the circulation hose 60 is pressed by the pressure member 500 or 600, the circulation hose 60 may have substantially no change in cross sectional shape thereof, thus having no effect on movement of air or wash water passing therethrough.

[0047] Hereinafter, the holder 100, 200, 300 or 400 and the pressure member 500 or 600 according to the embodiments of the present invention will be described in detail.

[0048] Although FIGS. 2 and 3 illustrate different arrangements of the circulation hose 60 for convenience in description of functions of the circulation hose 60, note that the holder 100, 200, 300 or 400 and the pressure member 500 or 600 applied to the circulation hose 60 of FIG. 2 is equally applicable even to the circulation hose 60 of FIG. 3.

[0049] FIG. 4 is an enlarged perspective view of the portion 'A' of FIG. 2, and FIG. 5 is a perspective view illustrating a coupling relation between the circulation hose of FIG. 4 and a holder according to one embodiment.

[0050] Referring to FIGS. 4 and 5 illustrating the firstly described embodiment with respect to the holder, the holder 100 includes at least one fixing protrusion 110, a guide rib 120 and a hook 180.

[0051] The fixing protrusion 110 has an approximately annular rod shape, and is configured to protrude from the front surface of the tub 40 by a predetermined length.

[0052] The guide rib 120 has an approximately U-shaped form to surround the fixing protrusion 110 and is configured to protrude from the front surface of the tub 40 by a predetermined length.

[0053] The guide rib 120 serves to prevent the hook 180 from pivoting about the fixing protrusion 110.

[0054] Although the fixing protrusion 110 and the guide rib 120 may be integrally formed with the tub 40 during injection molding of the tub 40, these components may be separately prefabricated and be mounted to the tub 40.

[0055] The hook 180 is coupled to the fixing protrusion 110 and includes a coupling plate 130 and a coupling loop 140.

[0056] The coupling plate 130 has a smaller width than an inner width of the guide rib 120 so as to be seated inside the guide rib 120.

[0057] A coupling boss 150 protrudes from one surface of the coupling plate 130, and a coupling hole 160 penetrates the center of the coupling boss 150.

[0058] The coupling hole 160 perforated in the coupling boss 150 is provided for insertion of the fixing protrusion 110.

[0059] The other surface of the coupling plate 130 at an opposite side of the coupling boss 150 functions to come into contact with the front surface of the tub 40.

[0060] The coupling loop 140 extends from one end of the coupling plate 130 and has an annular shape to surround an outer peripheral surface of the circulation hose 60.

[0061] The annular coupling loop 140 may be partially opened such that the circulation hose 60 is pushed into the coupling loop 140 so as to be fitted to an inner peripheral surface of the coupling loop 140.

[0062] As will be clearly understood, if the circulation hose 60 does not have the above described annular shape, the shape of the coupling loop 140 may be changed to correspond to a shape of the circulation hose 60, to allow the circulation hose 60 to be fitted to the inner peripheral surface of the coupling loop 140.

[0063] FIG. 6 is a perspective view illustrating a coupling relation between the circulation hose and a holder according to another embodiment.

[0064] Referring to FIG. 6 illustrating the secondly described embodiment with respect to the holder, the holder 200 includes a plurality of fixing protrusions 210.

[0065] The plurality of fixing protrusions 210 protrudes

from the front surface of the tub 40 by a predetermined length, and is curved by a predetermined curvature such that distal ends 220 of the fixing protrusions 210 face each other.

[0066] The plurality of fixing protrusions 210 is arranged with a predetermined gap therebetween such that the circulation hose 60 is seated between the plurality of fixing protrusions 210. The gap between the fixing protrusions 210 may be approximately similar to a diameter of the circulation hose 60.

[0067] Since the plurality of fixing protrusions 210 is curved to face each other, the gap between the fixing protrusions 210 is reduced at the distal ends 220 of the fixing protrusions 210.

[0068] If the circulation hose 60 is pushed into the gap, the distal ends 220 of the plurality of fixing protrusions 210 are moved away from each other by a constant distance.

[0069] Then, once the circulation hose 60 is brought into contact with the front surface of the tub 40 and is seated between the plurality of fixing protrusions 210, the distal ends 220 of the fixing protrusions 210 are returned to keep the original gap, thereby preventing separation of the seated circulation hose 60.

[0070] The plurality of fixing protrusions 210 may be made of, e.g., plastics to realize elastic deformation and constant restoration thereof.

[0071] Although the plurality of fixing protrusions 210 may be integrally formed with the tub 40 during injection molding of the tub 40, the fixing protrusions 210 may be separately prefabricated and be mounted to the tub 40.

[0072] FIG. 7 is a perspective view illustrating a coupling relation between the circulation hose and a holder according to another embodiment, and FIG. 8 is a perspective view illustrating a coupling relation between the circulation hose and a holder according to a further embodiment.

[0073] Referring to FIG. 7 illustrating the thirdly described embodiment with respect to the holder, the holder 300 includes at least one fixing protrusion 310, a seating recess 320 in which the circulation hose 60 is seated, and a fixing plate 380.

[0074] The fixing protrusion 310 has an approximately annular rod shape and protrudes from the front surface of the tub 40 by a predetermined distance.

[0075] The fixing protrusion 310 is formed at a distal end thereof with an expanded anti-separation portion 315, to prevent the fixing plate 380 from being separated from the fixing protrusion 310. The expanded anti-separation portion 315 is tapered away from the front surface of the tub 40 to assure easy coupling between the fixing plate 380 and the fixing protrusion 310.

[0076] The seating recess 320 is indented in the front surface of the tub 40 such that the circulation hose 60 is seated on the tub 40.

[0077] The seating recess 320 may be configured to surround a predetermined area of the outer peripheral surface of the circulation hose 60. If the circulation hose 60 does not have a circular shape, the seating recess 320 may have a shape corresponding to the shape of the circulation hose 60.

[0078] The fixing plate 380 includes a first close-contact portion 340, a second close-contact portion 350 and a fastening hole 360.

[0079] The first close-contact portion 340 has a size similar to the diameter of the circulation hose 60 and is curved to surround the predetermined area of the outer peripheral surface of the circulation hose 60. The second close-contact portion 350 extends from either end of the first close-contact portion 340 to have a predetermined angle with respect to the first close-contact portion 340. The fastening hole 360 is perforated in the second close-contact portion 350 and is used for fastening with the fixing protrusion 310.

[0080] In a state in which the fixing plate 380 is coupled to the tub 40, one surface of the second close-contact portion 350 may come into close contact with the front surface of the tub 40.

