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(54) **SENSOR FIXING MEMBER AND DISHWASHER COMPRISING SENSOR FIXING MEMBER**

(57) There is disclosed a sensor fixing member and a dishwasher including the sensor fixing member. A dishwasher may include a case defining an exterior and having an open front; a door sealing the open front of the case and comprising a door panel and a door cover covering the door panel; a nozzle spraying washing water into the case; a nozzle restriction detecting sensor provided inside the door and disposed at a height equal to the height of the nozzle from a bottom surface; and a sensor fixing member having one side coupled to the nozzle restriction detecting sensor and the other side coupled to the door.

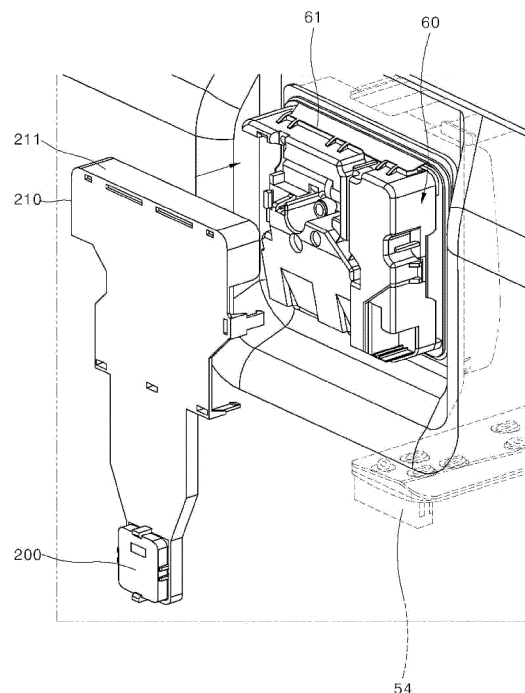


FIG. 7

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Description

[Technical Field]

[0001] The present disclosure relates a sensor fixing member and a dishwasher including the same.

[Background Art]

[0002] A dishwasher is a home appliance configured to wash off contaminants such as food scraps or waste on dishes by automatically spraying washing water. In detail, a nozzle disposed inside the dishwasher sprays washing water while rotating, and the sprayed washing water directly collides with dishes to wash dishes by friction. Hereinafter, the internal structure of a dishwasher and detailed operation method of the dishwasher will be described.

[0003] FIG. 1 is a perspective view of a dishwasher in a state where a door of the dishwasher is open. Referring to FIG. 1, the exterior of the dishwasher is composed of a case 10 with an open front and a door 20 for sealing and opening the open front of the case. When the door 20 is open, an angle between the door 20 and the case 10 may form a right angle of 90 degrees. The door 20 may include a door panel 22 provided therein and a door cover 24 for covering the door panel. The interior of the dishwasher is composed of a tub 30 for holding washing water, a sump 40 provided below the tub 30 and spraying the washing water after collecting the washing water and filtering foreign substances, a lower nozzle 50 and a lower nozzle 52 spraying the washing water into the tub while rotating with being connected with the sump, a rack 70 on which dishes are stored, and a detergent dispenser 60 attached to an upper end of the door panel 22 and guiding an introduced detergent into the tub.

[0004] The detergent dispenser 60 may introduce a detergent while the door 20 is open. When the door 20 is closed, the detergent introduced as a detergent introduction opening cover is open based on processes of the dishwasher is guided below the tub mounted inside the dishwasher. The guided detergent is mixed with the washing water collected in the sump 40 and the washing water mixed with the detergent is sprayed through the nozzles to wash the dishes stored in the rack 70 provided in the tub.

[0005] Meanwhile, since the nozzles spray washing water while rotating, there is a problem in that the rotation of the nozzles is restricted for various reasons. For example, when foreign substances are caught in the nozzles or the dishes stored on the rack 70 collide with the nozzles after protruding downward from the rack, the rotation of the nozzles could be restricted.

[0006] A nozzle restriction detecting sensor may be used to detect the rotation restriction of the nozzles. However, when the nozzle restriction detecting sensor is disposed inside the tub, there is a possibility that the nozzle restriction detecting sensor might be damaged by foreign

substances and washing water.

[0007] In addition, to dispose the nozzle restriction detecting sensor in the door in order to prevent damage to the nozzle restriction detecting sensor, an additional process of molding the conventional door panel should be preceded. For example, there are works such as drilling new holes in the door panel, using molds or welding new structures.

[0008] Such a method cannot use the conventional door panel as it is, and it requires a separate installation cost for a sensor fixing member configured to detect nozzle restriction. In addition, there is a problem in that the conventional door panel has to be damaged during the process of installing the sensor.

[Description of Disclosure]

[Technical Problems]

[0009] An objective of the present disclosure is to provide a fixing member of a nozzle restriction detecting sensor that may improve washing efficiency by immediate action after detecting whether a nozzle operates normally, and a dishwasher including the sensor fixing member.

[0010] An objective of the present disclosure is to provide a sensor fixing member that may prevent physical collision between foreign substances or washing water and a nozzle restriction detecting sensor and damage to the nozzle restriction detecting sensor, and a dishwasher including the sensor fixing member.

[0011] An objective of the present disclosure is to provide a sensor fixing member that may reduce installation and manufacturing costs by using a conventional door panel without damage to the door, and a dishwasher including the sensor fixing member.

[0012] Aspects according to the present disclosure are not limited to the above ones, and other aspects and advantages that are not mentioned above can be clearly understood from the following description and can be more clearly understood from the embodiments set forth herein. Additionally, the aspects and advantages in the present disclosure can be realized via means and combinations thereof that are described in the appended claims.

[Technical Solutions]

[0013] A dishwasher according to an embodiment of the present disclosure may include a case defining an exterior and having an open front; a door sealing the open front of the case and comprising a door panel and a door cover covering the door panel; a nozzle spraying washing water into the case; a nozzle restriction detecting sensor provided inside the door and disposed at a height equal to the height of the nozzle from a bottom surface; and a sensor fixing member having one side coupled to the nozzle restriction detecting sensor and the other side coupled to the door.

[0014] The door panel may include a first surface directed to the door cover; and a second surface directed to an inside of the tub.

[0015] The sensor fixing member may include a member fixing portion fixing the sensor fixing member to the first surface of the door panel; a sensor coupling portion to which the nozzle restriction detecting sensor is coupled; and an extending portion disposed between the member fixing portion and the sensor coupling portion.

[0016] The dishwasher according to an embodiment of the present disclosure may further include a detergent dispenser configured to guide a detergent introduced therein to the inside of the tub. The member fixing portion may include at least one of an anti-falling support and a hook. The detergent dispenser may include at least one of a support hanger and a hook hanger. The anti-falling support may be detachably coupled to the support hanger and the hook is detachably coupled to the hook hanger.

[0017] The member fixing portion may include a first through hole and a second through hole. A first screw hole for connecting the door panel and the door cover with each other may be formed in one side of the door. A second screw hole may be formed in the other side of the door at a height corresponding to the first screw hole from a bottom surface. The sensor fixing member may be fixed to a first surface of the door panel by a first fixing member penetrating the first screw hole and the first through hole and a second fixing member penetrating the second screw hole and the second through hole.

[0018] The dishwasher according to an embodiment of the present disclosure may further include an air discharge device disposed inside the door. The member fixing portion may be coupled to a protruding member formed on a lateral surface of the air discharge device.

[0019] The sensor coupling portion may include a sensor fixing member, and the nozzle restriction detecting sensor may be detachably coupled by the sensor fixing member.

[0020] The nozzle may include a sensing target device, and the nozzle restriction detecting sensor may detect restriction of the nozzle by using the sensing target device.

[0021] The nozzle restriction detecting sensor may be a hall sensor or a coil sensor.

[0022] A sensor fixing member according to an embodiment of the present disclosure may include a member fixing portion fixing the sensor fixing member to a first surface of a door panel, which is directed to a door cover of the door; a sensor coupling portion to which the nozzle restriction detecting sensor is coupled; and an extending portion extending the member fixing portion and the sensor coupling portion.

[0023] The dishwasher further comprises a nozzle spraying washing water into the case, and the nozzle restriction detecting sensor may be disposed at a height corresponding to the height of the nozzle from a bottom surface.

[0024] The dishwasher may further include a detergent

dispenser configured to guide a detergent introduced therein to an inside of a tub. The member fixing portion may include at least one of an anti-falling support and a hook. The detergent dispenser may include at least one of a support hanger and a hook hanger, and the anti-falling support may be detachably coupled to the support hanger and the hook is detachably coupled to the hook hanger.

[0025] The member fixing portion may include a first through hole and a second through hole. A first screw hole for connecting the door panel and the door cover with each other may be formed in one side of the door. A second screw hole may be formed in the other side of the door at a height corresponding to the first screw hole from a bottom surface. The sensor fixing member may be fixed to a first surface of the door panel by a first fixing member penetrating the first screw hole and the first through hole and a second fixing member penetrating the second screw hole and the second through hole.

[0026] The sensor fixing member may further include an air discharge device disposed inside the door. The member fixing portion may be coupled to a protruding member formed on a lateral surface of the air discharge device.

[0027] The sensor coupling portion comprises a sensor fixing member, and the nozzle restriction detecting sensor may be detachably coupled by the sensor fixing member.

[0028] The nozzle may include a sensing target device, and the nozzle restriction detecting sensor may detect restriction of the nozzle by using the sensing target device.

[0029] The nozzle restriction detecting sensor may be a hall sensor or a coil sensor.

[Advantageous Effect]

[0030] The sensor fixing member and the dishwasher according to an embodiment of the present disclosure may improve washing efficiency by immediate action after detecting whether the nozzle operates normally.

[0031] In addition, the sensor fixing member and the dishwasher according to an embodiment of the present disclosure may dispose the nozzle restriction detecting sensor inside the door, thereby preventing physical collision between foreign substances or washing water and a nozzle restriction detecting sensor and damage to the nozzle restriction detecting sensor, and a dishwasher including the sensor fixing member.

[0032] In addition, the sensor fixing member and the dishwasher according to an embodiment of the present disclosure may reduce installation and manufacturing costs by using a conventional door panel without damage to the door.

