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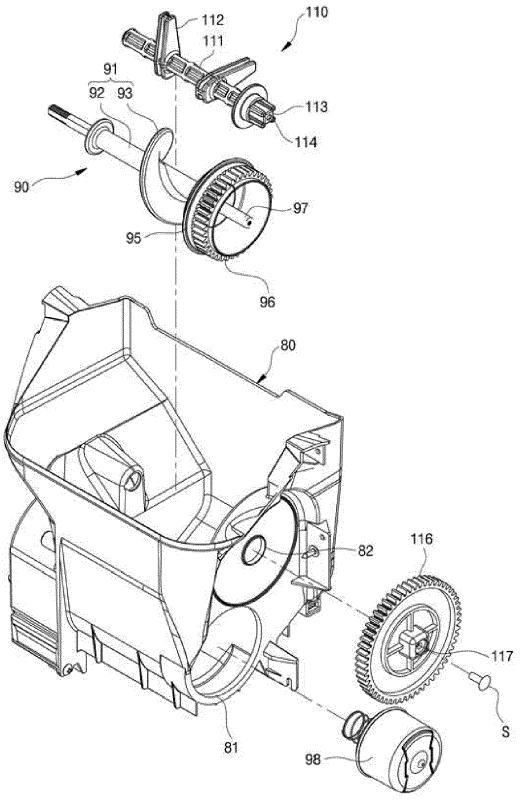
(54) Refrigerator

(57) A refrigerator includes an auger including a transfer unit transferring ice in an ice bucket and a driving gear unit formed at the end of the transfer unit and transmitting rotary force and an agitator including an agitation unit agitating the ice in the ice bucket and a driven gear unit combined with the end of the agitation unit. The auger is formed integrally and thus, the number of parts of the auger is reduced and the assembled structure of the auger is simplified. The ice bucket is fixed in the upward, downward, and horizontal directions by a dual fixing device and is easily attached to and detached from a door of the refrigerator.

FIG. 3



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Description

[0001] The following description relates to a refrigerator having an ice maker provided on a door.

[0002] In general, a refrigerator is an electric home appliance which includes storage chambers storing food and cold air supply devices supplying cold air to the storage chambers to keep the food in a fresh state. The storage chambers are provided within a main body such that the front surfaces of the storage chambers are opened and the opened front surfaces of the storage chambers are opened and closed by doors.

[0003] The refrigerator may include an ice maker to make ice, an ice bucket storing the ice made by the ice maker, an auger transferring the ice in the ice bucket, an agitator agitating the ice in the ice bucket, and a driving motor to drive the auger.

[0004] Particularly, the auger and the agitator may be driven together by one driving motor.

[0005] Therefore, it is an aspect of the present disclosure to provide a refrigerator in which an auger and an agitator are operated together by one driving motor, assembly of the auger and the agitator is simplified, the number of parts of the auger and the number of parts of the agitator are reduced and thus, productivity is improved.

[0006] It is an aspect of the present disclosure to provide a refrigerator in which an ice bucket is easily attached to and detached from a door.

[0007] Additional aspects of the disclosure will be set forth in part in the description which follows and, in part, will be obvious from the description, or may be learned by practice of the disclosure.

[0008] In accordance with an aspect of the present disclosure, a refrigerator includes a main body including storage chambers, doors rotatably combined with the main body to open and close the storage chambers, an ice maker provided on one of the doors, an ice bucket provided on the door to store ice made by the ice maker, an auger provided on the ice bucket to be rotatable and including a transfer unit transferring the ice in the ice bucket and a driving gear unit formed integrally with the end of the transfer unit and transmitting rotary force, and an agitator provided on the ice bucket to be rotated by the rotary force transmitted from the auger and including an agitation unit agitating the ice in the ice bucket and a driven gear unit engaged with the driving gear unit and combined with the end of the agitation unit.

[0009] The transfer unit and the driving gear unit may be formed integrally through injection molding.

[0010] The refrigerator may further include a motor driving the auger and the auger and the agitator may be rotated together by driving the motor.

[0011] The auger and the agitator may be rotated in opposite directions.

[0012] The driving gear unit of the auger and the driven gear unit of the agitator may be disposed at the outside of the ice bucket.