[0081] The fastening hole 360 perforated in the second close-contact portion 350 has a diameter similar to a diameter of the fixing protrusion 310, such that the fixing protrusion 310 is fastened through the fastening hole 360.

[0082] If the fixing plate 380 is coupled to the tub 40 by fastening the fixing protrusion 310 through the fastening hole 360 in a state in which the circulation hose 60 is seated in the seating recess 320, an inner surface of the first close-contact portion 340 of the fixing plate 380 acts to push the circulation hose 60 toward the tub 40, allowing the circulation hose 60 to come into close contact with the seating recess 320 indented in the tub 40. In this way, fixing of the circulation hose 60 is accomplished.

[0083] Referring to FIG. 8 illustrating the fourthly described embodiment with respect to the holder, the holder 400 includes at least one fixing protrusion 410 and a fixing plate 480.

[0084] As compared to the holder 300 of the thirdly described embodiment, the holder 400 does not adopt the seating recess 320 of the holder 300, and fixes the circulation hose 60 to the front surface of the tub 40 by use of only the fixing plate 480.

[0085] The shapes and operations of the fixing protrusion 410 and the fixing plate 480 are substantially identical to those of the fixing protrusion 310 and the fixing plate 380 of the thirdly described embodiment, and thus, description thereof will be omitted herein.

[0086] FIG. 9 is a perspective view illustrating the interior of the drum washing machine, in a state in which the pressure member is coupled to the tub to which the holder has been mounted, and FIG. 10 is a sectional view taken along the line I-I of FIG. 9 in the case where the holder of the firstly described embodiment is used.

[0087] As illustrated in FIGS. 9 and 10, the pressure member 500 may be coupled to the front surface of the tub 40.

[0088] The pressure member 500 is fastened with the fastening bosses 45 protruding from the front surface of the tub 40, thereby being fixed to the tub 40.

[0089] The pressure member 500 includes an accommodation portion 510 and a pressure plane 520 provided at the accommodation portion 510.

[0090] The accommodation portion 510 takes the form of a recess having an open side such that the coupling loop 140 of the hook 180 and a part of or the entire circulation hose 60 fitted to the inner peripheral surface of the coupling loop 140 may be received in the accommodation portion 510.

[0091] The pressure plane 520 comes into contact with a part of the coupling loop 140 and acts to press the hook 180 and the circulation hose 60 toward the front surface or lateral surface of the tub 40.

[0092] In a state in which the holder 100 of the firstly described embodiment is mounted to the tub 40, the pressure member 500 is coupled to the tub 40 to cover the holder 100 and serves to prevent the hook 180 and the circulation hose 60 coupled to the hook 180 from moving forward or rearward due to rotational vibration of the drum 50.

[0093] The pressure member 500 coupled to the tub 40 may also serve as a weight-balance.

[0094] When the drum 50 is rotated upon receiving drive force from the motor (not shown), laundry received in the drum 50 may be concentrated on one side of the drum 50, thus causing eccentric rotation of the drum 50 because the drum 50 is made of a thin metal panel and has a light weight.

[0095] To prevent the eccentric rotation of the drum 50, the weight-balance is coupled to the tub 40 connected with the drum 50, to increase the weight of the drum 50.

[0096] The pressure member 500 according to the embodiment contains a material (e.g., cement) having an appropriate weight and thus, may serve as a weight-balance to be coupled to the tub 40.

[0097] FIG. 11 is a sectional view taken along the line I-I of FIG. 9 in the case where the pressure member is used instead of the fixing plate.

[0098] As described above, the holder 300 of the thirdly described embodiment includes the at least one fixing protrusion 310, the seating recess 320 in which the circulation hose 60 is seated, and the fixing plate 380.

[0099] As illustrated in FIG. 11, when using the pressure member 600, it may be possible to omit the fixing plate 380 and the fixing protrusion 310.

[0100] More specifically, in a state in which the circulation hose 60 is seated in the seating recess 320 indented in the front surface of the tub 40, the pressure member 600 is coupled to the tub 40 to fix the circulation hose 60.

[0101] Once the pressure member 600 is coupled to the tub 40, a pressure plane 620 of the pressure member 600 presses the circulation hose 60, causing the circulation hose 60 to come into close contact with the tub 40 and consequently, preventing movement of the circulation hose 60.

[0102] Similarly, the pressure member 600 contains a material (e.g., cement) having an appropriate weight and thus, may serve as a weight-balance to be coupled to the tub 40.

[0103] FIG. 12 is an enlarged perspective view of the portion 'B' of FIG. 2.

[0104] As illustrated in FIG. 12, the tub 40 is provided at a lateral surface thereof with a protruding rib 700.

[0105] The protruding rib 700 protrudes from the lateral surface of the tub 40 by a predetermined length, and includes a supporting plane 710.

[0106] The supporting plane 710 is provided at a surface of the protruding rib 700, and in particular, serves to support a specific region of the circulation hose 60 that is bent rapidly in the course of being connected to the tub 40, thereby allowing the circulation hose 60 to be naturally connected to the tub 40.

[0107] When the circulation hose 60 is naturally connected to the tub 40 owing to the supporting plane 710, this may also assure efficient circulation of air within the circulation hose 60.

[0108] Although the protruding rib 700 may be integrally formed with the tub 40 during injection molding of the tub 40, the protruding rib 700 may be separately prefabricated and be mounted to the tub 40.

[0109] Hereinafter, one of manufacturing processes of the drum washing machine 10, i.e. a process of assembling the tub 40 will be described.

[0110] The tub 40 consists of a front tub 42 and a rear tub 44 (see FIG. 2 or 3). The front tub 42 and the rear tub 44 are individually formed by injection molding.

[0111] After the circulation hose 60 is coupled to the front tub 42 via the diaphragm 25, a hose-drawer (not shown) and the holder 100, 200, 300 or 400 according to the embodiments of the present invention, the front tub 42 is assembled with the rear tub 44 via screws, to complete the tub 40.

[0112] Alternatively, the circulation hose 60 may be coupled to the front tub 42 via the holder 100, 200, 300 or 400 after the front tub 42 and the rear tub 44 are assembled with each other.

[0113] As described above, when using the holder 100, 200, 300 or 400 according to the embodiments of the present invention, the circulation hose 60 may be directly fixed to the tub 40. Accordingly, a process of coupling the circulation hose 60 to the tub 40 may be included in the process of assembling the tub 40.

[0114] In this way, a separate process of coupling the circulation hose 60 may be unnecessary, resulting in enhanced productivity.

[0115] As is apparent from the above description, according to the embodiments, simplified fixing of a hose may be possible.

