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(54) **DRIVING MOTOR ASSEMBLY FOR DOOR OF WASHING MACHINE**

(57) A driving motor assembly (30) for a door of a washing machine is provided. The door includes a door body (20), and the driving motor assembly (30) includes: a motor (33); and a reduction gearbox (32) having an anti-slip gear mechanism (50), in which a first gear (52) is associated with one of the motor (33) and the door body (20), a second gear (51) is associated with the other

one of the motor (33) and the door body (20), and the second gear (51) is adapted to slip with respect to the first gear (52) via the anti-slip gear mechanism (53). The motor according to the present invention can be prevented from being damaged by incorrect operations when driving the door body.

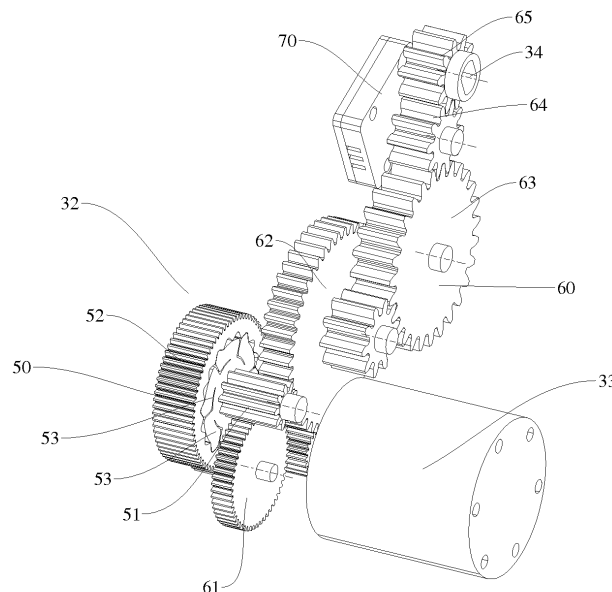


Fig. 7

Description

FIELD

[0001] Embodiments of the present invention generally relate to a field of a washing machine, and more particularly, to a driving motor assembly for a door of a washing machine.

BACKGROUND

[0002] For the first time, a simple door driven by a motor is provided by the present applicant in Chinese application No. 201520365984.3. Compared with manual door opening, door opening driven by the motor is an improvement which relatively meets the needs of users.

[0003] In this simple door, the driving motor and a damper are respectively disposed in different positions at a door frame to perform a driving. In the door, a kind of condition occurs frequently, that is, in a process of electrically opening the door, the user closes the door downward suddenly, which often causes damage to the motor.

SUMMARY

[0004] Embodiments of the present invention seek to solve at least one of the problems existing in the related art to at least some extent.

[0005] Accordingly, an object of the present invention is to provide a driving motor assembly for a door of a washing machine, which is provided with an improved driving motor configuration so as to prevent a reverse incorrect operation for opening or closing a door from causing damage to the motor, in which the reverse incorrect operation for opening or closing a door body of the door occurs while a motor is driving the door body.

[0006] Embodiment of the present invention provides a driving motor assembly for a door of a washing machine, the door including a door body, wherein the driving motor assembly includes: a motor; and a reduction gearbox having an anti-slip gear mechanism, wherein a first gear is associated with one of the motor and the door body, a second gear is associated with the other one of the motor and the door body, and the first gear is adapted to slip with respect to the second gear via the anti-slip gear mechanism.

[0007] With the driving motor assembly for the door of the washing machine according to embodiments of the present invention, by providing the anti-slip gear mechanism in the reduction gearbox, the first gear and the second gear can slip with respect to each other when an external force is applied on the door body, so that the motor is prevented from being damaged, usage safety of the motor is improved, a working life of the motor is lengthened and usability of the washing machine provided with the motor is enhanced.

[0008] In addition, the following technology features

can also be included in the driving motor assembly for a door of a washing machine.

[0009] In some embodiments, the anti-slip gear mechanism includes the first gear, the second gear and a plurality of anti-slip teeth, when the motor drives the door body to operate in a forward direction, the first gear and the second gear are driven to rotate in a same direction, if a reverse incorrect operation occurs while the motor is driving the door body to operate in the forward direction, the second gear is driven to rotate in a reverse direction relative to the first gear via the plurality of anti-slip teeth.

[0010] In some embodiments, an output hole is provided in the driving motor assembly.

[0011] In some embodiments, the driving motor assembly includes a gear train, the first gear of the anti-slip gear mechanism is connected with the motor via the gear train, and the second gear of the anti-slip gear mechanism is connected with the output hole of the driving motor assembly via the gear train.

[0012] In some embodiments, the reduction gearbox is provided with an upwardly-extending ear, and the output hole is provided in the ear.

[0013] In some embodiments, the output hole of the reduction gearbox is connected with the door body via a one-way bearing.

[0014] In some embodiments, the plurality of anti-slip teeth is integrally formed with the second gear.

[0015] In some embodiments, the driving motor assembly for the door of the washing machine further includes a position sensor disposed in the reduction gearbox and configured to determine a position of the door body.