[0013] The ice bucket may include a driving gear unit passage hole through which the driving gear unit of the auger passes.

[0014] The auger may further include an auger separation prevention rib having a greater diameter than the diameter of the driving gear unit passage hole to prevent the auger from being separated to the outside of the ice bucket via the driving gear unit passage hole.

[0015] The agitation unit may include a gear combination unit provided at the end of the agitation rotary shaft so that the driven gear unit is combined with the gear combination unit.

[0016] The ice bucket may include a gear combination unit passage hole through which the gear combination unit passes.

[0017] The agitator may further include an agitator separation prevention rib having a greater diameter than the diameter of the gear combination unit passage hole to prevent the agitator from being separated to the outside of the ice bucket via the gear combination unit passage hole.

[0018] The agitation unit and the driven gear unit may be fixed to each other using a screw or a hook.

[0019] In accordance with an aspect of the present disclosure, a refrigerator includes a main body, doors rotatably combined with the main body, an ice bucket attached to and detached from one of the doors, and a dual fixing device fixing the ice bucket to the door, wherein the dual fixing device includes first latches provided on the ice bucket to be rotatable, each of the first latches including a first locking part, elastic members elastically supporting the first latches, second latches provided on the ice bucket to be fixed, each of the second latches including a second locking part, first catches provided on the door, each of the first catches including an upper support surface supporting the upper end of the first locking part to prevent separation of the ice bucket in the upward direction and a first side support surface supporting the side end of the first locking part to prevent separation of the ice bucket in the horizontal direction, and second catches provided on the door, each of the second catches including a lower support surface supporting the lower end of the second locking part to prevent separation of the ice bucket in the downward direction and a second side support surface supporting the side end of the second locking part to prevent separation of the ice bucket in the horizontal direction.

[0020] The first latches may be provided at higher positions of the ice bucket than the second latches.

[0021] The first latches may be fixed to the first catches after the second latches are fixed to the second catches.

[0022] Locking between the second latches and the second catches may be released after locking between the first latches and the first catches are released.

[0023] These and/or other aspects of the disclosure will become apparent and more readily appreciated from the following description of the embodiments, taken in conjunction with the accompanying drawings in which:

FIG. 1 is a perspective view illustrating a refrigerator in accordance with an embodiment of the present disclosure;
FIG. 2 is a perspective view illustrating an ice bucket of the refrigerator of FIG. 1;
FIG. 3 is an exploded perspective view illustrating the ice bucket, an auger, and an agitator of the refrigerator of FIG. 1;
FIG. 4 is a plan view illustrating the ice bucket of the refrigerator of FIG. 1;
FIG. 5 is a partial sectional view illustrating the ice bucket of the refrigerator of FIG. 1;
FIG. 6 is a sectional view illustrating the ice bucket of the refrigerator of FIG. 1;
FIG. 7 is a view illustrating an attachment and detachment structure of the ice bucket on a door of the refrigerator of FIG. 1;
FIG. 8 is a view illustrating a fixation structure between a second latch and a second catch of the refrigerator of FIG. 1;
FIG. 9 is a view illustrating a fixation structure between a first latch and a first catch of the refrigerator of FIG. 1; and
FIG. 10 is a sectional view illustrating the fixation structure between the first latch and the first catch of the refrigerator of FIG. 1.

[0024] Reference will now be made in detail to the embodiments of the present disclosure, examples of which are illustrated in the accompanying drawings, wherein like reference numerals refer to like elements throughout.

[0025] FIG. 1 is a perspective view illustrating a refrigerator in accordance with an embodiment of the present disclosure. FIG. 2 is a perspective view illustrating an ice bucket of the refrigerator of FIG. 1. FIG. 3 is an exploded perspective view illustrating the ice bucket, an auger, and an agitator of the refrigerator of FIG. 1. FIG. 4 is a plan view illustrating the ice bucket of the refrigerator of FIG. 1. FIG. 5 is a partial sectional view illustrating the ice bucket of the refrigerator of FIG. 1. FIG. 6 is a sectional view illustrating the ice bucket of the refrigerator of FIG. 1.