[0116] As a result of stably fixing a hose, it may be possible to prevent the hose from colliding with other interior components of a washing machine due to rotational vibration of a drum. This may prevent abrasion of the hose and also, generation of collision noise.

[0117] With provision of a structure for simplified hose fixing, enhanced assembly efficiency and productivity may be accomplished.

[0118] 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 of the invention, the scope of which is defined in the claims.

Claims

1. A washing machine (10) comprising:

a cabinet (30) having a front opening through which laundry can be loaded;
a tub (40) disposed in the cabinet (30);
a drum (50) rotatably disposed in the tub (40);
a circulation pump (70);
a circulation hose (60) connected to the circulation pump (70) and configured to supply wash water pumped by the circulation pump to an inside of the drum (50); and
a holder (100, 200, 300, 400) provided at a position of the tub (40) to fix the circulation hose (90),
characterized by
a plurality of fastening bosses (45) protruding from a front surface of the tub (40) and integrally formed with the tub and, a weight-balance (500, 600) coupled to the front surface of the tub by said fastening bosses to prevent eccentric rotation of the drum and thereby to reduce the vibration of the circulation hose caused by the eccentric rotation of the drum.

2. The washing machine of claim 1, wherein the holder is at least comprising a seating recess (320) in the front surface of the tub (40), such that the circulation hose (60) is fixed by coupling the weight-balance to the front surface of the tub with a circulation hose between the weight-balance and the seating recess.

3. The washing machine of claim 1 or 2, wherein the washing machine (10) further comprises a diaphragm (25) connecting the front opening and the tub (40), the circulation hose (60) has a first end connected to the circulation pump and a second end connected to the diaphragm (25).

4. The washing machine according to claim 3, wherein in the diaphragm (25) includes an injection hole to which the second end of the circulation hose is coupled.

5. The washing machine according to claim 1, wherein the holder (200, 300, 400) includes a pair of fixing protrusions (210, 310, 410) protruding from a front surface of the tub (40) and a part of the circulation hose (60) is disclosed between the fixing protrusions.

6. The washing machine of claim 5, wherein each of the pair of fixing protrusions (210) is curved by a predetermined curvature, such that the distal ends (220) of the fixing protrusions face each other.