[0016] Additional aspects and advantages of embodiments of present invention will be given in part in the following descriptions, become apparent in part from the following descriptions, or be learned from the practice of the embodiments of the present invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0017] These and other aspects and advantages of embodiments of the present invention will become apparent and more readily appreciated from the following descriptions made with reference to the accompanying drawings, in which:

Fig. 1 is a schematic view of a washing machine according to an embodiment of the present invention, in which a port is closed by a door body;

Fig. 2 is a perspective view of a washing machine according to an embodiment of the present invention, in which a door body closes a port;

Fig. 3 is a perspective view of a washing machine according to an embodiment of the present invention, in which a door body is opened to expose a port;

Fig. 4 is a schematic assembly view of a door body, a driving motor assembly and a one-way bearing of a washing machine according to an embodiment of

the present invention;

Fig. 5 is an exploded view of a door body, a driving motor assembly and a one-way bearing of a washing machine according to an embodiment of the present invention;

Fig. 6 is a schematic view of a driving motor assembly and a one-way bearing of a washing machine according to an embodiment of the present invention;

Fig. 7 is a perspective view of a driving motor assembly for a door of a washing machine according to an embodiment of the present invention; and

Fig. 8 is another perspective view of a driving motor assembly for a door of a washing machine according to an embodiment of the present invention.

Reference signs:

[0018]

Washing machine 100;

Cabinet 10; port 11; cabinet body 12; worktable 13; Door body 20; frame 21 of door body 10; bearing mounting portion 22;

Driving motor assembly 30; ear 31; reduction gearbox 32; motor 33; output hole 34; One-way bearing 40; inner shaft portion 41; outer ring portion 42;

Anti-slip gear mechanism 50; second gear 51; first gear 52; anti-slip tooth 53;

Gear train 60; third gear 61; fourth gear 62; fifth gear 63; sixth gear 64; seventh gear 65;

Position sensor 70.

DETAILED DESCRIPTION

[0019] Reference will be made in detail to embodiments of the present invention. The embodiments described herein with reference to drawings are explanatory, illustrative, and used to generally understand the present invention. The embodiments shall not be construed to limit the present invention. The same or similar elements and the elements having same or similar functions are denoted by like reference numerals throughout the descriptions.

[0020] A washing machine 100 according to embodiments of the present invention will be described in the following with reference to Figs. 1 to 6.

[0021] The washing machine 100 according to embodiments of the present invention includes: a cabinet 10, a door body 20, a driving motor assembly 30 and a one-way bearing 40. As shown in Fig. 3, the cabinet 10 is provided with a port 11 for putting in and taking out laundry, the door body 20 is disposed at a top of the cabinet 10 and configured to close and open the port 11, and a bearing mounting portion 22 is provided at a frame 21 of the door body 20. As shown in Figs. 1 and 2, the door body 20 can close the port 11. When the washing machine 100 is working, the door body 20 closes the port

11 to ensure that the washing machine 100 works normally. Alternatively, when the washing machine 100 is not working, the door body 20 closes the port 11 to prevent outside objects from entering into the interior of the washing machine 100 through the port 11, so as to protect the washing machine 100 to at least some extent. As shown in Fig. 3, the door body 20 can be opened to expose the port 11, the door body 20 is opened after the washing machine finishes the clothes washing, so that it is convenient to take out clothes for drying.

[0022] As shown in Figs. 4 and 5, the one-way bearing 40 has a first end fixedly mounted in a bearing mounting portion 22 at the door body 20 and a second end connected with the driving motor assembly 30, so that the driving motor assembly 30 can drive the door body 20 to rotate around a portion of the frame 21 of the door body 20 via the one-way bearing 40 so as to open the door body 20, and thus a configuration in which the portion of the frame 21 of the door body 20 serves as a pivot is simple and is easy to operate. It should be understood that, when the driving motor assembly 30 is working, the driving motor assembly 30 drives the one-way bearing 40 to move. Since the one-way bearing 40 is fixed at the bearing mounting portion 22, the door body 20 and the one-way bearing 40 move synchronously, that is, the driving motor assembly 30 drives the door body 20 to be opened so as to expose the port 11 via the one-way bearing 40. As shown in Figs. 3 to 5, the bearing mounting portion 22 is disposed at a rear portion of the frame 21 of the door body 20 (i.e., a rear frame bar of the frame 21), so that the door body 20 can rotate around the rear bar of the frame 21. By connecting the driving motor assembly 30 with the one-way bearing 40 and fixing the one-way bearing 40 at the bearing mounting portion 22, coaxiality of the driving motor assembly 30, the one-way bearing 40 and the bearing mounting portion 22 are ensured, so that the driving motor assembly 30 drives the door body 20 to open more smoothly, thus avoiding the door body 20 from getting stuck. Optionally, the driving motor assembly 30 may be a reduction motor assembly.

[0023] When the port 11 needs to be closed by the door body 20, the driving motor assembly 30 may drive the door body 20 to rotate around the portion of the frame 21 via the one-way bearing 40 so as to close the port 11.

[0024] In some embodiments, the cabinet 10 of the washing machine 100 may be provided with a control button for opening and closing the door body 20. The control button is connected with the driving motor assembly 30, and a user only needs to press the control button to realize a motion of opening or closing the door body 20, thus further improving the automation degree of the washing machine 100 and the user experience.

[0025] In some embodiments, as shown in Fig. 6, the one-way bearing 40 includes an inner shaft portion 41 connected to the driving motor assembly 30 and an outer ring portion 42 fixedly mounted within the bearing mounting portion 22 at the frame 21 of the door body 20.

[0026] When the driving motor assembly 30 drives the

one-way bearing 40 to open the door body 20, the inner shaft portion 41 and the outer ring portion 42 move in a same direction, so that the outer ring portion 42 may drive the door body 20 to rotate around the portion of the frame 21, so as to enable the door body 20 to be opened to expose the port 11. When the driving motor assembly 30 drives the one-way bearing 40 to close the door body 20, the driving motor assembly 30 drives the inner shaft portion 41 to rotate, and the door body 20 associated with the outer ring portion 42 moves downward under an effect of its own gravity to close the port 11. The difference between a technical effect achieved using the one-way bearing in the door of the present invention and a technical effect achieved without using the one-way bearing in the related art will be described in detail as follows.