[Brief Description of Drawings]

[0033]

FIG. 1 is a perspective view of a dishwasher in a state where a door is open;

FIG. 2 is a view showing a door panel and a door cover;

FIG. 3 is a perspective view of a rear surface of a detergent dispenser disposed in a door panel according to an embodiment of the present disclosure, viewed from a top;

FIG. 4 is a perspective view of the rear surface of the detergent dispenser disposed in the door panel according to the embodiment of the present disclosure, viewed from a bottom;

FIG. 5 is a front view of the sensor fixing member according to the embodiment of the present disclosure;

FIG. 6 is a perspective of the sensor fixing member according to the embodiment of the present disclosure;

FIG. 7 is a view showing a method of coupling the sensor fixing member according to the embodiment of the present disclosure to the detergent dispenser;

FIG. 8 is a side view showing a process of coupling the sensor fixing member according to the embodiment of the present disclosure to the detergent dispenser;

FIG. 9 is a view showing a method of coupling a sensor fixing member according to another embodiment of the present disclosure to a screw hole of a door panel;

FIG. 10 is a view showing a dishwasher in which the sensor fixing member according to the embodiment to a screw hole of a door panel;

FIG. 11 is a view showing the sensor fixing member according to the embodiment coupled to an air discharge device; and

FIG. 12 is a view showing a dishwasher in which the sensor fixing member according to the embodiment is coupled to the air discharge device.

[DESCRIPTION OF SPECIFIC EMBODIMENTS]

[0034] The above-described aspects, features and advantages are specifically described hereunder with reference to the accompanying drawings such that one having ordinary skill in the art to which the present disclosure pertains can easily implement the technical spirit of the disclosure. In the *disclosure, detailed descriptions* of known technologies in relation to the disclosure are omitted if they are deemed to *make the gist of the disclosure unnecessarily vague*. Below, preferred embodiments according to the disclosure are specifically described with reference to the accompanying drawings. In the drawings, identical reference numerals can denote identical or similar components.

[0035] FIG. 2 is a view showing a door panel and a door cover.

[0036] Referring to FIGS. 1 and 2, the door 20 may include a door panel 22 and a door cover 24. The door

cover 24 may be coupled to the outside of the door panel 22 to define the exterior of a dishwasher. An empty space may be formed between the door panel 22 and the door cover 24 spaced a preset distance apart from each other.

[0037] The door panel 22 may include a detergent dispenser 60. Specifically, the door panel 22 may include a first surface 22a directed to the door cover and a second surface 22b directed to the inside of the tub. As shown in FIG. 1, as a front surface of the detergent dispenser 60 is inserted to the second surface 22b of the door panel through the door panel 22, a rear surface of the detergent dispenser 60 is visible on the first surface 22a of the door panel.

[0038] FIG. 3 is a perspective view of a rear surface of a detergent dispenser disposed in a door panel according to an embodiment of the present disclosure, viewed from a top. FIG. 4 is a perspective view of the rear surface of the detergent dispenser disposed in the door panel according to the embodiment of the present disclosure, viewed from a bottom.

[0039] The detergent dispenser 60 may include at least one of a support hanger formed long in a shape of a straight line on the rear surface, and a hook hanger protruding so that the hook can be fastened thereto. In other words, the sensor fixing member, which will be described later, may be supported by the support hanger to prevent the sensor fixing member from falling off, thereby being stably secured to the detergent dispenser 60. Accordingly, the sensor fixing member may be secured to the first surface 22a of the door panel.

[0040] A plurality of the hook hanger may be provided and the hook hanger may be disposed on a lateral surface or a lower surface of the detergent dispenser 60. However, the number or positions of the hook hangers may not be limited thereto but may be set or fabricated freely if necessary. Referring to FIG. 3, in an embodiment, the support hanger 61 may be provided in an upper area of a rear surface of the detergent dispenser 60, and a first hook hanger 62 may be provided in a right area of the rear surface of the detergent dispenser 60. Referring to FIG. 4, a second hanger 63, a third hanger and a fourth hanger 65 may be provided in a lower area of the rear surface of the detergent dispenser 60 to hook a plurality of hooks thereto.

[0041] The first to fourth hangers 62 to 65 may be formed in the same shape, and a surface of each hanger, which becomes into contact with the hooks, may be made of a non-slippery material so that the hook fastened to each hanger may be firmly secured.

[0042] The support hanger 61 and the first hanger 62 to the fourth hanger 65 may be formed at even intervals across the top, side and bottom so as to stably fix the sensor fixing member, which will be described later.

[0043] FIG. 5 is a front view of the sensor fixing member according to the embodiment of the present disclosure. FIG. 6 is a perspective of the sensor fixing member according to the embodiment of the present disclosure.

[0044] The sensor fixing member 210 according to this

embodiment of the present disclosure may be detachably coupled to the rear surface of the detergent dispenser 60 provided in the door panel 22. More specifically, the sensor fixing member 210 may include a member fixing portion 210a, an extending portion 210b and a sensor coupling portion 210c.

[0045] The member fixing portion 210 may be coupled to the detergent dispenser 60 to fix the sensor fixing member 210 to the first surface 22a of the door panel. The member fixing portion 210a may include an anti-falling support for preventing the sensor fixing member from falling from the detergent dispenser 60 and a hook formed in a hook shape with one bent side.

[0046] The hook may be provided in plural and formed on a lateral surface or a lower surface of the member fixing portion 210a. However, the number of positions of hooks may not be limited but freely set and manufactured based on the number of arrangement of hook hangers.

[0047] Referring to FIG. 1 in the embodiment of the present disclosure, the member fixing portion 210a may include a anti-falling support 211 provided in an upper area, a first hook 212 provided in a center area of a lateral surface thereof, with a hook shape, and a second hook 213, a third hook 214 and a fourth hook 215 that are provided in a lower end area.

[0048] The anti-falling support 211 and the first to fourth hooks 212 to 215 may have ends that are bent at a steep angle, and they may be disposed in the upper, side and lower areas of the member fixing portion 210a so that they can have a strong coupling force when coupled to the detergent dispenser 60.

[0049] Accordingly, even when at least one of the anti-falling support 211 and the first to fourth hooks 212 to 215 may be coupled to the detergent dispenser 60 and the other ones are not coupled thereto due to damage or the like, the sensor fixing member 210 may be fixedly coupled to the detergent dispenser 60.

[0050] However, the sensor fixing member 210 may be detachable based on a user's manipulation. Specifically, the user may release the coupling by applying a pressure to each end of the anti-falling support 211 and the first to fourth hooks 212 and 215 of the sensor fixing member 210 coupled to the detergent dispenser 60 in an opposite direction to a direction in which the detergent dispenser 60 is disposed.

[0051] The sensor coupling portion 210c may include a sensor fixing member coupled to the nozzle restriction detecting sensor 200 to fix the nozzle restriction detecting sensor 200 to the sensor coupling portion 210c. In an embodiment of the present disclosure, the sensor fixing member may be provided in plural. For example, the sensor coupling portion 210c may include a first sensor fixing member and a second sensor fixing member.

[0052] Referring to FIG. 6, the sensor coupling portion 210c may include a first fixing member 216 and a second sensor fixing member 217. The nozzle restriction detecting sensor 200 may be detachably coupled between the first sensor fixing member 216 and the second sensor

fixing member 217.

[0053] The first sensor fixing member 216 and the second sensor fixing member 217 may have ends that are bent in a direction surrounding the nozzle restriction detecting sensor 200 to prevent separation of the nozzle restriction detecting sensor 200. However, the shapes of the first and second sensor fixing members 216 and 217 are not limited thereto.

[0054] The extending portion 210b may be disposed between the member fixing portion 210a and the sensor coupling portion 210c, and may constitute a part of the sensor fixing member 210. The width of the extending portion 210b may become broader as getting closer to the member fixing portion 210a and narrower as getting closer to the sensor coupling portion 210c. However, the shape of the extending portion 210 may not be limited thereto.

[0055] A distance between the member fixing portion 210a and the coupling portion 210c may be changeable based on the length of the extending portion 210b. Accordingly, the length of the extending portion 210b may be determined in consideration of the distance between the member fixing portion 210a and the sensor coupling portion 210c.

[0056] Meanwhile, the nozzle restriction detecting sensor 200 may be configured to detect the restriction of the nozzle by using a sensing target device provided in the nozzle. Due to this structure, the nozzle restriction detecting sensor 200 has to be provided at a height that is the same as the height from a bottom surface of the sensing target device provided in the nozzle. FIG. 7 is a view showing a method of coupling the sensor fixing member according to the embodiment of the present disclosure to the detergent dispenser. FIG. 8 is a side view showing a process of coupling the sensor fixing member according to the embodiment of the present disclosure to the detergent dispenser. Hereinafter, referring to FIGS. 7 and 8, the process of coupling the sensor fixing member to the detergent dispenser will be described.

[0057] Referring to FIG. 7, the anti-falling support 211 of the sensor fixing member 210 may be coupled to the support hanger 61 of the detergent dispenser 60 first to couple the sensor fixing member to the detergent dispenser 60.

[0058] When the anti-falling support 211 is coupled to an upper area of the detergent dispenser 60, the anti-falling support 211 may support the sensor fixing member 210 to prevent the sensor fixing member 210 from falling off from the detergent dispenser 60 due to the gravity. In addition, the support hanger 61 may prevent the releasing of the coupling between the anti-falling support 211 and the detergent dispenser 60.

[0059] Meanwhile, the nozzle restriction detecting sensor 200 provided in the sensor fixing member 210 may be disposed at the height corresponding to the height of the nozzle from the bottom surface. Specifically, the nozzle may include an upper nozzle 522 or a lower nozzle 50. Hereinafter, the nozzle will be described on the

premise that the upper nozzle 52 is used.

[0060] The upper nozzle 52 may include a sensing target device 54 that is a target to be detected by the nozzle restriction detecting sensor 200. Specifically, the sensing target device 54 may be provided at one end of the upper nozzle 52. In an embodiment of the present disclosure, as shown in FIG. 7, the sensing target device 54 may be disposed on a lower end surface of one side of the upper nozzle 52 to as not to restrict the rotational movement of the upper nozzle 52.