FIG. 1

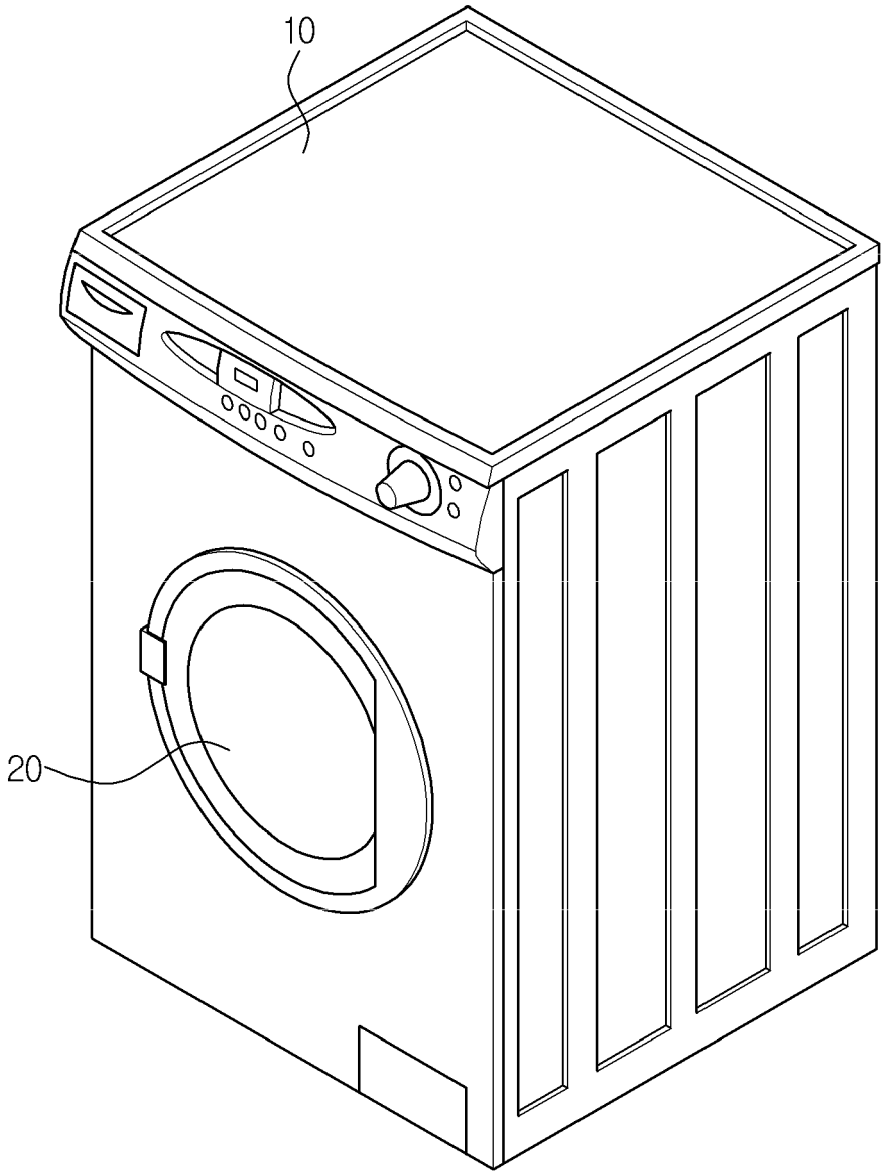


FIG. 2

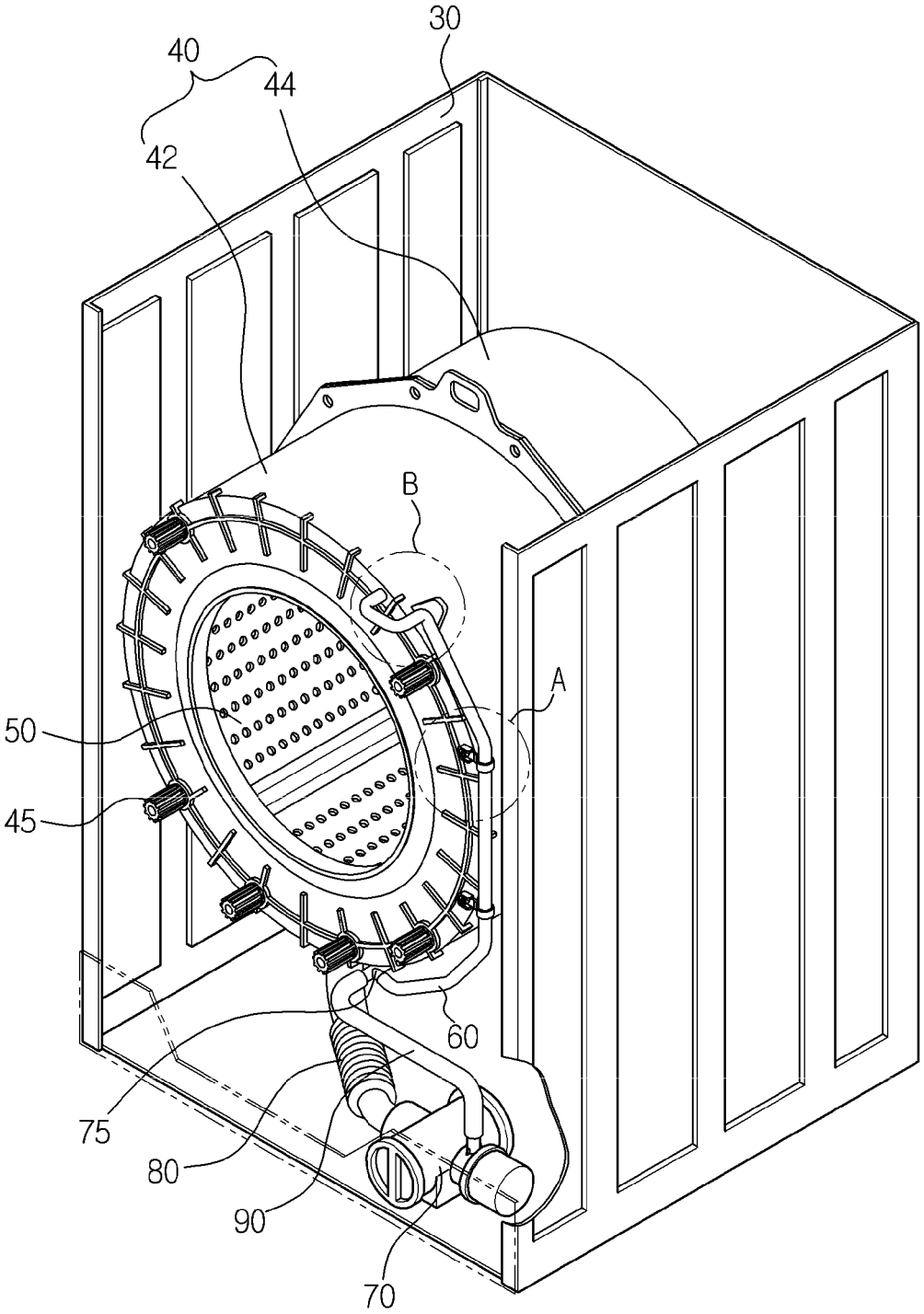


FIG. 3

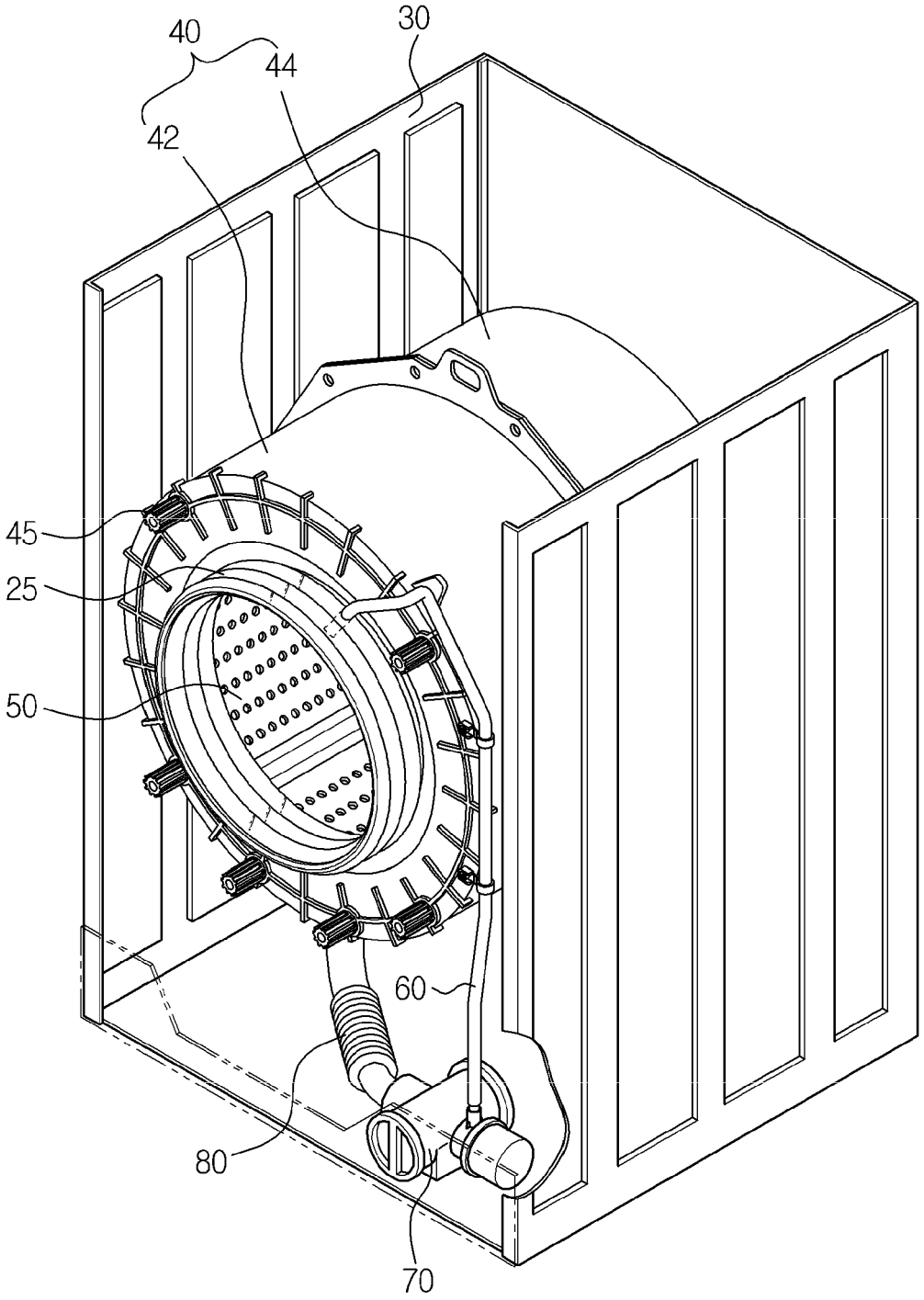