[0027] In the related art, when the door body 20 is only driven by the driving motor assembly 30 without any one-way bearing 40, if the driving motor assembly 30 is driven to rotate in a first direction, the door body 20 also rotates in the first direction, in which the first direction is set to be a direction of opening the door body 20; if the driving motor assembly 30 is driven to rotate in a second direction, the door body 20 also rotates in the second direction, in which the second direction is set to be a direction of closing the door body 20.

[0028] However, when the driving motor assembly 30 according to embodiments of the present invention drives the door body 20 via the one-way bearing 40, if the driving motor assembly 30 is driven to rotate in a first direction, the door body 20 rotates in the first direction, in which the first direction is set to be a direction of opening the door body 20; if the driving motor assembly 30 is driven to rotate in a second direction, the inner shaft portion 41 of the one-way bearing 40 connected to the driving motor assembly 30 rotate in the second direction, and the outer ring portion 42 of the one-way bearing 40 connected to the door body 20 will not rotate if the door body 20 is not mounted. However, the door body 20 is mounted to the outer ring portion 42 herein, under the gravity of the door body 20, the outer ring portion 42 rotates in the second direction following the inner shaft portion 41, so that the door body 20 coupled to the outer ring portion 42 falls down or closes under its own gravity. If the door body 20 is blocked by an obstacle such as a human hand or an foreign object during a process of closing the door body 20, the outer ring portion 42 may stop rotating because of an effect of the one-way bearing 40, although the inner shaft portion 41 of the one-way bearing 40 rotates under a drive of the driving motor assembly 30, and thus the door body 20 connected to the outer ring portion 42 may stop falling or be stopped, which prevents a hand of the user from being nipped by the door body 20, thus improving use safety of the washing machine 100. Once the door body 20 is no more obstructed by the hand or the foreign object, the door body 20 will continue to fall down under the effect of gravity to complete a motion of closing the door body 20. Therefore, a use of the one-way bearing 40 at the driving motor assembly 30 can prevent hand

from being nipped.

[0029] Certainly, during the process of closing the door body 20, if further pressed downward by the human hand, the door body 20 will be closed faster under pressure.

[0030] Optionally, as shown in Fig. 3, the cabinet 10 includes a cabinet body 12 and a worktable 13 disposed on the cabinet body 12. The port 11 for taking out and putting in laundry is provided in the worktable 13, and a receiving space configured to receive the driving motor assembly 30 is provided at a top of the cabinet body 12. The receiving space may be depressed towards an inner side of the cabinet body 12, i.e., the driving motor assembly 30 may be disposed in the cabinet 10. By providing the receiving space, a problem of placing the driving motor assembly 30 is solved, so that the driving motor assembly 30 can be disposed in the cabinet 10 reasonably. It should be noted that the control button may be disposed at the worktable 13 for convenient operations of the user.

[0031] In some specific embodiments of the present invention, as shown in Figs. 4 and 5, two axial ends of the bearing mounting portion 22 are opened respectively, the one-way bearing 40 is received in the bearing mounting portion 22 completely, and the inner shaft portion 41 of the one-way bearing 40 extends out of an end of the bearing mounting portion 22. Since the one-way bearing 40 is received in the bearing mounting portion 22 completely, the one-way bearing 40 can be mounted at the door body 20 stably and reliably. The inner shaft portion 41 extends out of the bearing mounting portion 22 and is connected with the driving motor assembly 30.

[0032] The driving motor assembly 30 for the door of the washing machine according to embodiments of the present invention will be described in the following with reference to Figs. 6 to 8.

[0033] As shown in Fig. 6, the driving motor assembly 30 for the door of the washing machine according to embodiments of the present invention may include a motor 33 and a reduction gearbox 32. As shown in Fig. 7 and 8, the reduction gearbox 32 has an anti-slip gear mechanism 50. In a preferred embodiment of the present invention, the anti-slip gear mechanism 50 includes a first gear 52, a second gear 51 and a plurality of anti-slip teeth 53. When the motor 33 drives the door body 20 to operate in a forward direction, the first gear 52 and the second gear 51 rotate in a same direction, if a reverse incorrect operation occurs while the motor 33 is driving the door body 20 to operate in the forward direction, the second gear 51 rotates in a reverse direction relative to the first gear 52 via the plurality of anti-slip teeth 53. The first gear 52 is associated with one of the motor 33 and the door body 20, the second gear 51 is associated with the other one of the motor 33 and the door body 22, and the second gear 51 is adapted to slip with respect to the first gear 52 via the plurality of anti-slip teeth 53. That is, the first gear 52 may be associated with the motor 33, or the first gear 52 may be associated with the door body 20, in which when the first gear 52 is associated with the door body

20, the second gear 51 is associated with the motor 33; when the first gear 52 is associated with the motor 33, the second gear 51 is associated with the door body 20. Optionally, the motor 33 may be a DC motor.

[0034] An operational principle of the driving motor assembly 30 for the door of the washing machine according to embodiments of the present invention will be described in the following, by an example in which the first gear 52 is associated with the motor 33 and the second gear 51 is associated with the door body 20.

[0035] Similar to above settings of opening and closing the door body 20 by the driving motor assembly 30 in the washing machine 100, the first direction is set to be direction of opening the door body 20 and the second direction is set to be the direction of closing the door body 20.