[0061] Here, the sensing target device 54 may be a magnet or a magnetic material. The nozzle restriction detecting device 200 may be a hall sensor or a coil sensor. In other words, the nozzle restriction detecting sensor 200 may be an element of which voltage changes according to the strength of the magnetic field. The sensing target device 54 attached to the upper nozzle 52 around the nozzle restriction detecting sensor 200 may detect the rotation speed of the upper nozzle 52 based on a potential difference generated when the sensing target device 54 moves along the rotation of the upper nozzle 52.

[0062] If the measured rotational speed of the upper nozzle 52 is 0 or lower than a preset normal rotational speed, it may be determined that the upper nozzle 52 is restricted. Accordingly, when it is determined that the upper nozzle 52 is restricted, immediate measures such as removal of foreign substances may be taken, thereby improving cleaning efficiency.

[0063] Next, referring to FIG. 8, the anti-falling support 211 may be first coupled to the support hanger 61 disposed in the upper area of the detergent dispenser 60 and then rotate around the support hanger 61 so that the hooks of the sensor fixing member 210 and the hook hangers of the detergent dispenser 60 may be coupled to each other in turn.

[0064] Specifically, the first hook 212 may be coupled to the first hook hanger 62 and the second hook 213 may be coupled to the second hook hanger 63 in turn. After that, the sensor coupling portion may become in contact with the first surface 22a of the door panel 22 and the sensor fixing member 210 may be fixed to the door panel 22.

[0065] Meanwhile, in an embodiment of the present disclosure, even in a state where the sensor fixing member 210 is coupled to the detergent dispenser 60, the member fixing portion 210c may be spaced apart therefrom without contacting the first surface 22a of the door panel.

[0066] Accordingly, it may be possible to prevent an operation error of the nozzle restriction detecting sensor 200 caused by vibration due to the operation of the dishwasher or a failure due to an impact caused by the nozzle restriction detecting sensor 200 colliding with the door panel 22. FIG. 9 is a view showing a method of coupling a sensor fixing member according to another embodiment of the present disclosure to a screw hole of a door panel. FIG. 10 is a view showing a dishwasher in which

the sensor fixing member according to the embodiment to a screw hole of a door panel. Hereinafter, the embodiment will be described referring to FIGS. 9 and 10.

[0067] The sensor fixing member 310 according to this embodiment of the present disclosure may include a member fixing portion 310a, an extending portion 310b and a sensor coupling portion 310c.

[0068] The member fixing portion 310a may be coupled to a screw hole to fix the sensor fixing member 310 to the first surface 22a of the door panel 22. Specifically, a screw hole for connecting the door panel 22 with the door cover 24 may be formed in an edge area of the door. Here, the screw hole may be singular or plural.

[0069] Referring to FIG. 9, a first screw hole 23a may be formed in one side of the door and a second screw hole 23b may be formed in the other side of the door at a height corresponding to the height from the bottom surface to the first screw hole 23a.

[0070] The member fixing portion 310a may include a through hole in the center. The number of the member fixing portions 310 and the through holes may be determined to be the same as the number of the screw holes. For example, when two screw holes, that is, a first screw hole 23a and a second screw hole 23b, are provided, two through holes including a first through hole 310a and a second through hole 310b may be provided to correspond to the number of the screw holes. In addition, the sensor fixing member 310 may include two member fixing portions 310a including the first through hole 310a and the second through hole 310b, respectively. Meanwhile, the nozzle restriction detecting sensor 200 may detect the restriction of the nozzle by using a sensing target device 54 provided in the nozzle. Accordingly, the nozzle restriction detecting sensor 200 has to be disposed at a height corresponding to the height from the bottom surface of the sensing target device 54 in order to improve detecting sensitivity. Due to this structure, the height of the screw hole and the through hole may be determined to correspond to the height of the nozzle restriction detecting sensor 200 from the bottom surface of the sensing target device of the nozzle, thereby minimizing a distance between the nozzle restriction detecting sensor 200 and the sensing target device 54 and determining presence of nozzle restriction precisely.

[0071] The sensor fixing member 310 may be fixed to the first surface 22a of the door panel by the first fixing member 25a penetrating the first through hole 312a and the first screw hole 23a and the second fixing member 25b penetrating the second through hole 312b and the second screw hole 23b.

[0072] The first fixing member 25a and the second fixing member 25b may members for fixing the sensor fixing member 310 while rotating along a helix or releasing the fixing of the sensor fixing member 310 while rotating in the opposite direction. The first fixing member 25a or the second fixing member 25b may be a screw, for example. Accordingly, the sensor fixing member 310 may be detachably provided on the first surface of the door panel.

[0073] The sensor coupling portion 310c may be coupled to the nozzle restriction detecting sensor 200 and include a sensor fixing member. The sensor fixing member may be provided in plural in an embodiment of the present disclosure. For example, the sensor coupling portion 210c may include a first sensor fixing member and a second sensor fixing member.

[0074] Referring to FIG. 9, the sensor coupling portion 310c may include a first sensor fixing sensor member 316 and a second sensor fixing member 317. The nozzle restriction detecting sensor 200 may be detachably coupled between the first sensor fixing member 316 and the second sensor fixing member 317.

[0075] The extending portion 310b may be disposed between the member fixing portion 310a and the sensor coupling portion 310c, to constitute a part of the sensor fixing member 310. The width of the extending portion 310b may be constant regardless of the position of the member fixing portion 310a, and the lengths of both sides of the extending portion 310b with respect to the member fixing portion 310a may be the same. However, the shape of the extending portion 310b may not be limited thereto.

[0076] Meanwhile, the nozzle restriction detecting sensor 200 may detect the restriction of the nozzle by using the sensor target device 54 provided in the nozzle. Accordingly, the position of the nozzle restriction detecting sensor 200 has to be equal to the position of the sensing target device 54 when the sensing target device 54 is disposed closest to the door panel 22. Due to this structure, the length of the extending portion may be determined in consideration of the position of the sending target device 54 or the nozzle restriction detecting sensor 200.

[0077] As shown in FIG. 10, the sensor fixing member 310 including the member fixing portion 310a, the extending portion 310b and the sensor coupling portion 130c may be disposed between the door panel 22 and the door cover 24, thereby preventing physical collision with foreign substances or washing water and damage to the nozzle restriction detecting sensor.

[0078] In addition, the sensor fixing member 310 may be further provided by using the screw hole of the door panel 22 without damage to the door panel, thereby reduce costs for installation and manufacturing.

[0079] FIG. 11 is a view showing the sensor fixing member according to the embodiment coupled to an air discharge device. FIG. 12 is a view showing a dishwasher in which the sensor fixing member according to the embodiment is coupled to the air discharge device. Hereinafter, referring to FIGS. 11 and 12, the sensor member coupled to an air discharge device will be described.

[0080] Referring to FIG. 11, the dishwasher according to the embodiment may further include an air discharge device 400 provided on a first surface 22a of the door panel. the air discharge device 400 may be configured to discharge dry air generated in a drying course of the dishwasher and disposed on the first surface 22a of the door panel, while being spaced a preset distance apart

from the detergent dispenser 60 to prevent collision. The air discharge device 400 may include a protruding member 402 as shown in FIG. 12.

[0081] The sensor fixing member 410 may include a member fixing portion 410a, an extending portion 410b and a sensor coupling portion 410c.

[0082] The member fixing portion 410a may be coupled to a screw hole to fix the sensor fixing member 410 to the first surface 22a of the door panel. Specifically, a through hole 412 may be provided in the center of the member fixing portion 410a and the sensor fixing member 410 may be coupled to the protruding member 402 of the air discharge device 400 through the through hole 412 of the member fixing portion 410a.

[0083] The member fixing portion 410a and the protruding member 402 may be coupled to each other in various methods. For example, by inserting an uneven portion (not shown) protruding from the protruding member 402 toward the through hole 412 into the through hole 412 of the member fixing portion 410a, the member fixing portion 410a and the protruding member 402 may be coupled. Alternatively, a screw hole (not shown) is formed at a position corresponding to the position of the through hole 412 in the protruding member 402, and the fixing member 410a and the protruding member 402 may be coupled by a fixing member (not shown) penetrating the through hole 412 and the screw hole.

[0084] The sensor coupling portion 410c may be coupled to the nozzle restriction detecting sensor 200 and include a sensor fixing member. In the embodiment of the present disclosure, the sensor fixing member may be provided in plural. For example, the sensor coupling portion 410c may include a first sensor fixing member and a second sensor fixing member.

[0085] Referring to FIG. 12, the sensor coupling portion 410c may include a first sensor fixing member 416 and a second sensor fixing member. The nozzle restriction detecting sensor 200 may be detachably coupled between the first sensor fixing member 416 and the second sensor fixing member 417.

[0086] The extending portion 410b may be disposed between the member fixing portion 410a and the sensor coupling portion 410c to constitute a part of the sensor fixing member 410. Accordingly, a distance between the member fixing portion 410a and the sensor coupling portion 410c may be changeable based on the length of the extending portion 410b. Accordingly, the length of the extending portion 410b may be determined in consideration of the distance between the member fixing portion 410a and the sensor coupling portion 410c.

[0087] Meanwhile, the nozzle restriction sensor 200 may be configured to detect the restriction of the nozzle by using a sensing target device 54 provided in the nozzle disposed inside the tub. As shown in FIG. 9, the position of the nozzle restriction detecting sensor 200 has to be equal to a position of the sensing target device 54 at which the sensing target device 54 is disposed closest to the door panel 22. Accordingly, the length of the ex-

tending portion 410b may be determined in consideration of the position of the sensing target device 43 or the nozzle restriction detecting sensor 200.

[0088] As described above, the sensor fixing member 410 may be coupled by using the existing air discharge device 400 without damage to the door panel, thereby reducing costs for installation and manufacturing.

[0089] The embodiments are described above with reference to a number of illustrative embodiments thereof. However, the present disclosure is not intended to limit the embodiments and drawings set forth herein, and numerous other modifications and embodiments can be devised by one skilled in the art. Further, the effects and predictable effects based on the configurations in the disclosure are to be included within the range of the disclosure though not explicitly described in the description of the embodiments.