FIG. 4

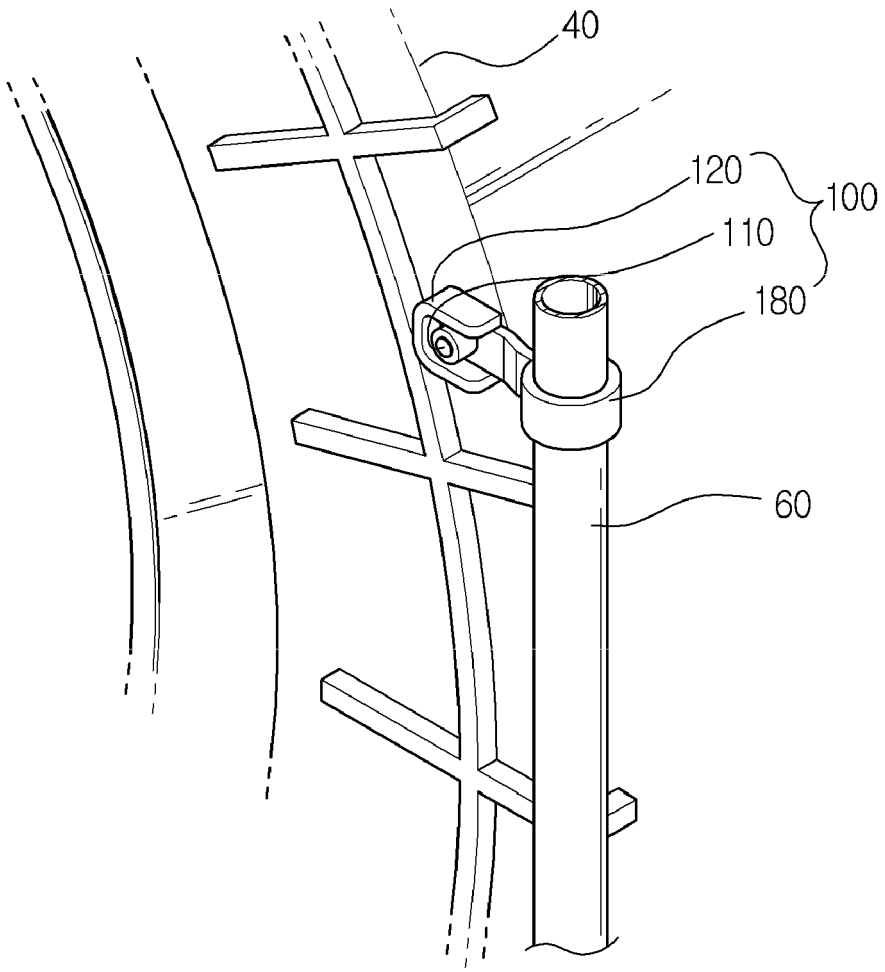


FIG. 5

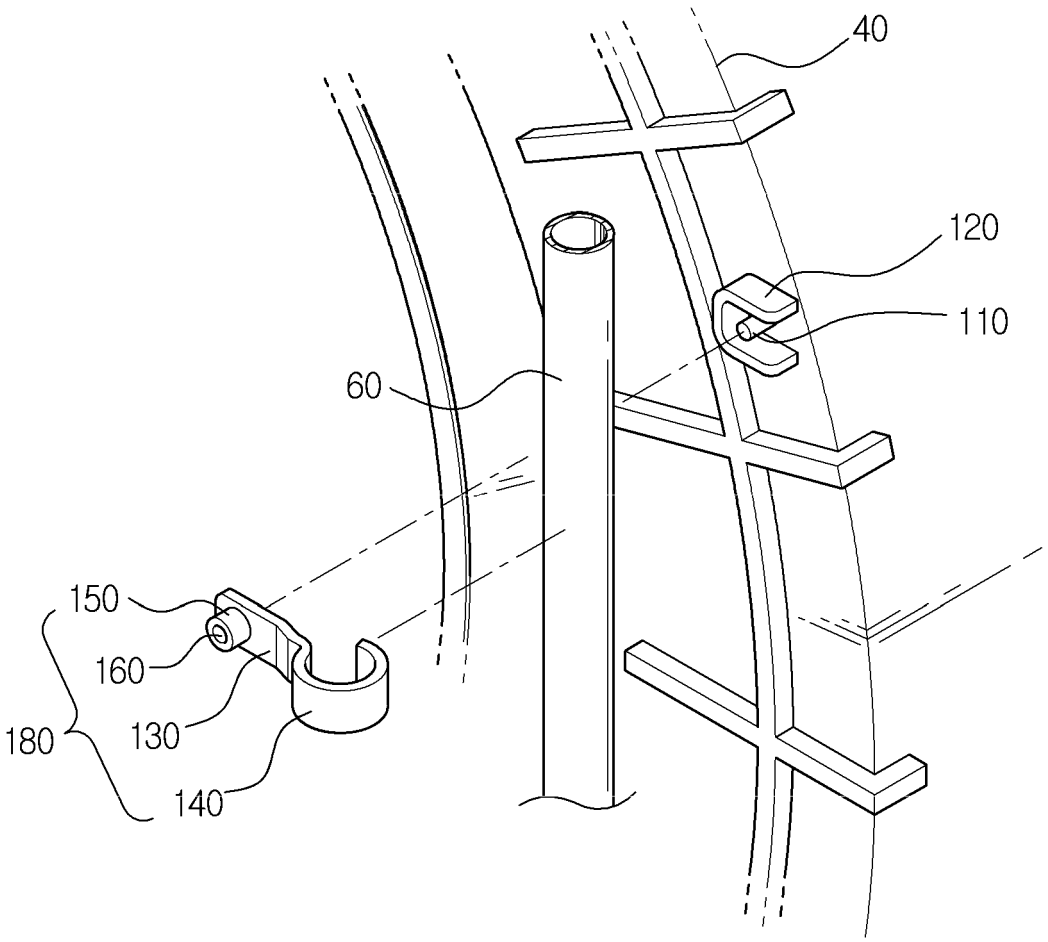


FIG. 6