[0036] If the door body 20 is pressed downward (for example, in a misuse condition) while the motor 33 is driving the door body 20 to open, i.e., if the door body 20 is pressed downward when the motor 33 is driven to rotate in the first direction and the first gear 52 associated with the motor 33 rotates in the first direction, the second gear 51 associated with the door body 20, which is rotating in the first direction to open the door body 20, stops to rotate in a reverse direction (i.e., the second direction) under an effect of a sudden external force, and the plurality of anti-slip teeth 53, which is integrally and rigidly coupled with the second gear 51 and abuts against the first gear 52, is compressed and deformed, so that the plurality of anti-slip teeth 53 breaks away from the first gear 52 and thus the first gear 52 rotates in a reverse direction relative to the second gear 51, thereby preventing the motor 33 from being damaged, enhancing the use safety of the motor 33, lengthening the working life of the motor 33 and improving the usability of the washing machine 100 provided with the motor 33.

[0037] If the door body 20 is opened at a faster speed suddenly (for example, the user pushes the door body 20 upward) while the motor 33 is driving the door body 20 to open, the second gear 51 suddenly changes to rotating at the faster speed from rotating in a same speed with that of the first gear 52, so that the plurality of anti-slip teeth 53, which is integrally and rigidly coupled with the second gear 51 and abuts against the first gear 52, breaks away from the first gear 52, and thus the first gear 52 and the second gear 51 rotate at different speeds in the same direction, thereby preventing the motor 33 from being damaged, enhancing the use safety of the motor 33, lengthening the working life of the motor 33 and improving the usability of the washing machine 100 provided with the motor 33.

[0038] Likewise, if the door body 20 is closed at the faster speed or opened by the user while the motor 33 is driving the door body 20 to close, the operational principle of the anti-slip gear mechanism 50 herein is the same with that of the anti-slip gear mechanism 50 in the above condition in which the motor 33 drives the door body 20 to open, and thus the motor 33 is also prevented

from being damaged.

[0039] With the motor assembly 30 for the door of the washing machine according to embodiments of the present invention, by providing the anti-slip gear mechanism 50 in the reduction gearbox 32, the first gear 52 and the second gear 51 can slip with respect to each other under the effect of the external force, so that the motor 33 is prevented from being damaged, the use safety of the motor 33 is improved, the working life of the motor 33 is lengthened and the usability of the washing machine 100 provided with the motor 33 is enhanced.

[0040] In some embodiments of the present invention, as shown in Figs. 6 and 7, an output hole 34 is provided in the driving motor assembly 30. As shown in Figs. 7 and 8, the driving motor assembly 30 further includes a gear train 60. Specifically, the reduction gearbox 32 may include the gear train 60. The first gear 52 of the anti-slip gear mechanism 50 is connected with the motor 33 via the gear train 60, and the second gear 51 of the anti-slip gear mechanism 50 is connected with the output hole 34 of the driving motor assembly 30 via the gear train 60. The output hole 34 may be connected with the inner shaft portion 41 of the one-way bearing 40 so as to drive the door cover 20 to open or close via the one-way bearing 40.

[0041] As shown in Figs. 7 and 8, the gear train 60 includes a plurality of gears, such as a third gear 61, a fourth gear 62, a fifth gear 63, a sixth gear 64 and a seventh gear 65.

[0042] Optionally, as shown in Figs. 6 and 7, the output hole 34 may be provided in the seventh gear 65 of the reduction gearbox 32 and connected with the door body 20 via the one-way bearing 40. The inner shaft portion 41 of the one-way bearing 40 may be connected with the output hole 34 so that the seventh gear 65 can drive the inner shaft portion 41 of the one-way bearing 40 to rotate, or the inner shaft portion 41 of the one-way bearing 40 can drive the seventh gear 65 to rotate.

[0043] In the following, a transmission process of the reduction gearbox 32 will be described in detail with a configuration of the reduction gearbox 32 shown in Figs. 7 and 8.

[0044] When the driving motor assembly 30 is working, a gear on a shaft of the motor 33 transmits power to the third gear 61, the first gear 52 of the anti-slip gear mechanism 50, the second gear 51 of the anti-slip gear mechanism 50, the fourth gear 62, the fifth gear 63, the sixth gear 64 and the seventh gear 65 in turn, in which the output hole 34 in the seventh gear 65 is connected with the inner shaft portion 41 of the one-way bearing 40, so that the driving motor assembly 30 can open and close the door body 20 via the one-way bearing 40.

[0045] It should be noted that, a number and an arrangement of the gears in the gear train 60 may be selected and adjusted according to actual requirements, and configurations of the third gear 61, the fourth gear 62 and the fifth gear 63 may be the same with or different from each other.

[0046] In some embodiments, the reduction gearbox 32 may be provided with an upwardly-extending ear 31, and the output hole 34 may be provided in the ear 31. That is, the inner shaft portion 41 extends into an interior of the ear 31 to be fitted with the output hole 34, so that the driving motor assembly 30 is connected with the inner shaft portion 41 of the one-way bearing 40. As shown in Fig. 4, the ear 31 is attached to an end surface of an end of the bearing mounting portion 22 at the door body 20. Specifically, the ear 31 may be attached to the end surface of the end of the bearing mounting portion 22, in which end, the inner shaft portion 41 extends out of the bearing mounting portion 22. By attaching the ear 31 to the end surface of the end of the bearing mounting portion 22, the driving motor assembly 30 is fitted with the one-way bearing 40 stably, so that a compact configuration is provided, the space is further saved and a space utilization of the washing machine 100 is improved.

[0047] Optionally, the motor 33 and the reduction gearbox 32 may be disposed at a same side. By disposing the motor 33 and the reduction gearbox 32 at the same side, the space is further saved and the space utilization of the washing machine 100 is improved further, which facilitates disposing other parts of the washing machine 100.