Claims

1. A dishwasher comprising:

a case defining an exterior of the dishwasher and having an open front;
 a door sealing the open front of the case and comprising a door panel and a door cover covering the door panel;
 a nozzle spraying washing water into the case;
 a nozzle restriction detecting sensor provided inside the door and disposed at a height equal to the height of the nozzle from a bottom surface; and
 a sensor fixing member having one side coupled to the nozzle restriction detecting sensor and the other side coupled to the door.

2. The dishwasher of claim 1, wherein the door panel comprises,

a first surface directed to the door cover; and
 a second surface directed to an inside of the tub.

3. The dishwasher of claim 2, wherein the sensor fixing member comprises,

a member fixing portion fixing the sensor fixing member to the first surface of the door panel;
 a sensor coupling portion to which the nozzle restriction detecting sensor is coupled; and
 an extending portion disposed between the member fixing portion and the sensor coupling portion.

4. The dishwasher of claim 3, further comprising:

a detergent dispenser configured to guide a detergent introduced therein to the inside of the

tub,

wherein the member fixing portion comprises at least one of an anti-falling support and a hook, the detergent dispenser comprises at least one of a support hanger and a hook hanger, and the anti-falling support is detachably coupled to the support hanger and the hook is detachably coupled to the hook hanger.

5. The dishwasher of claim 3, wherein the member fixing portion comprises a first through hole and a second through hole,

a first screw hole for connecting the door panel and the door cover with each other is formed in one side of the door,
 a second screw hole is formed in the other side of the door at a height corresponding to the first screw hole from a bottom surface, and
 the sensor fixing member is fixed to a first surface of the door panel by a first fixing member penetrating the first screw hole and the first through hole and a second fixing member penetrating the second screw hole and the second through hole.

6. The dishwasher of claim 3, further comprising:

an air discharge device disposed inside the door,
 wherein the member fixing portion is coupled to a protruding member formed on a lateral surface of the air discharge device.

7. The dishwasher of claim 3, wherein the sensor coupling portion comprises a sensor fixing member, and the nozzle restriction detecting sensor is detachably coupled by the sensor fixing member.

8. The dishwasher of claim 1, wherein the nozzle comprises a sensing target device, and the nozzle restriction detecting sensor detects restriction of the nozzle by using the sensing target device.

9. The dishwasher of claim 1, wherein the nozzle restriction detecting sensor is a hall sensor or a coil sensor.

10. A sensor fixing member provided inside a door of a dishwasher, the sensor fixing member comprising:

a member fixing portion fixing the sensor fixing member to a first surface of a door panel, which is directed to a door cover of the door;
 a sensor coupling portion to which the nozzle restriction detecting sensor is coupled; and
 an extending portion extending the member fix-

ing portion and the sensor coupling portion.

device.

11. The sensor fixing member of claim 10, wherein the dishwasher further comprises a nozzle spraying washing water into the case, and
the nozzle restriction detecting sensor is disposed at a height corresponding to the height of the nozzle from a bottom surface. 5
12. The sensor fixing member of claim 10, wherein the dishwasher further comprises a detergent dispenser configured to guide a detergent introduced therein to an inside of a tub, 10

the member fixing portion comprises at least one of an anti-falling support and a hook, 15
the detergent dispenser comprises at least one of a support hanger and a hook hanger, and
the anti-falling support is detachably coupled to the support hanger and the hook is detachably coupled to the hook hanger. 20
13. The sensor fixing member of claim 10, wherein the member fixing portion comprises a first through hole and a second through hole, 25

a first screw hole for connecting the door panel and the door cover with each other is formed in one side of the door,
a second screw hole is formed in the other side of the door at a height corresponding to the first screw hole from a bottom surface, and 30
the sensor fixing member is fixed to a first surface of the door panel by a first fixing member penetrating the first screw hole and the first through hole and a second fixing member penetrating the second screw hole and the second through hole. 35
14. The sensor fixing member of claim 10, further comprising: 40

an air discharge device disposed inside the door,
wherein the member fixing portion is coupled to a protruding member formed on a lateral surface of the air discharge device. 45
15. The sensor fixing member of claim 10, wherein the sensor coupling portion comprises a sensor fixing member, and 50
the nozzle restriction detecting sensor is detachably coupled by the sensor fixing member.
16. The sensor fixing member of claim 11, wherein the nozzle comprises a sensing target device, and 55
the nozzle restriction detecting sensor detects restriction of the nozzle by using the sensing target
17. The dishwasher of claim 10, wherein the nozzle restriction detecting sensor is a hall sensor or a coil sensor.