[0026] With reference to FIGS. 1 to 6, a refrigerator 1 in accordance with an embodiment of the present disclosure includes a main body 10 forming the external appearance of the refrigerator 1, storage chambers 18 and 19 formed within the main body 10 and storing food, doors 20 and 30 combined with the main body 10 to open and close the storage chambers 18 and 19, an ice maker 11 making ice, and an ice bucket assembly 50 storing the ice made by the ice maker 11. The ice bucket assembly 50 includes an ice bucket 80 and an ice bucket cover 60 combined with the front surface of the ice bucket 80.

[0027] The storage chambers 18 and 19 may include a freezing chamber 18 formed in the left portion of the main body 10 and a refrigerating chamber 19 formed in the right portion of the main body 10. The freezing chamber 18 and the refrigerating chamber 19 may be divided by a diaphragm 17.

[0028] The doors 20 and 30 may include a door 20 opening and closing the freezing chamber 18 and a door 30 opening and closing the refrigerating chamber 19. The doors 20 and 30 may be combined with the main body 10 by hinges 15 and 16 to be rotatable.

[0029] A driving motor 120 transmitting rotary force to an auger 90 of the ice bucket 80 when the door 20 is closed may be provided on the side wall of the main body 10. Therefore, in the refrigerator in accordance with the embodiment of the present disclosure, connection between the auger 90 and the driving motor 120 may be released when the door 20 is opened and the auger 90 and the driving motor 120 may be connected when the door 20 is closed.

[0030] By providing the driving motor 120 on the side wall of the main body 10 in such a manner, an ice storage space within the ice bucket 80 may be increased and the structure of the ice bucket 80 may be simplified.

[0031] The auger 90 is provided in the ice bucket 80 to transfer ice stored in the ice bucket 80 to an ice discharge port. When the driving motor 120 is operated, the auger 90 may be rotated to transfer the ice.

[0032] Further, an agitator 100 agitating the stored ice is provided in the ice bucket 80. The agitator 100 is connected to the auger 90 and thus, when the auger 90 is rotated, the agitator 100 may be rotated in connection with the auger 90.

[0033] The auger 90 includes a transfer unit 91 transferring ice in the ice bucket 80 and a driving gear unit 96 formed at the lengthwise end of the transfer unit 91 and transferring rotary force to the agitator 100.

[0034] The transfer unit 91 may include an auger rotary shaft 92 and a transfer blade 93 protruding from the auger rotary shaft 92 in the radial direction to transfer ice. The transfer blade 93 may be provided in a spiral shape and transfer ice in the axial direction when the auger 90 is rotated.

[0035] The driving gear unit 96 may be disposed at the outside of the ice bucket 80 and engaged with a driven gear unit 116 of the agitator 100. When the driving gear unit 96 is rotated, the driven gear unit 116 may be rotated in the opposite direction to the rotation direction of the driving gear unit 96.

[0036] A driving gear unit passage hole 81 through which the driving gear unit 96 passes may be formed on the ice bucket 80. Therefore, the auger 90 may be combined with the ice bucket 80 by causing the driving gear unit 96 to pass through the driving gear unit passage hole 81 from the inside to the outside of the ice bucket 80.

[0037] The auger 90 may include a coupler combination unit 97 with which a coupler 98 combined with the driving motor 120 and receiving driving force transmitted from the driving motor 120 and an auger separation prevention rib 95 preventing the auger 90 from being separated to the outside of the ice bucket 80 through the driving gear unit passage hole 81.

[0038] The auger separation prevention rib 95 may have a greater diameter than the diameter of the driving

gear unit passage hole 81 and be supported by the inner surface of the ice bucket 80.

[0039] The transfer unit 91 and the driving gear unit 96 may be integrally formed of a resin through injection molding. Therefore, the auger including the transfer unit 91 and the driving gear unit 96 may be formed integrally. Although not shown in the drawings, an iron core may be provided within the auger rotary shaft 92 to reinforce the auger rotary shaft 92. Here, the iron core may be inserted into a mold for the auger 90 and then, the auger 90 be formed around the iron core by injection molding.