[0048] Preferably, a radius of the second gear 51 is less than a radius of the first gear 52. Thus, the plurality of anti-slip teeth 53 may be disposed on an inner circumferential wall of the first gear 52, and the second gear 51 is rigidly coupled with the plurality of anti-slip teeth 53 so that movements of the second gear 51 and the plurality of anti-slip teeth 53 are combined. Thus, the second gear 51 can slip or rotate in the reverse direction relative to the first gear 52 via the plurality of anti-slip teeth 53.

[0049] In an embodiment of the present invention, the driving motor assembly 30 may further include a position sensor 70. The position sensor 70 may be disposed in the reduction gearbox 32 and configured to determine a position of the door body 20. Specifically, the position sensor 70 is disposed at the seventh gear 65. By providing the position sensor 70, a rotation position of the seventh gear 65 can be detected by the position sensor 70, so that a state and a position of the door body 20 can be judged, which facilitates the driving motor assembly 30 to determine a next action.

[0050] In the specification, unless specified or limited otherwise, relative terms such as "central", "longitudinal", "lateral", "front", "rear", "right", "left", "inner", "outer", "lower", "upper", "horizontal", "vertical", "above", "below", "up", "top", "bottom", "inner", "outer", "clockwise", "anticlockwise" as well as derivative thereof (e.g., "horizontally", "downwardly", "upwardly", etc.) should be construed to refer to the orientation as then described or as shown in the drawings under discussion. These relative terms are for convenience of description and do not require that the present disclosure be constructed or operated in a particular orientation.

[0051] In addition, terms such as "first" and "second"

are used herein for purposes of description and are not intended to indicate or imply relative importance or significance. Thus, features limited by "first" and "second" are intended to indicate or imply including one or more than one these features. In the description of the present disclosure, "a plurality of" relates to two or more than two.

[0052] In the description of the present disclosure, unless specified or limited otherwise, it should be noted that, terms "mounted," "connected" and "coupled" may be understood broadly, such as permanent connection or detachable connection, electronic connection or mechanical connection, direct connection or indirect connection via intermediary, inner communication or interaction between two elements. Those having ordinary skills in the art should understand the specific meanings in the present disclosure according to specific situations.

[0053] In the description of the present disclosure, a structure in which a first feature is "on" a second feature may include an embodiment in which the first feature directly contacts the second feature, and may also include an embodiment in which an additional feature is formed between the first feature and the second feature so that the first feature does not directly contact the second feature, unless otherwise specified. Furthermore, a first feature "on," "above," or "on top of" a second feature may include an embodiment in which the first feature is right "on," "above," or "on top of" the second feature, and may also include an embodiment in which the first feature is not right "on," "above," or "on top of" the second feature, or just means that the first feature has a sea level elevation larger than the sea level elevation of the second feature. While first feature "beneath," "below," or "on bottom of" a second feature may include an embodiment in which the first feature is right "beneath," "below," or "on bottom of" the second feature, and may also include an embodiment in which the first feature is not right "beneath," "below," or "on bottom of" the second feature, or just means that the first feature has a sea level elevation smaller than the sea level elevation of the second feature.

[0054] Reference throughout this specification to "an embodiment," "some embodiments," "one embodiment", "another example," "an example," "a specific example," or "some examples," means that a particular feature, structure, material, or characteristic described in connection with the embodiment or example is included in at least one embodiment or example of the present invention. Thus, the appearances of the phrases such as "in some embodiments," "in one embodiment", "in an embodiment", "in another example," "in an example," "in a specific example," or "in some examples," in various places throughout this specification are not necessarily referring to the same embodiment or example of the present invention. Furthermore, the particular features, structures, materials, or characteristics may be combined in any suitable manner in one or more embodiments or examples.

[0055] Although explanatory embodiments have been shown and described, it would be appreciated by those

skilled in the art that the above embodiments cannot be construed to limit the present invention, and changes, alternatives, and modifications can be made in the embodiments without departing from spirit, principles and scope of the present invention.

Claims

1. A driving motor assembly (30) for a door of a washing machine, the door comprising a door body (20), the driving motor assembly (30) comprises:
 - a motor (33); and
 - a reduction gearbox (32) having an anti-slip gear mechanism (50),
 - wherein a first gear (52) is associated with one of the motor (33) and the door body (20), a second gear (51) is associated with the other one of the motor (33) and the door body (20), and the second gear (51) is adapted to slip with respect to the first gear (52) via the anti-slip gear mechanism (50).
2. The driving motor assembly (30) according to claim 1, wherein the anti-slip gear mechanism (50) comprises the first gear (52), the second gear (51) and a plurality of anti-slip teeth (53), when the motor (33) drives the door body (20) to operate in a forward direction, the first gear (52) and the second gear (51) are driven to rotate in a same direction, if a reverse incorrect operation occurs while the motor (33) is driving the door body (20) to operate in the forward direction, the second gear (51) is driven to rotate in a reverse direction relative to the first gear (52) via the plurality of anti-slip teeth (53).
3. The driving motor assembly (30) according to claim 1, wherein an output hole (34) is provided in the driving motor assembly (30).
4. The driving motor assembly (30) according to claim 3, wherein the driving motor assembly (30) comprises a gear train (60), the first gear (52) of the anti-slip gear mechanism (50) is connected with the motor (33) via the gear train (60), and the second gear (51) of the anti-slip gear mechanism (50) is connected with the output hole (34) of the driving motor assembly (30) via the gear train (60).
5. The driving motor assembly (30) according to claim 3, wherein the reduction gearbox (32) is provided with an upwardly-extending ear (31), and the output hole (34) is provided in the ear (31).
6. The driving motor assembly (30) according to claim 5, wherein the output hole (34) of the reduction gear-

box (32) is connected with the door body (20) via a one-way bearing (40).