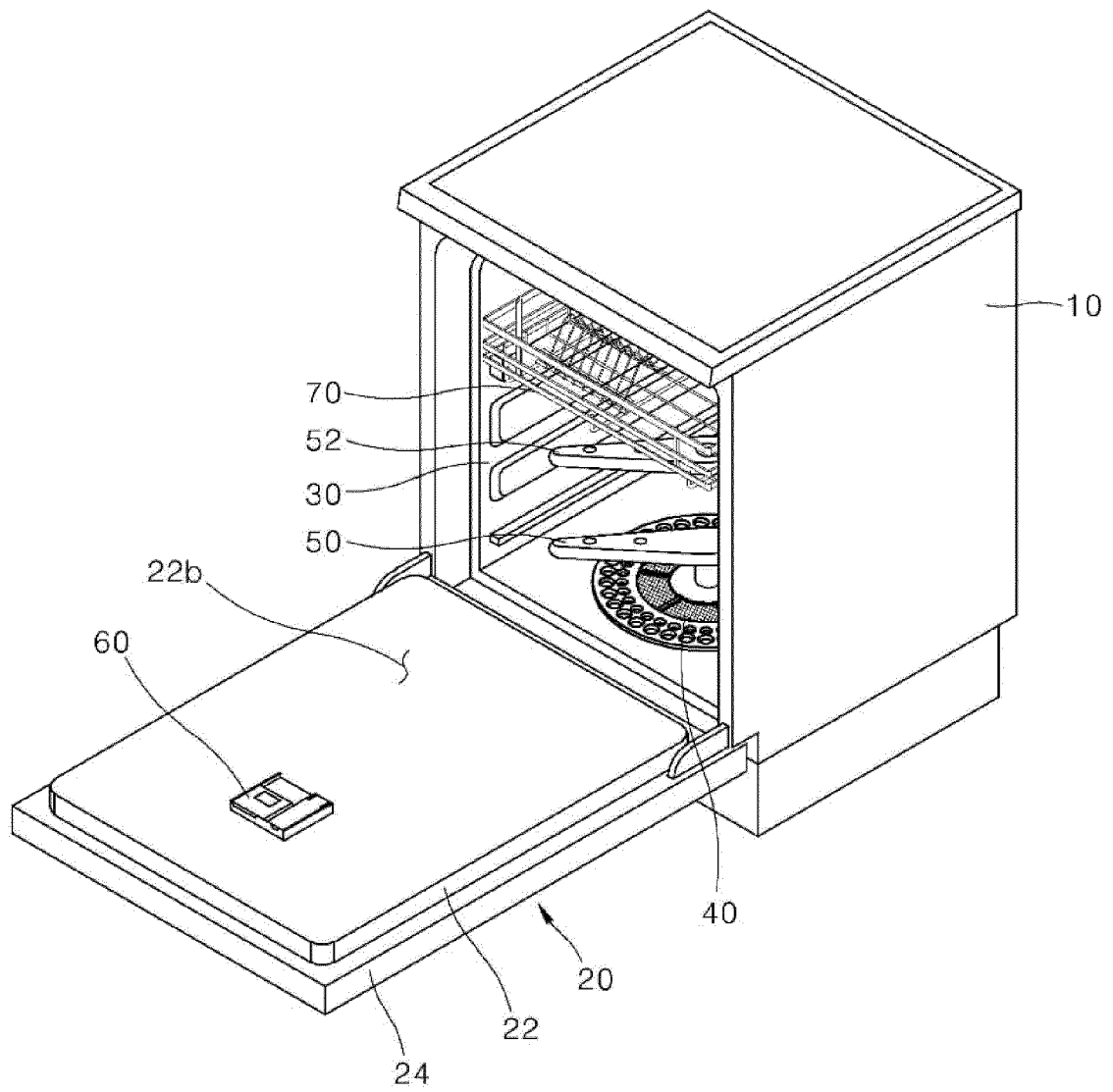


FIG. 1

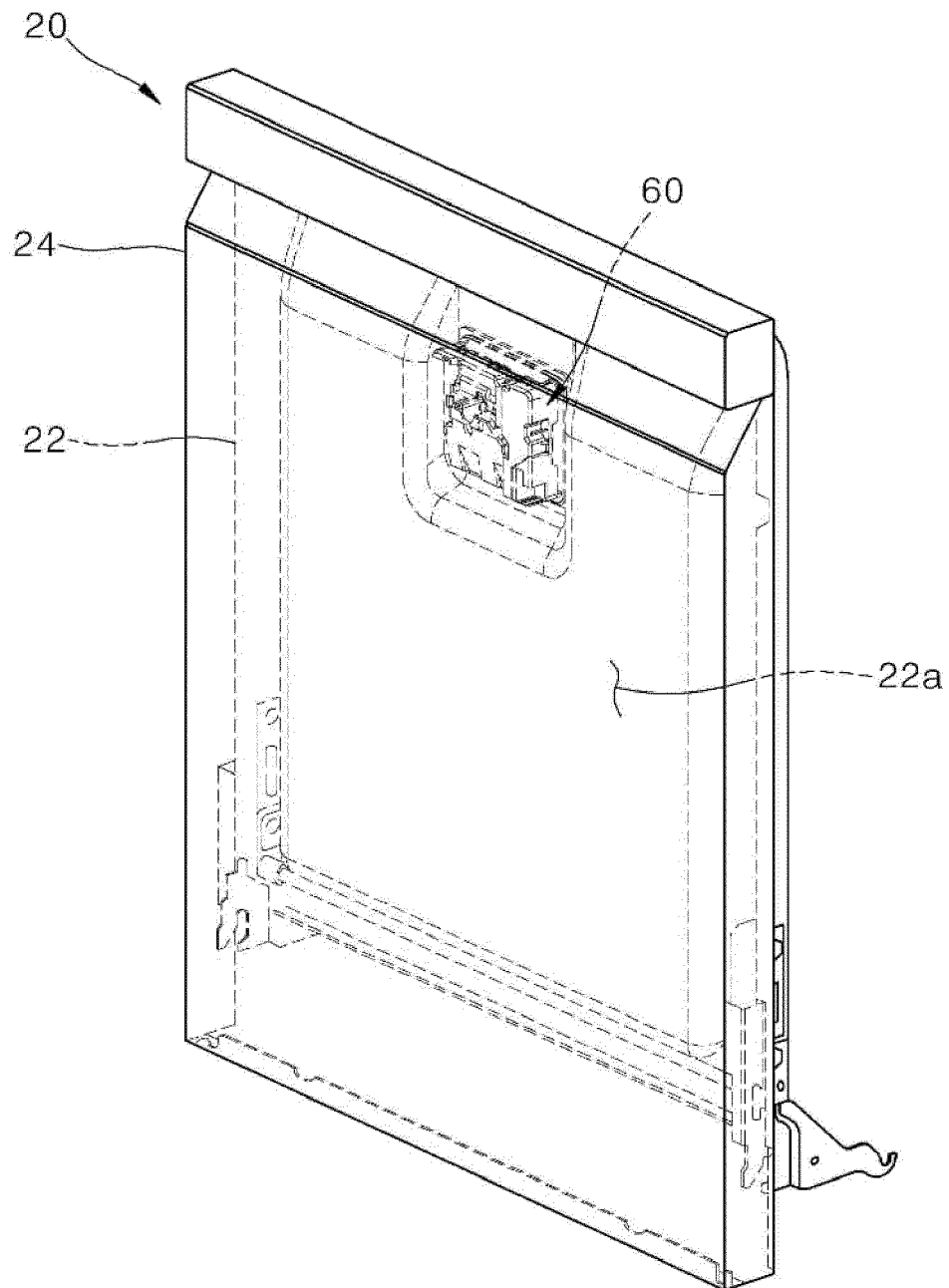


FIG. 2

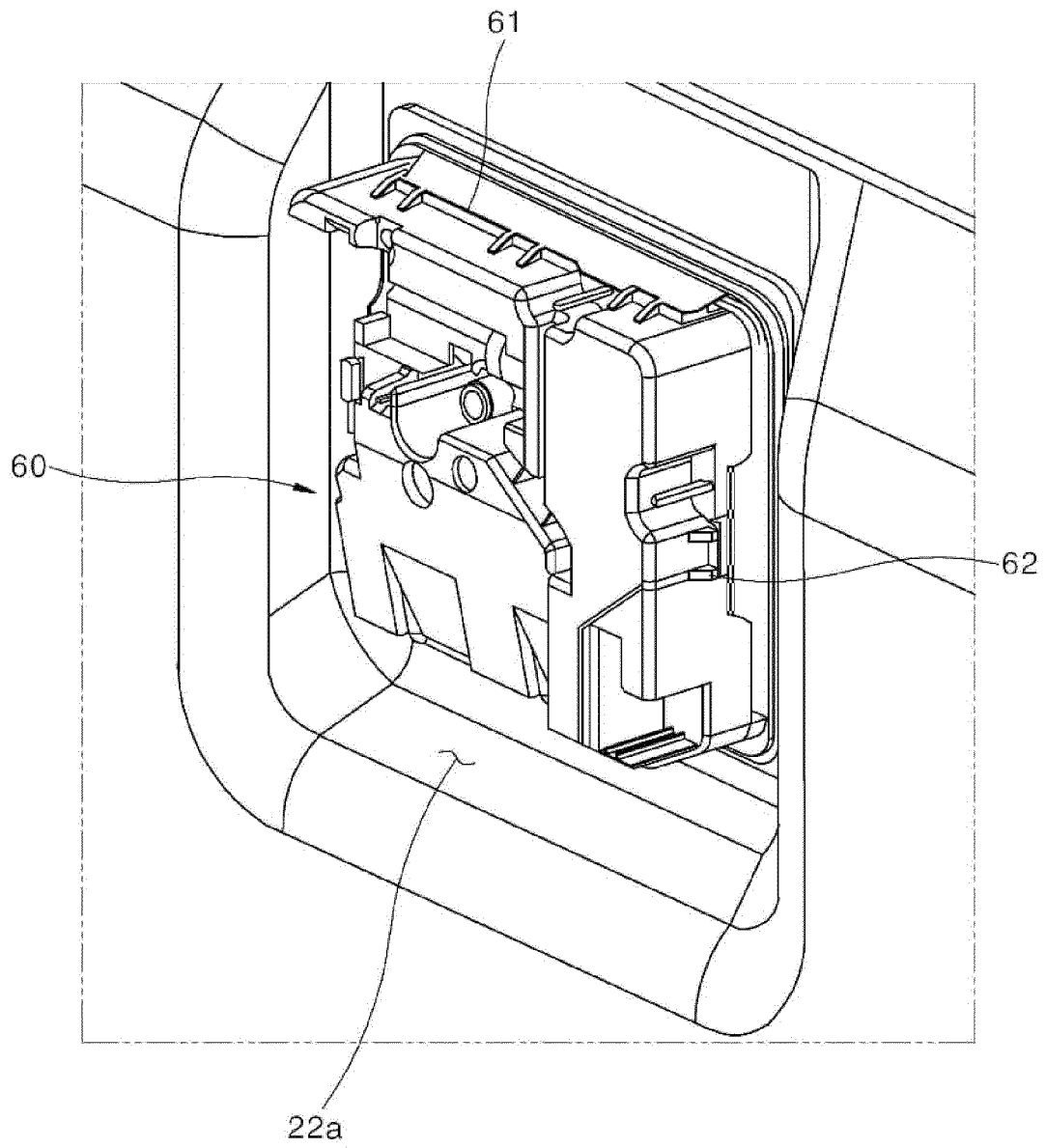


FIG. 3

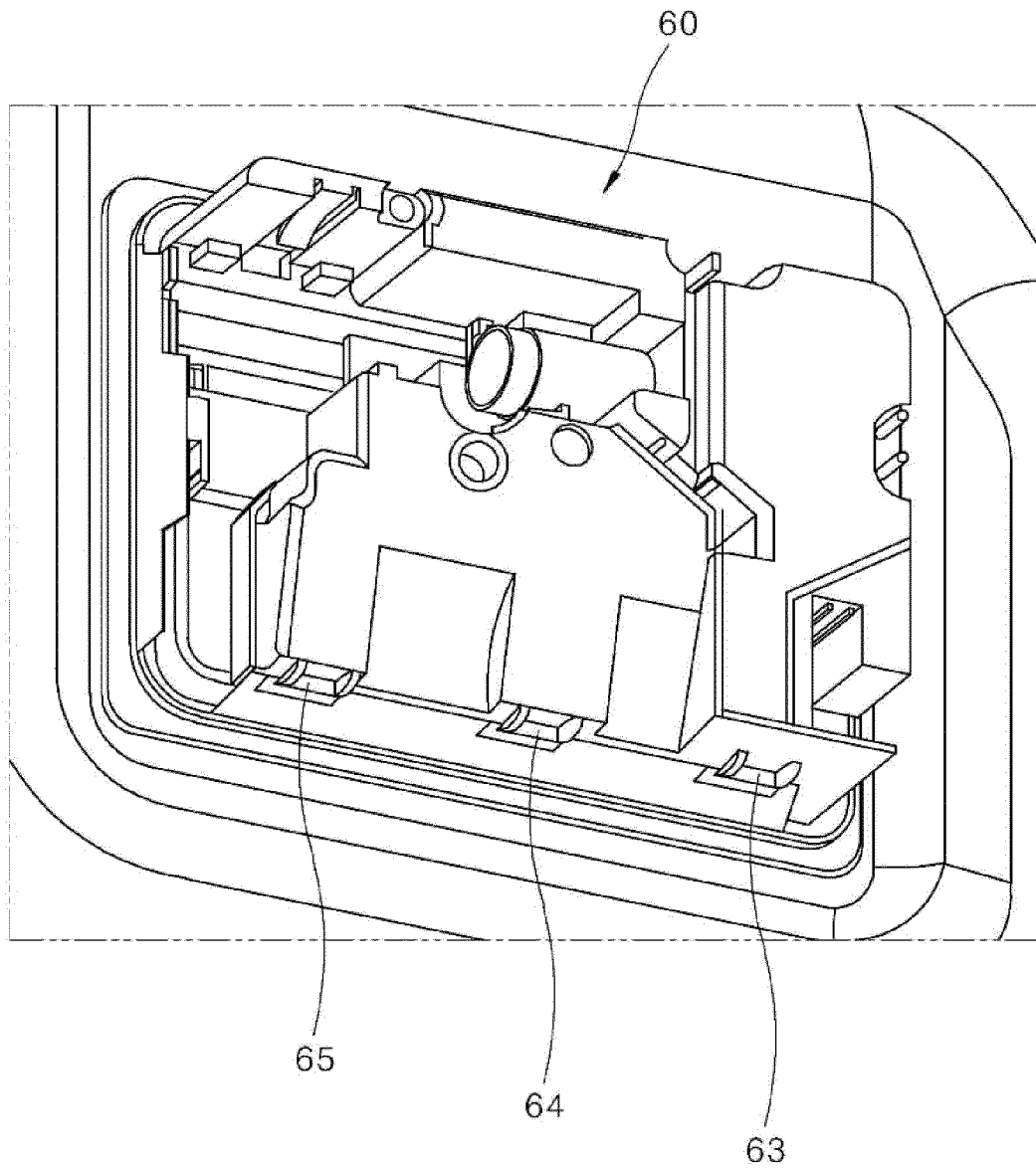


FIG. 4

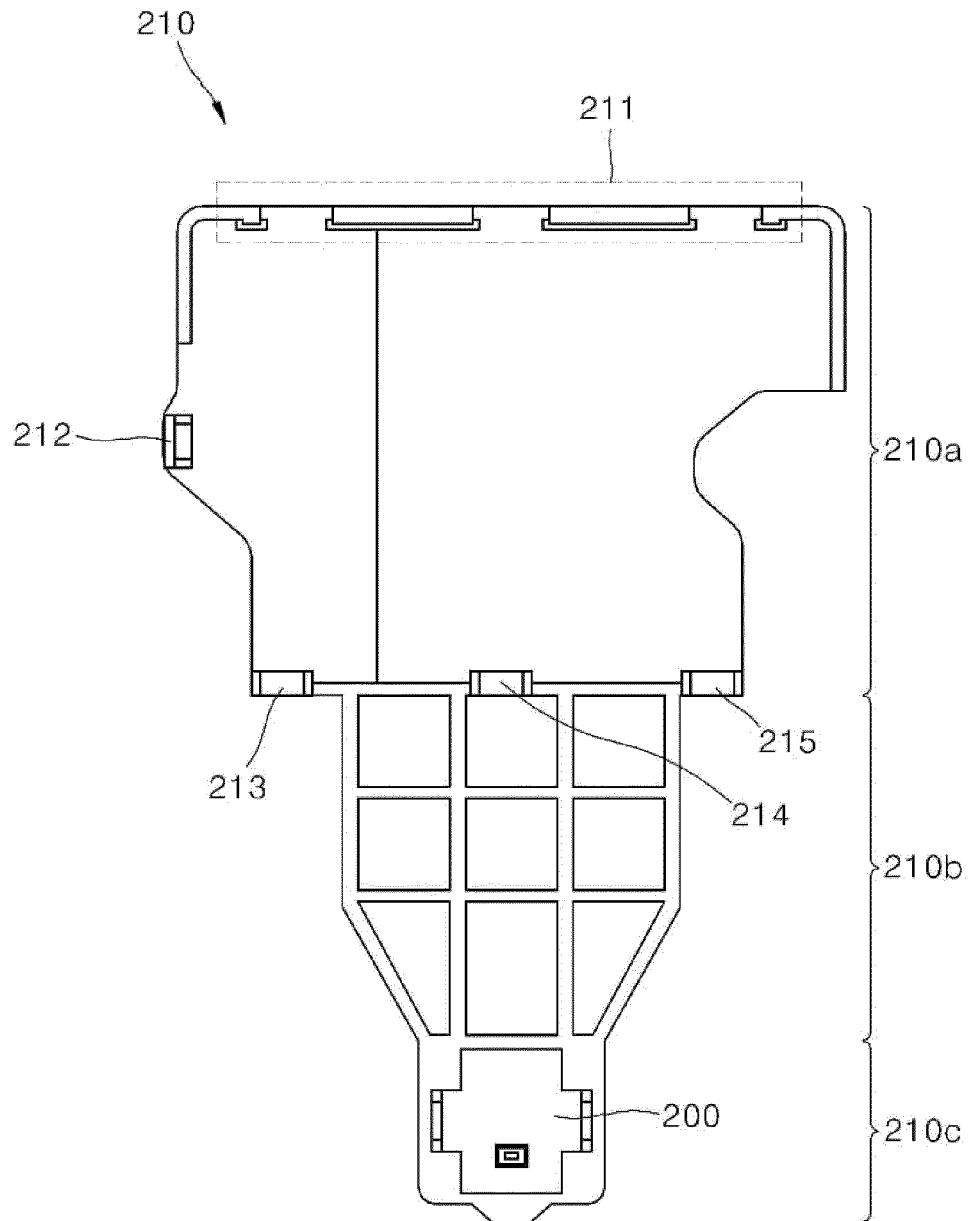


FIG. 5

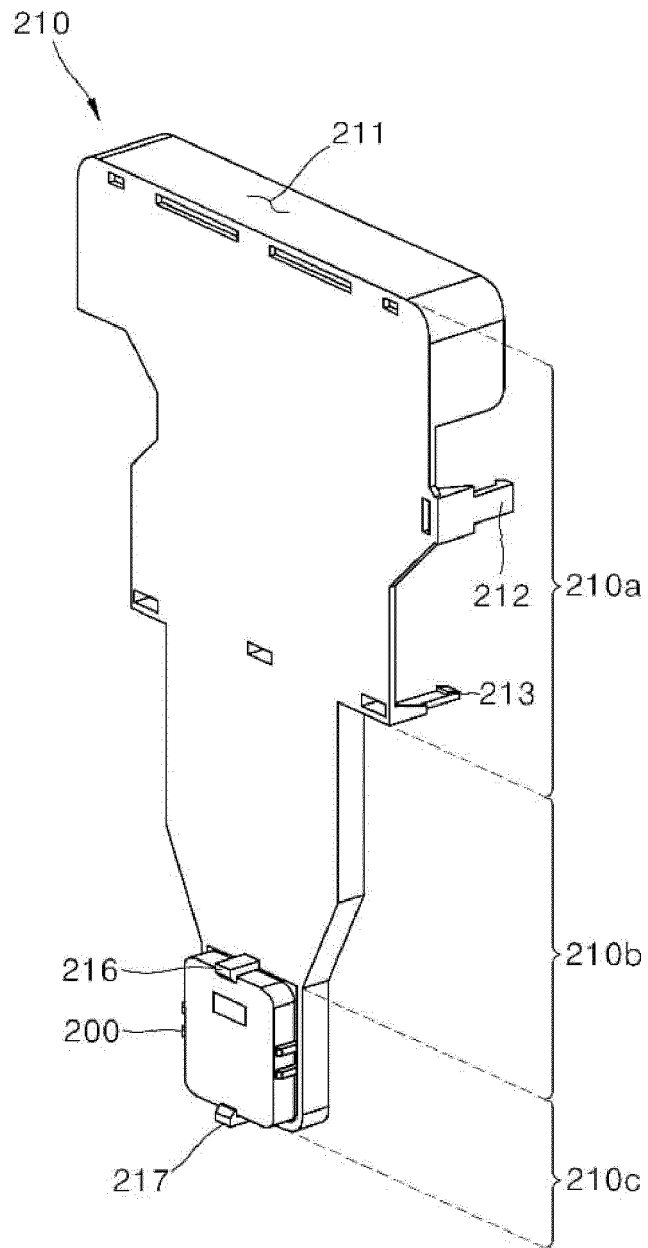


FIG. 6

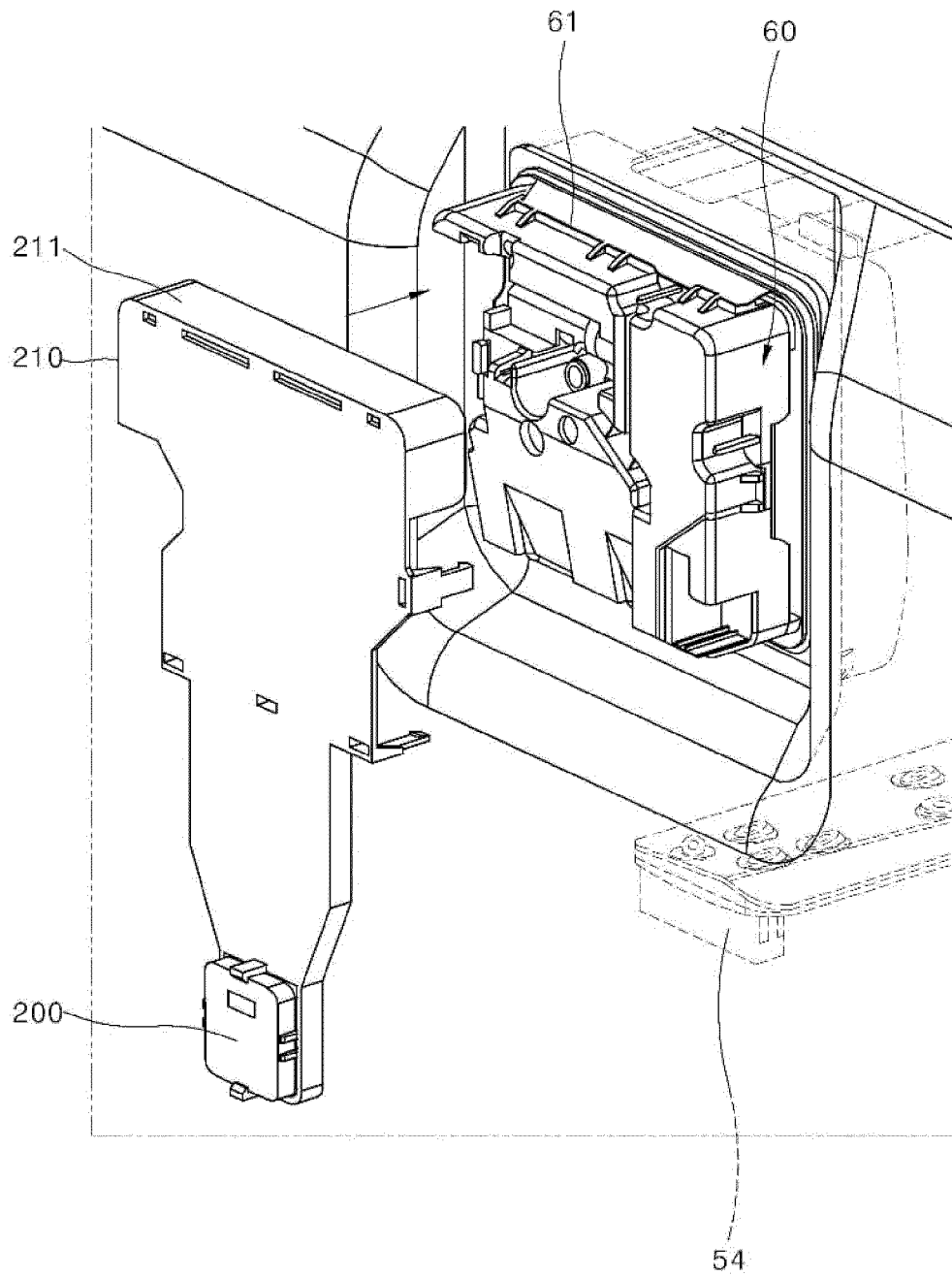


FIG. 7

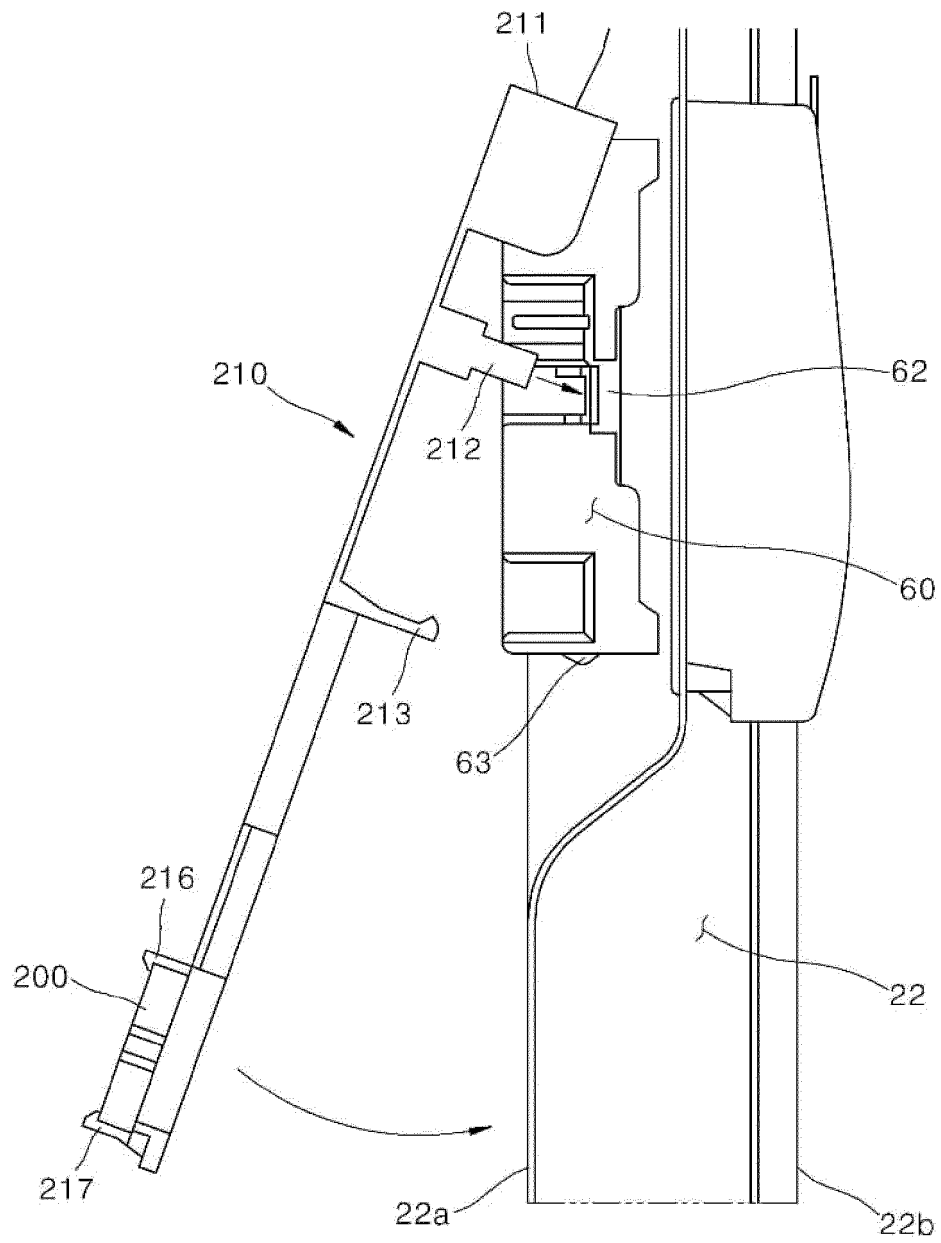


FIG. 8

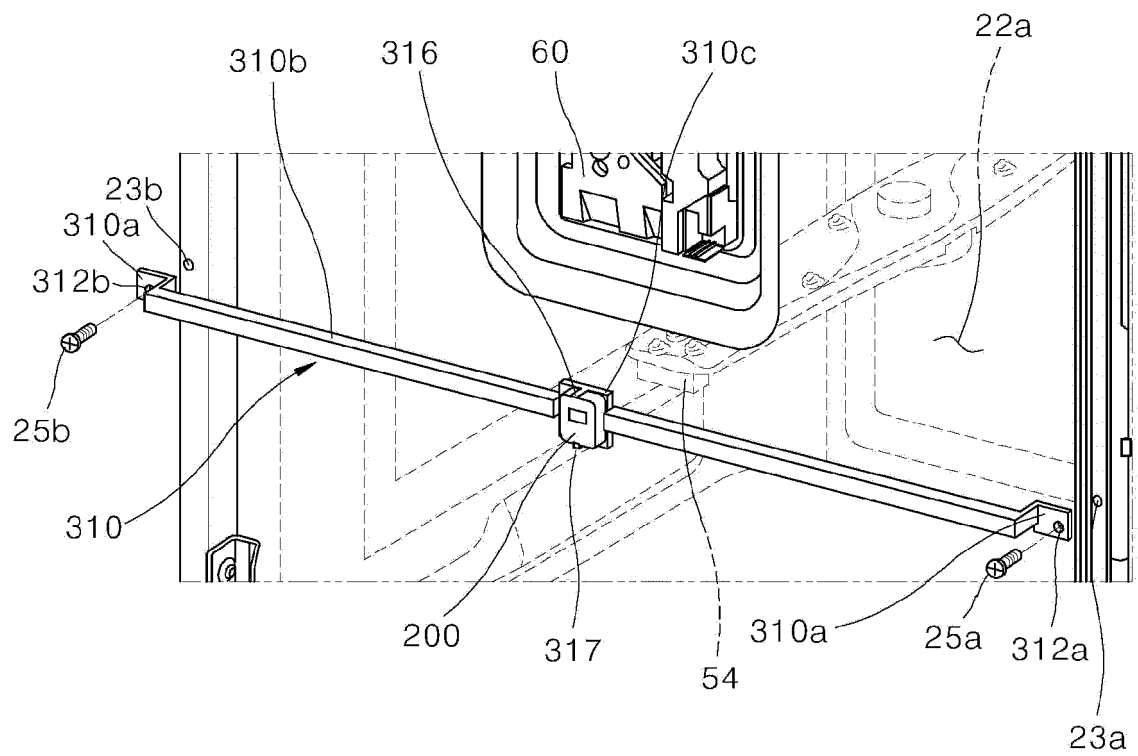


FIG. 9

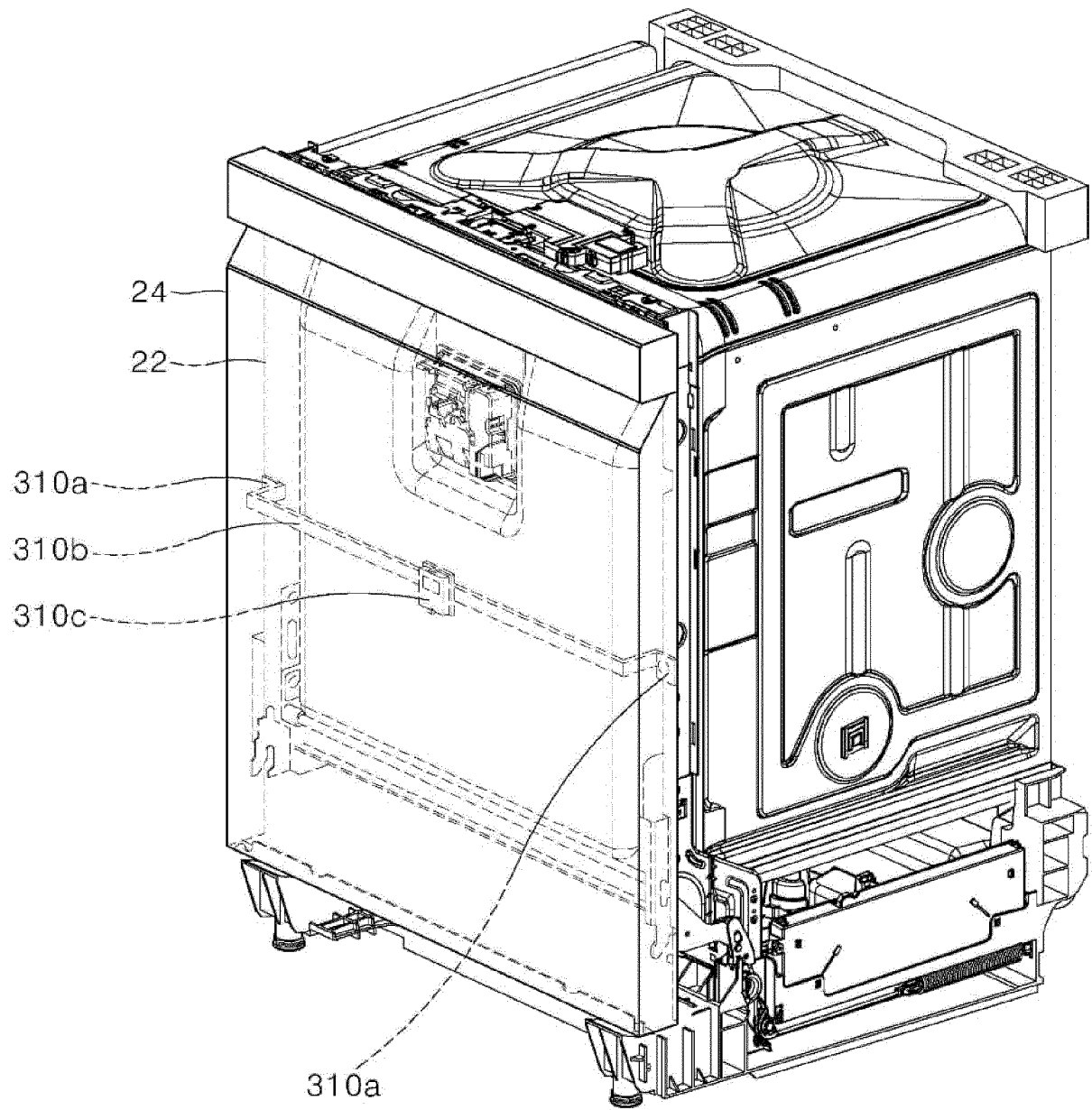


FIG. 10

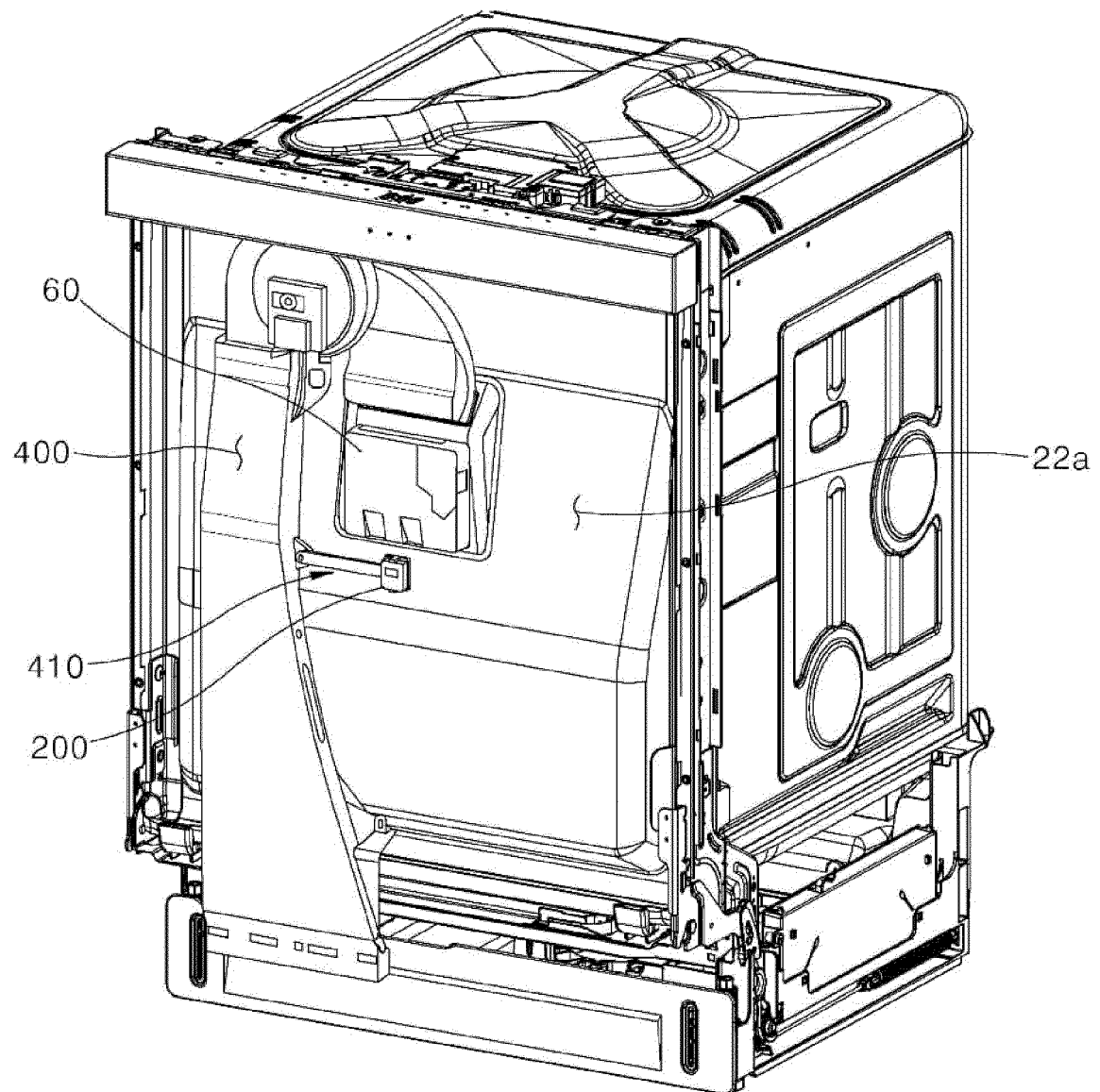


FIG. 11

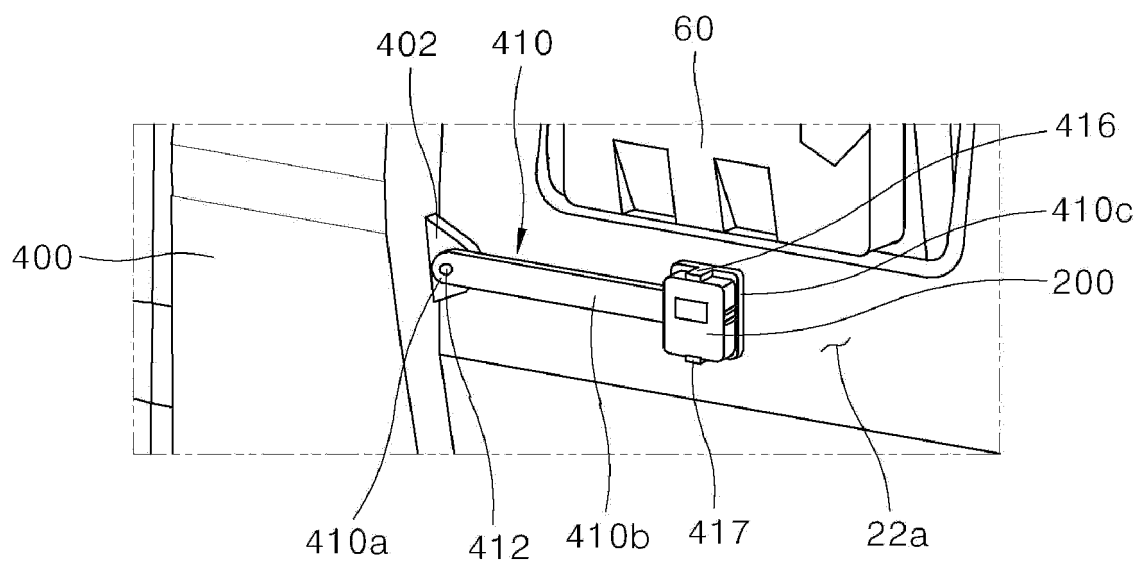


FIG. 12

INTERNATIONAL SEARCH REPORT

International application No.

PCT/KR2020/019225

A. CLASSIFICATION OF SUBJECT MATTER A47L 15/00(2006.01)i; A47L 15/42(2006.01)i According to International Patent Classification (IPC) or to both national classification and IPC																		