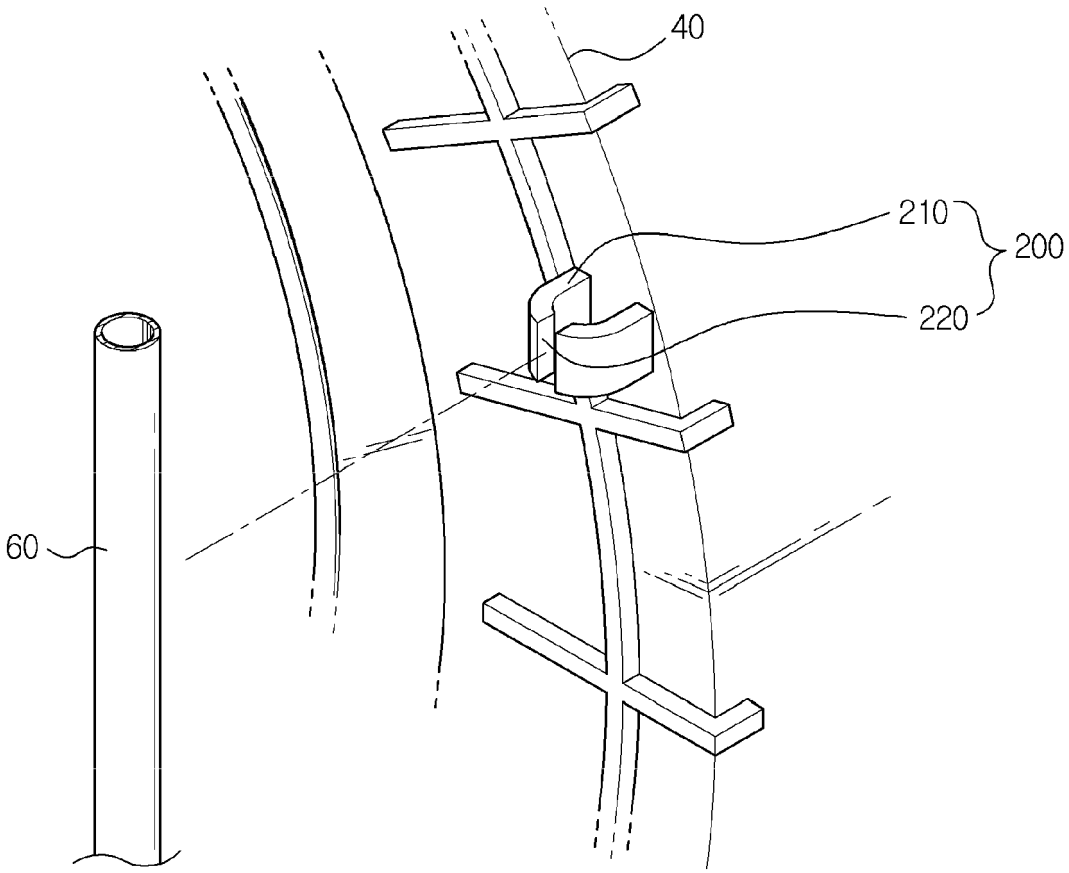


FIG. 7

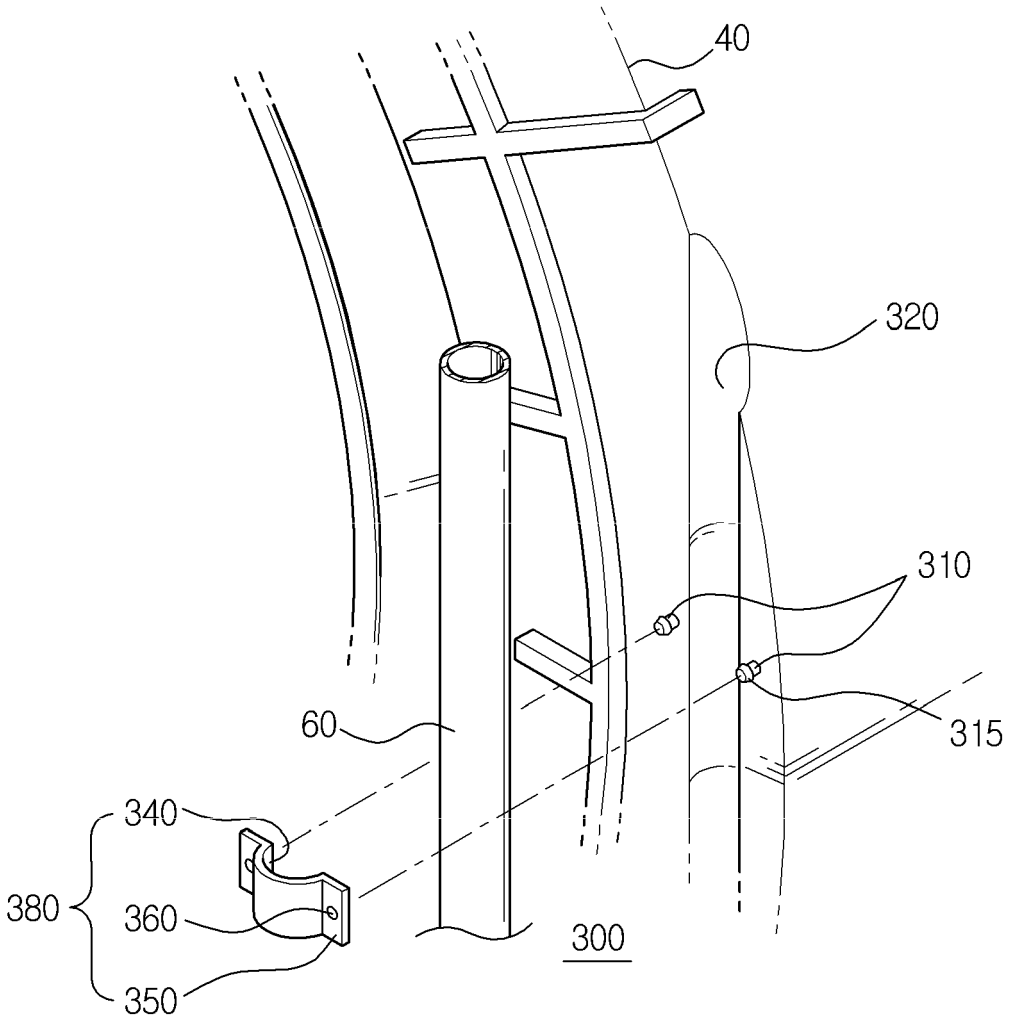


FIG. 8

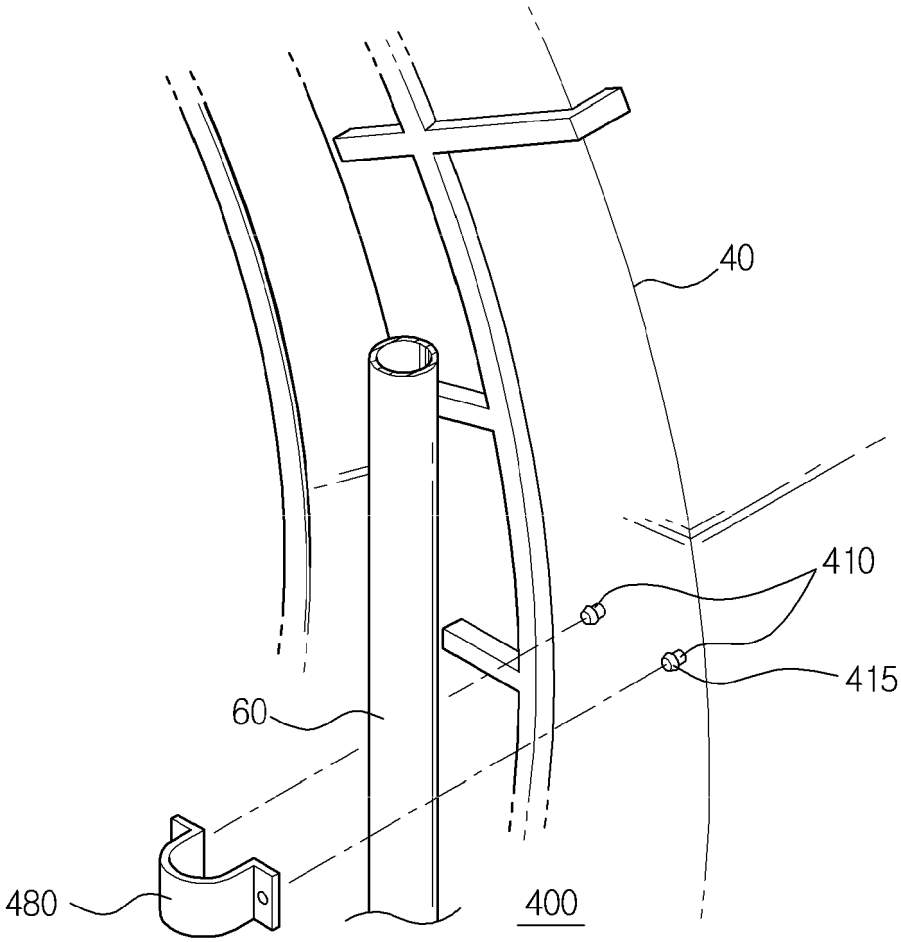