[0040] The agitator 100 includes an agitation unit 110 agitating ice in the ice bucket 80 and the driven gear unit 116 combined with the end of the agitation unit 110, engaged with the driving gear unit 96, and rotated. The agitation unit 110 is disposed at the inside of the ice bucket 80 and the driven gear unit 116 is disposed at the outside of the ice bucket 80.

[0041] The agitation unit 110 may agitate ice, thus preventing the ice from clumping and guiding the ice to be efficiently dispensed. The agitation unit 110 may include an agitation rotary shaft 111, agitation blades 112 protruding from the agitation rotary shaft 111 in the radial direction to agitate ice, and a gear combination unit 113 provided at the end of the agitation rotary shaft 111 so that the driven gear unit 116 is combined with the gear combination unit 113.

[0042] A gear combination unit passage hole 82 through which the gear combination unit 113 of the agitator 100 passes may be formed on the ice bucket 82. Therefore, the agitation unit 110 and the driven gear unit 116 may be combined with each other through the gear combination unit passage hole 82.

[0043] The agitation unit 110 and the driven gear unit 116 may be firmly coupled with a screw S. For this purse, coupling holes 114 and 117 may be formed through the agitation unit 110 and the driven gear unit 116. However, differently from this embodiment, the agitation unit 110 and the driven gear unit 116 may be combined through a hook structure.

[0044] The agitator 100 includes an agitator separation prevention rib 115 preventing the agitator 100 from being separated to the outside of the ice bucket 80 through the gear combination unit passage hole 82.

[0045] The agitator separation prevention rib 115 may have a greater diameter than the diameter of the gear combination unit passage hole 82 and be supported by the inner surface of the ice bucket 80.

[0046] FIG. 7 is a view illustrating an attachment and detachment structure of the ice bucket on a door of the refrigerator of FIG. 1. FIG. 8 is a view illustrating a fixation structure between a second latch and a second catch of the refrigerator of FIG. 1. FIG. 9 is a view illustrating a fixation structure between a first latch and a first catch of the refrigerator of FIG. 1. FIG. 10 is a sectional view illustrating the fixation structure between the first latch and the first catch of the refrigerator of FIG. 1.

[0047] The refrigerator in accordance with the embodiment of the present disclosure includes a dual fixing device fixing the ice bucket 50 to the door 20.

[0048] The dual fixing device includes first latches 61 provided on the ice bucket 50 to be rotatable, each of the first latches 61 including a first locking part 62, second latches 71 provided on the ice bucket 50 to be fixed, each of the second latches 71 including a second locking part 72, first catches 21 provided on the door 20 to correspond to the first latches 61, and second catches 31 provided on the door 20 to correspond to the second latches 71.

[0049] The first latches 61 are provided at higher positions than the second latches 71 and thus, the first catches 21 may be provided at higher positions than the second catches 31.

[0050] The first latch 61 may include a rotary shaft 66, the first locking part 62, a pressing part 67 to apply pressure to release locking between the first latch 61 and the first catch 21, and an elastic member 65 elastically supporting the first latch 61.

[0051] When pressure is applied to the pressing part 67, the first latch 61 is rotated and thus, locking between the first latch 61 and the first catch 21 may be released and, when pressure applied to the pressing part 67 is removed, the first latch 67 may return to the locking position by elastic force of the elastic member 65.

[0052] The first catch 21 may include an upper support surface 22 supporting an upper end 63 of the first locking part 62 to prevent separation of the ice bucket 50 in the upward direction and a first side support surface 23 supporting a side end 64 of the first locking part 62 to prevent separation of the ice bucket 50 in the horizontal direction.

[0053] Thereby, the first latch 61 and the first catch 21 may prevent separation of the ice bucket 50 in the upward direction and separation of the ice bucket 50 in the horizontal direction.

[0054] The second catch 31 may include a lower support surface 32 supporting a lower end 73 of the second locking part 72 to prevent separation of the ice bucket 50 in the downward direction and a second side support surface 33 supporting a side end 74 of the second locking part 72 to prevent separation of the ice bucket 50 in the horizontal direction.

[0055] Thereby, the second latch 71 and the second catch 31 may prevent separation of the ice bucket 50 in the downward direction and separation of the ice bucket 50 in the horizontal direction.