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) A47L 15/00(2006.01); A47L 15/22(2006.01); A47L 15/23(2006.01); A47L 15/42(2006.01); A47L 15/46(2006.01) Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Korean utility models and applications for utility models: IPC as above Japanese utility models and applications for utility models: IPC as above Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) eKOMPASS (KIPO internal) & keywords: 식기세척기(dishwasher), 센서(sensor), 고정(fix), 탈착(attach), 노즐(nozzle), 구속(restriction), 도어(door), 도어 덮개(door cover), 세제(detergent)																		
C. DOCUMENTS CONSIDERED TO BE RELEVANT <table border="1"> <thead> <tr> <th>Category*</th> <th>Citation of document, with indication, where appropriate, of the relevant passages</th> <th>Relevant to claim No.</th> </tr> </thead> <tbody> <tr> <td>Y A</td> <td>US 2018-0008118 A1 (SANHUA AWECO APPLIANCE SYSTEMS GMBH) 11 January 2018 (2018-01-11) See paragraphs [0037]-[0040] and [0043], claim 1 and figures 1-3.</td> <td>1-3,6-11,14-17 4-5,12-13</td> </tr> <tr> <td>Y</td> <td>JP 2019-093033 A (PANASONIC IP MANAGEMENT CORP.) 20 June 2019 (2019-06-20) See paragraphs [0044]-[0050] and figure 4.