FIG. 9

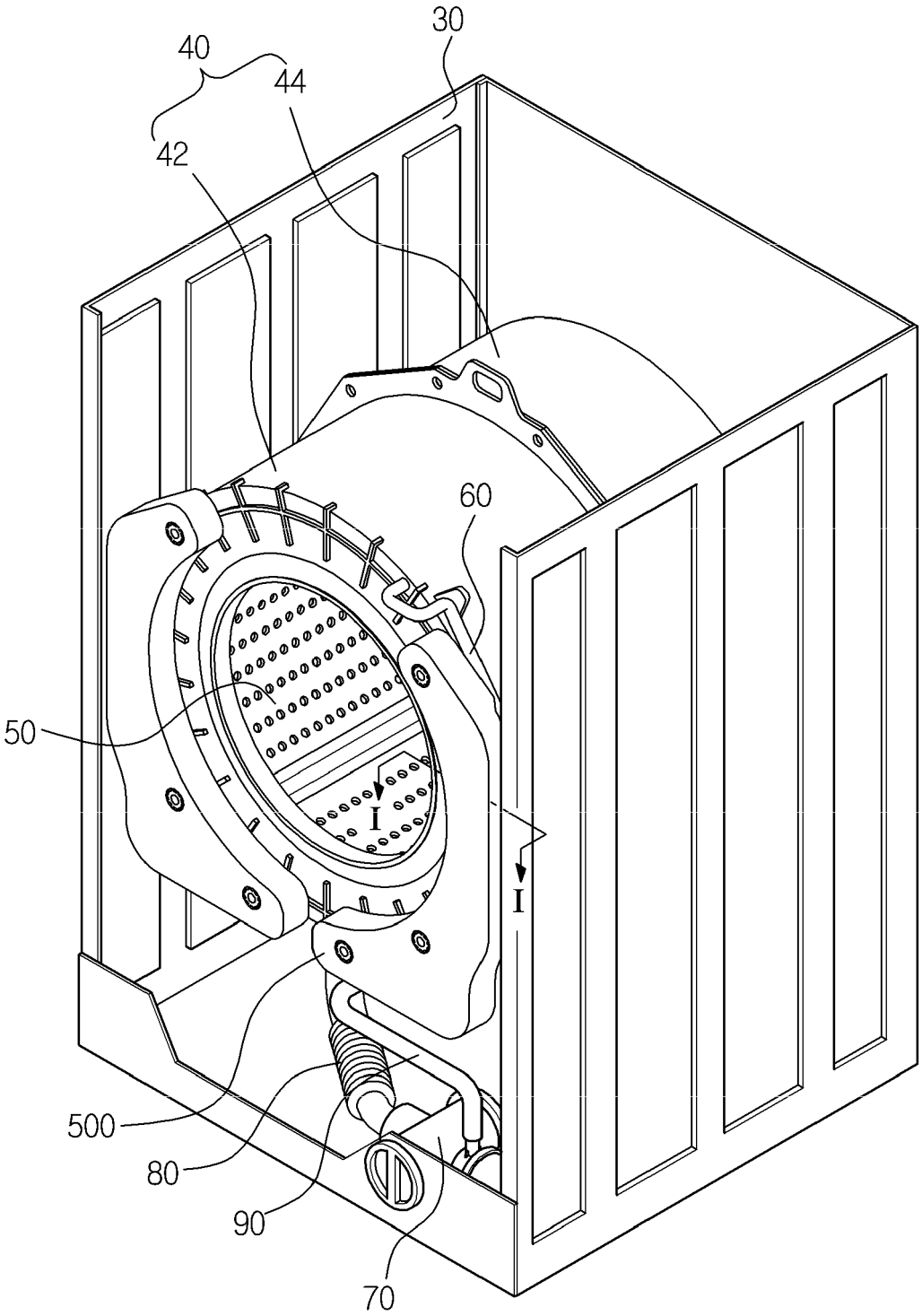


FIG. 10

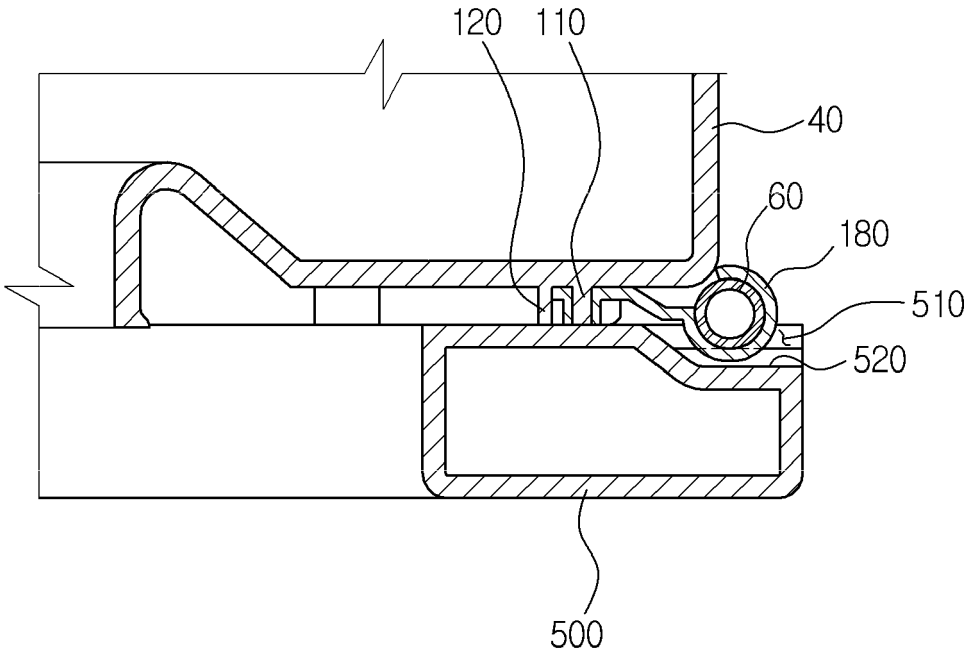


FIG. 11