[0056] The ice bucket 50 in accordance with the embodiment of the present disclosure is fixed in the upward, downward, and horizontal directions by the dual fixing device in such a manner and may thus be stably fixed regardless of vibration due to operation of the driving motor 120.

[0057] The ice bucket 50 having the above configuration in accordance with the embodiment of the present disclosure may be mounted on the door 20 by sequentially fixing the lower portion of the ice bucket 50 and then fixing the upper portion of the ice bucket 50. That is, after the second latches 71 are fixed to the second catches

31, the first latches 51 may be fixed to the first catches 21.

[0058] Therefore, the ice bucket 50 may be easily mounted on the door 20 by fixing the lower portion of the ice bucket 50 and then pushing the upper portion of the ice bucket 50.

[0059] On the other hand, the ice bucket 50 may be easily separated from the door 20 by releasing locking of the upper portion of the ice bucket 50 and then releasing locking of the lower portion of the ice bucket 50. That is, after locking between the first latches 51 and the first catches 21 is released, locking between the second latches 71 and the second catches 31 may be released.

[0060] As is apparent from the above description, in a refrigerator in accordance with an embodiment of the present disclosure, the number of parts of an auger and the number of parts of an agitator are reduced and thus, productivity of the refrigerator may be improved and the auger and the agitator may be simply assembled.

Further, an ice bucket may be easily attached to and detached from a door and stably fixed to the door.

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

Claims

1. A refrigerator comprising:

a main body including a storage chamber;
a door rotatably combined with the main body to open and close the storage chamber;
an ice maker provided on the door;
an ice bucket provided on the door to store ice made by the ice maker;
an auger provided on the ice bucket so as to be rotatable and including a transfer unit transferring the ice in the ice bucket and a driving gear unit formed integrally with the end of the transfer unit and transmitting rotary force; and
an agitator provided on the ice bucket to be rotated by the rotary force transmitted from the auger and including an agitation unit agitating the ice in the ice bucket and a driven gear unit engaged with the driving gear unit and combined with the end of the agitation unit.

2. The refrigerator according to claim 1, wherein the transfer unit and the driving gear unit are formed integrally through injection molding.

3. The refrigerator according to claim 1 or 2, further comprising a motor driving the auger,
wherein the auger and the agitator are rotated together by driving the motor.

4. The refrigerator according to claim 3, wherein the auger and the agitator are rotated in opposite directions.

5. The refrigerator according to any one of the preceding claims, wherein the driving gear unit of the auger and the driven gear unit of the agitator are disposed at the outside of the ice bucket.

6. The refrigerator according to any one of the preceding claims, wherein the ice bucket includes a driving gear unit passage hole through which the driving gear unit of the auger passes.

7. The refrigerator according to claim 6, wherein the auger further includes an auger separation prevention rib having a greater diameter than the diameter of the driving gear unit passage hole so as to prevent the auger from being separated to the outside of the ice bucket via the driving gear unit passage hole.

8. The refrigerator according to any one of the preceding claims, wherein the agitation unit includes a gear combination unit provided at the end of the agitation rotary shaft so that the driven gear unit is combined with the gear combination unit.

9. The refrigerator according to claim 8, wherein the ice bucket includes a gear combination unit passage hole through which the gear combination unit passes.

10. The refrigerator according to claim 9, wherein the agitator further includes an agitator separation prevention rib having a greater diameter than the diameter of the gear combination unit passage hole so as to prevent the agitator from being separated to the outside of the ice bucket via the gear combination unit passage hole.

11. The refrigerator according to any one of the preceding claims, wherein the agitation unit and the driven gear unit are fixed to each other using a screw or a hook.

12. A refrigerator comprising:

a main body;
a door rotatably combined with the main body;
an ice bucket attached to and detached from the door; and
a dual fixing device fixing the ice bucket to the door, wherein the dual fixing device includes:

a first latch provided on the ice bucket so as to be rotatable and including a first locking part;
an elastic member elastically supporting the

first latch;
a second latch provided on the ice bucket so as to be fixed and including a second locking part;
a first catch provided on the door and including an upper support surface supporting the upper end of the first locking part to prevent separation of the ice bucket in the upward direction and a first side support surface supporting the side end of the first locking part to prevent separation of the ice bucket in the horizontal direction; and
a second catch provided on the door and including a lower support surface supporting the lower end of the second locking part to prevent separation of the ice bucket in the downward direction and a second side support surface supporting the side end of the second locking part to prevent separation of the ice bucket in the horizontal direction.