</td> <td>1-3,6-11,14-17</td> </tr> <tr> <td>A</td> <td>US 2016-0000297 A1 (GENERAL ELECTRIC COMPANY) 07 January 2016 (2016-01-07) See paragraphs [0014]-[0031] and figures 1-2.</td> <td>1-17</td> </tr> <tr> <td>A</td> <td>WO 2011-035940 A1 (HENKEL AG & CO. KGAA) 31 March 2011 (2011-03-31) See claims 1-17 and figures 1-5.</td> <td>1-17</td> </tr> <tr> <td>A</td> <td>JP 2018-175310 A (RINNAI CORP.) 15 November 2018 (2018-11-15) See paragraphs [0030]-[0031] and [0052] and figure 1.</td> <td>1-17</td> </tr> </tbody> </table>	Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.	Y A	US 2018-0008118 A1 (SANHUA AWECO APPLIANCE SYSTEMS GMBH) 11 January 2018 (2018-01-11) See paragraphs [0037]-[0040] and [0043], claim 1 and figures 1-3.	1-3,6-11,14-17 4-5,12-13	Y	JP 2019-093033 A (PANASONIC IP MANAGEMENT CORP.) 20 June 2019 (2019-06-20) See paragraphs [0044]-[0050] and figure 4.	1-3,6-11,14-17	A	US 2016-0000297 A1 (GENERAL ELECTRIC COMPANY) 07 January 2016 (2016-01-07) See paragraphs [0014]-[0031] and figures 1-2.	1-17	A	WO 2011-035940 A1 (HENKEL AG & CO. KGAA) 31 March 2011 (2011-03-31) See claims 1-17 and figures 1-5.	1-17	A	JP 2018-175310 A (RINNAI CORP.) 15 November 2018 (2018-11-15) See paragraphs [0030]-[0031] and [0052] and figure 1.	1-17
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Date of the actual completion of the international search 06 August 2021	Date of mailing of the international search report 09 August 2021																	
Name and mailing address of the ISA/KR Korean Intellectual Property Office Government Complex-Daejeon Building 4, 189 Cheongsaro, Seo-gu, Daejeon 35208 Facsimile No. +82-42-481-8578	Authorized officer Telephone No.																	

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/KR2020/019225

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		EP 3266360 A1	10 January 2018
		WO 2018-007533 A1	11 January 2018
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		EP 2453783 A1	23 May 2012
JP 2018-175310 A	15 November 2018	None	

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