7. The driving motor assembly (30) according to claim 2, wherein the plurality of anti-slip teeth (53) is integrally formed with the second gear (51).
8. The driving motor assembly (30) according to claim 1, further comprising a position sensor (70) disposed in the reduction gearbox (32) and configured to determine a position of the door body (20).

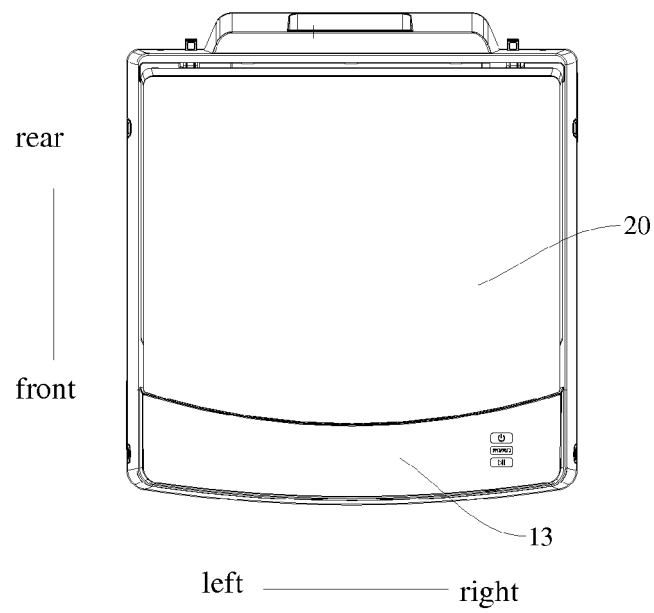


Fig. 1

100

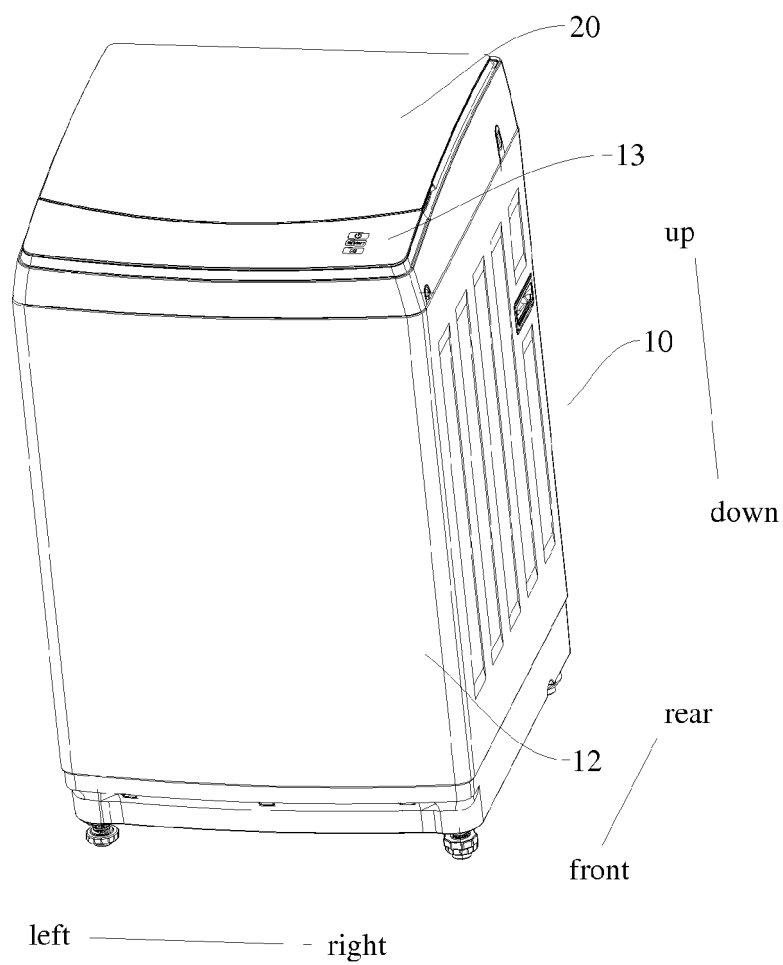


Fig. 2

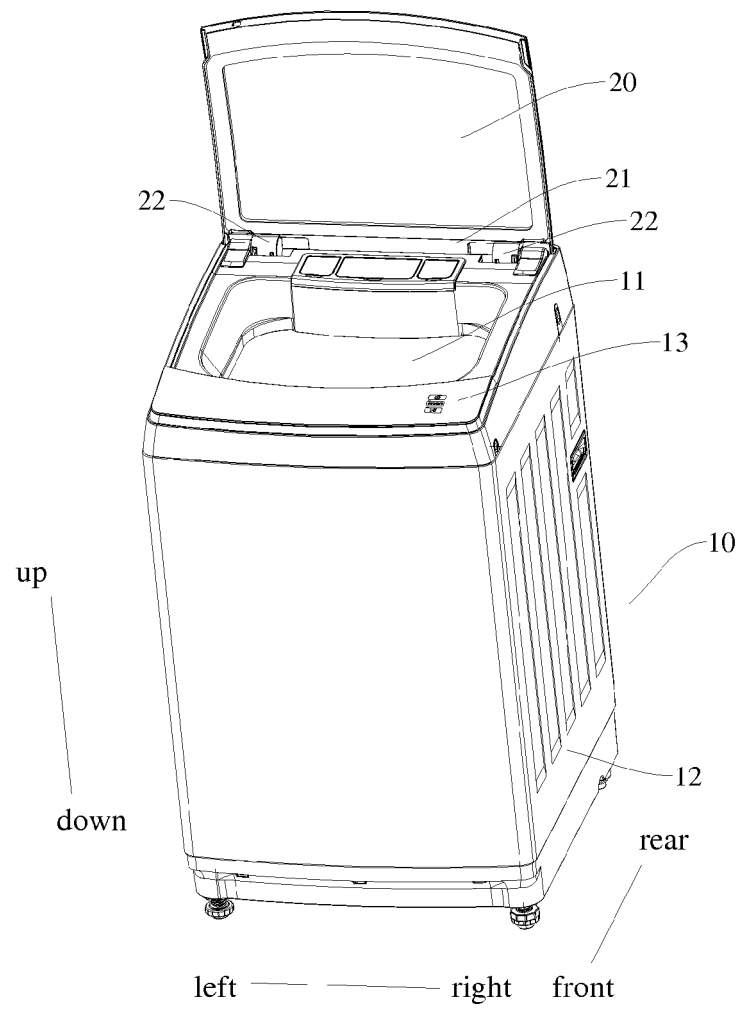


Fig. 3

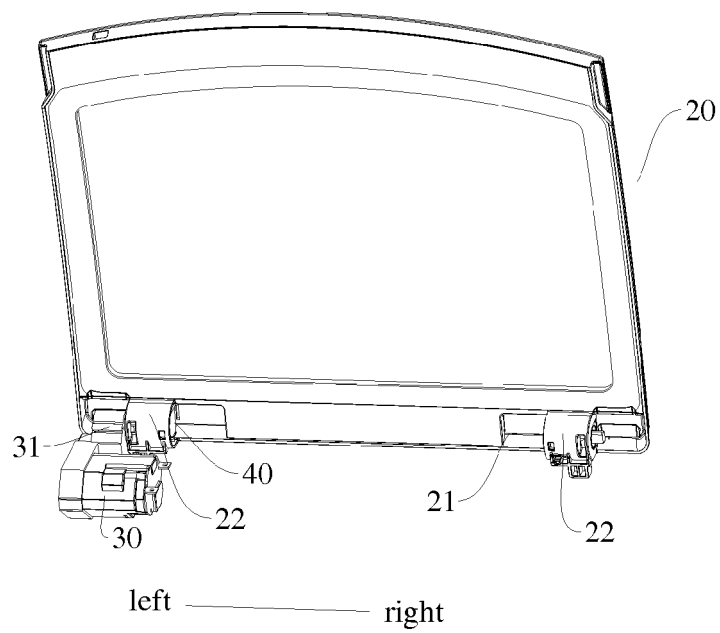
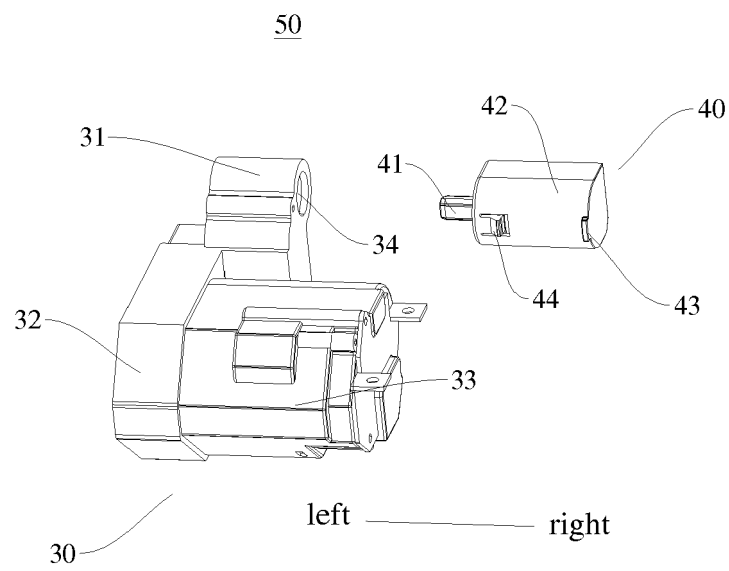
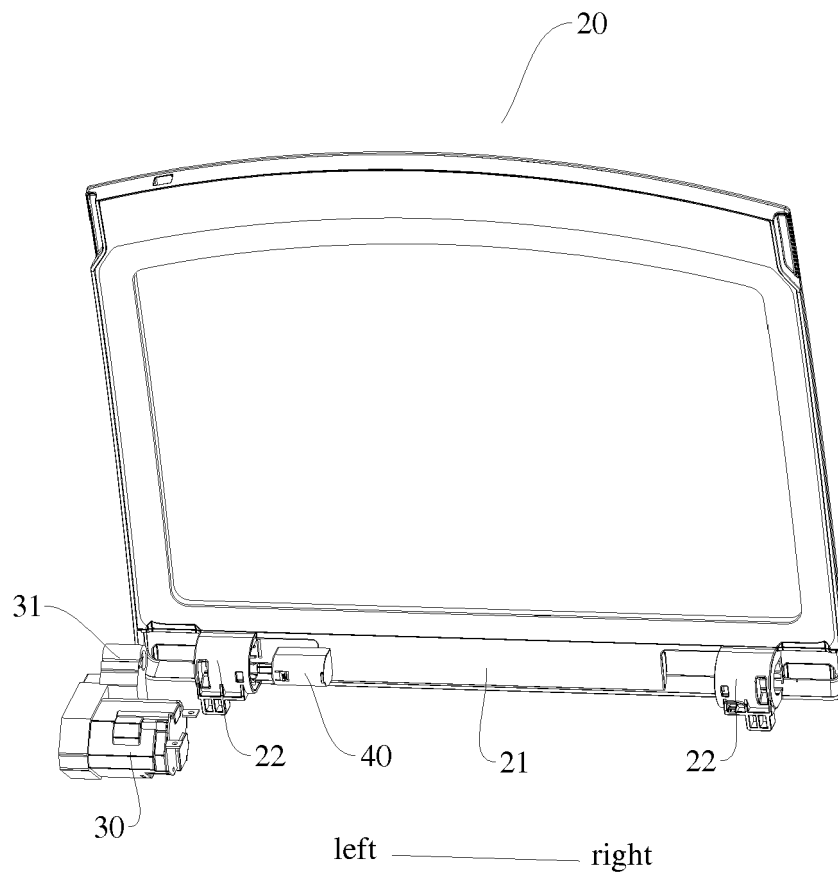