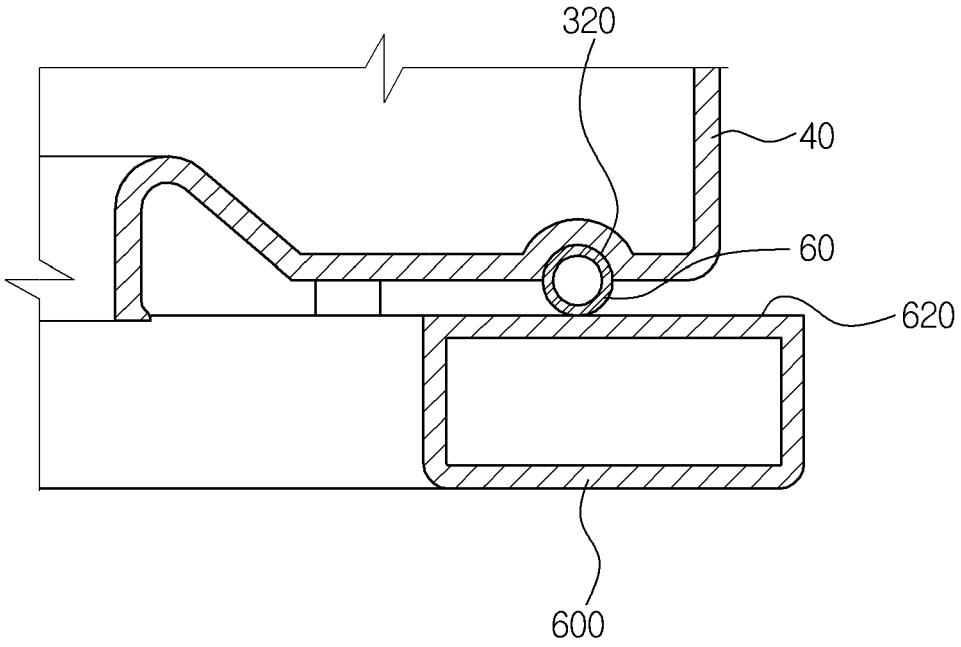
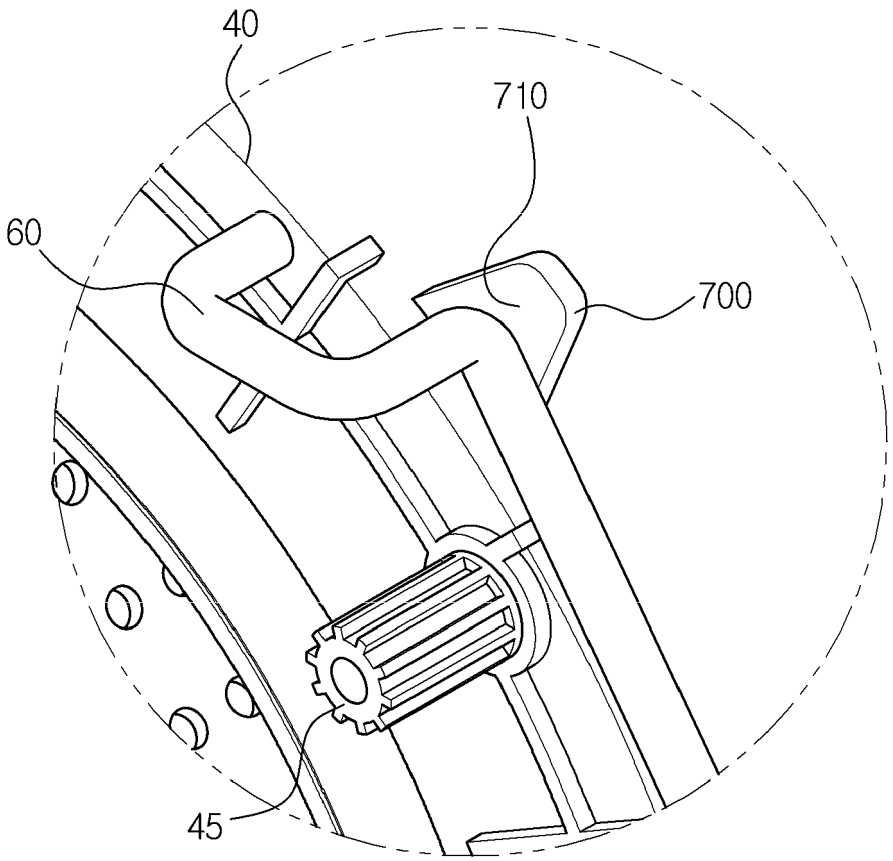


FIG. 12



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