Fig. 4



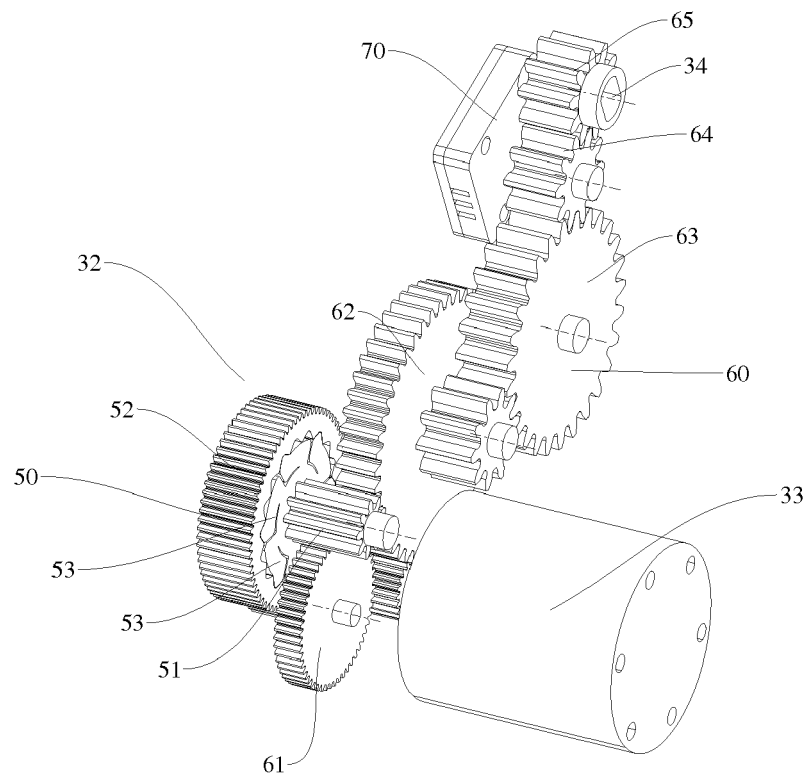


Fig. 7

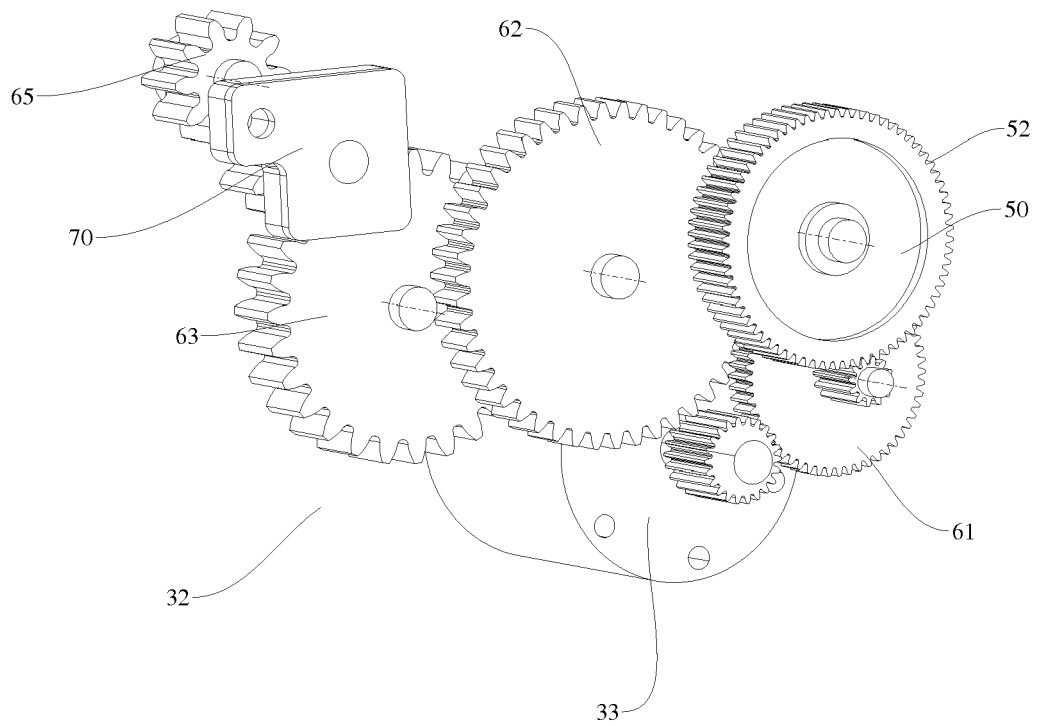


Fig. 8



EUROPEAN SEARCH REPORT

Application Number
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Place of search Munich		Date of completion of the search 13 December 2016	Examiner Weidner, Maximilian
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