13. The refrigerator according to claim 12, wherein the first latch is provided at a higher position of the ice bucket than the second latch.

14. The refrigerator according to claim 12, wherein the first latch is fixed to the first catch after the second latch is fixed to the second catch.

15. The refrigerator according to claim 12, wherein locking between the second latch and the second catch is released after locking between the first latch and the first catch is released.

FIG. 1

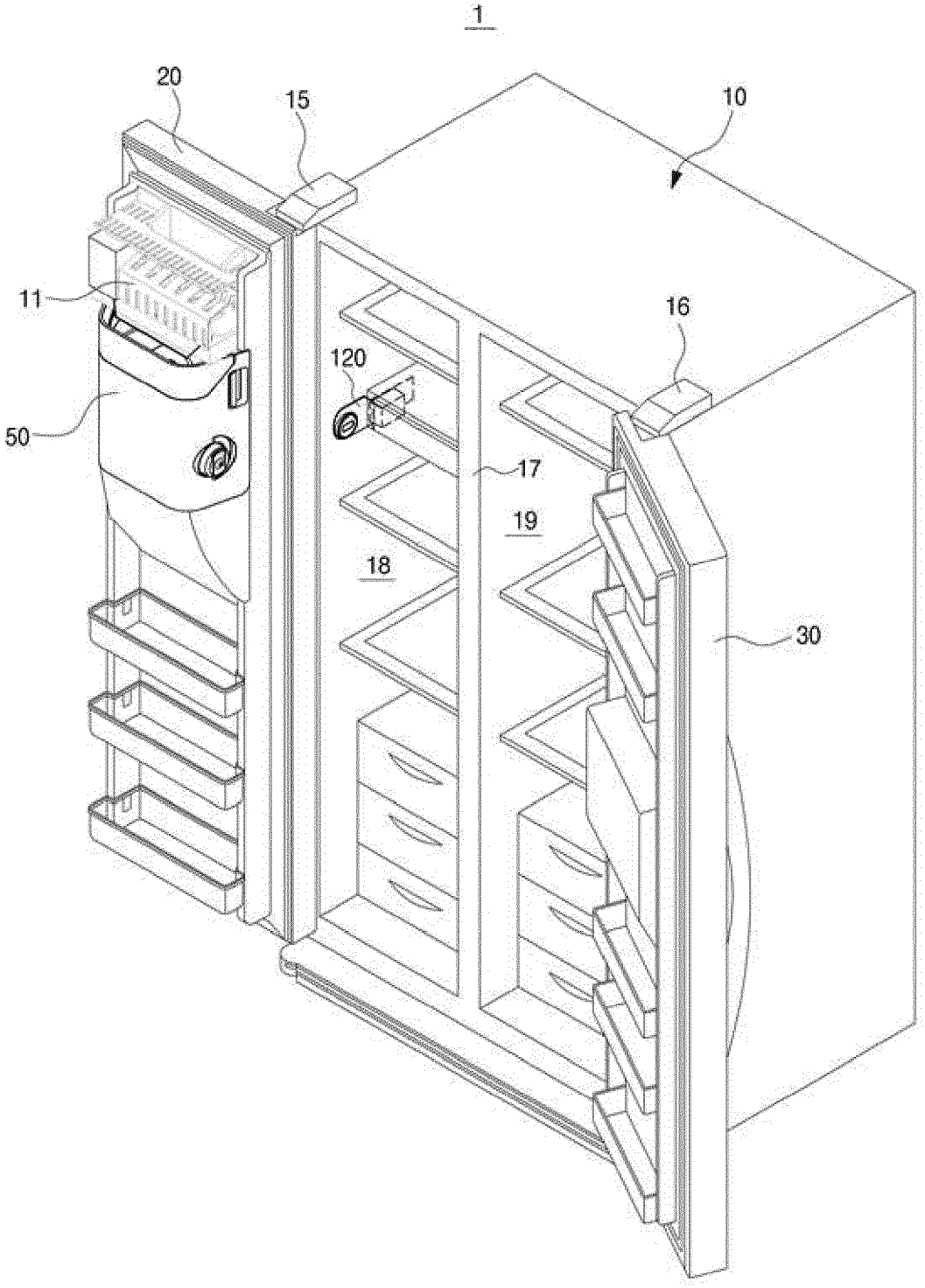

FIG. 2

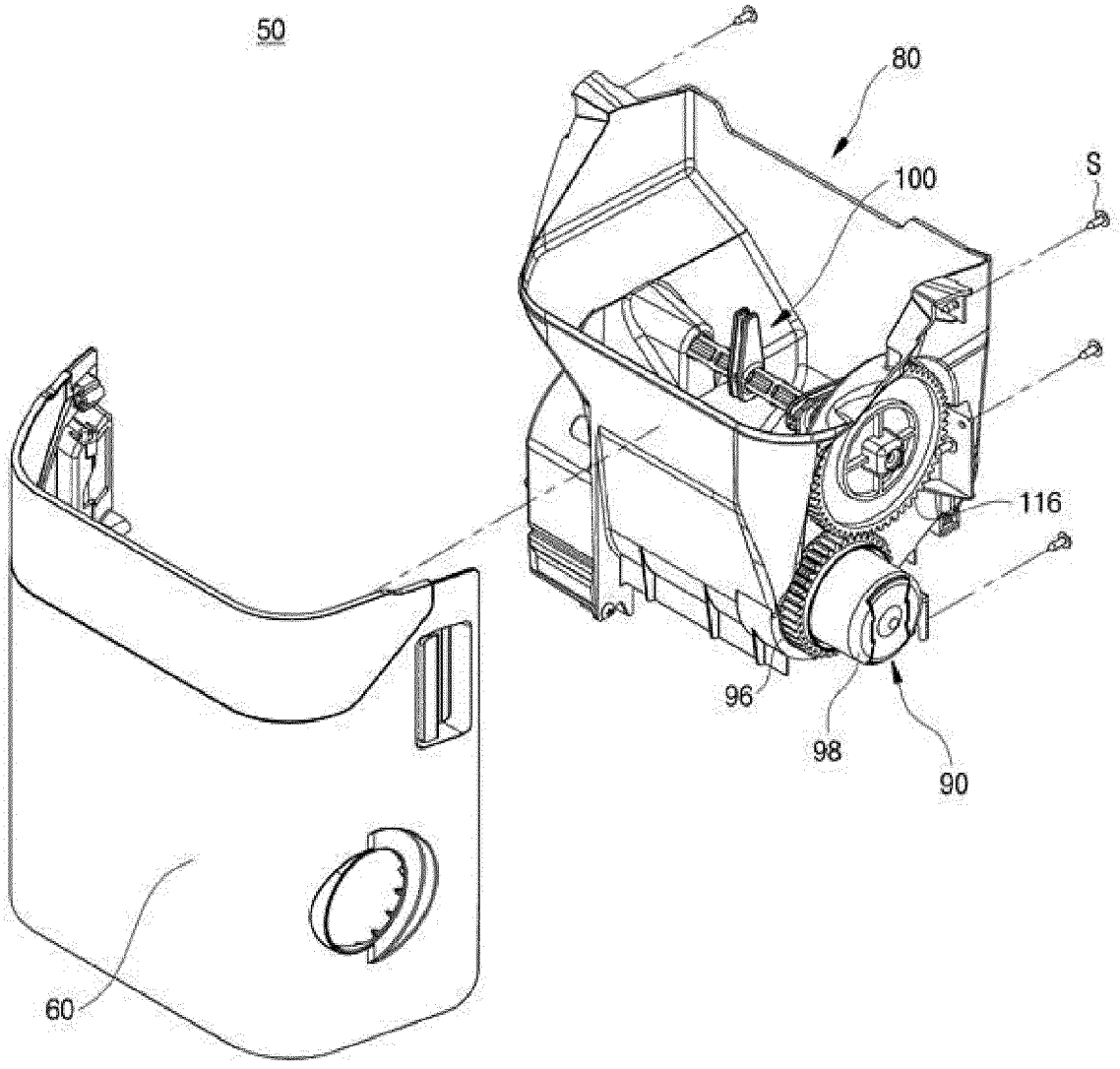

FIG. 3

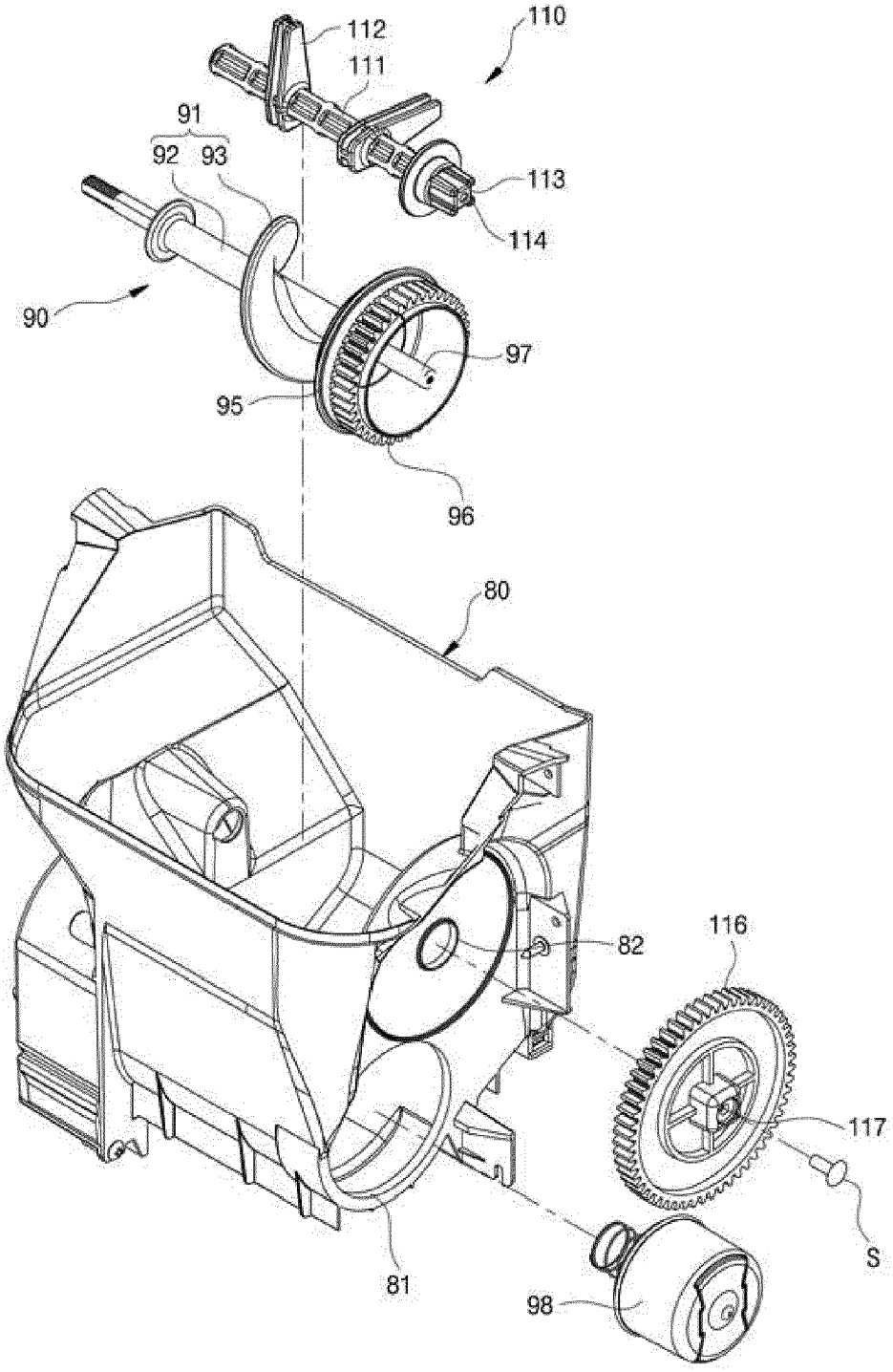

FIG. 4

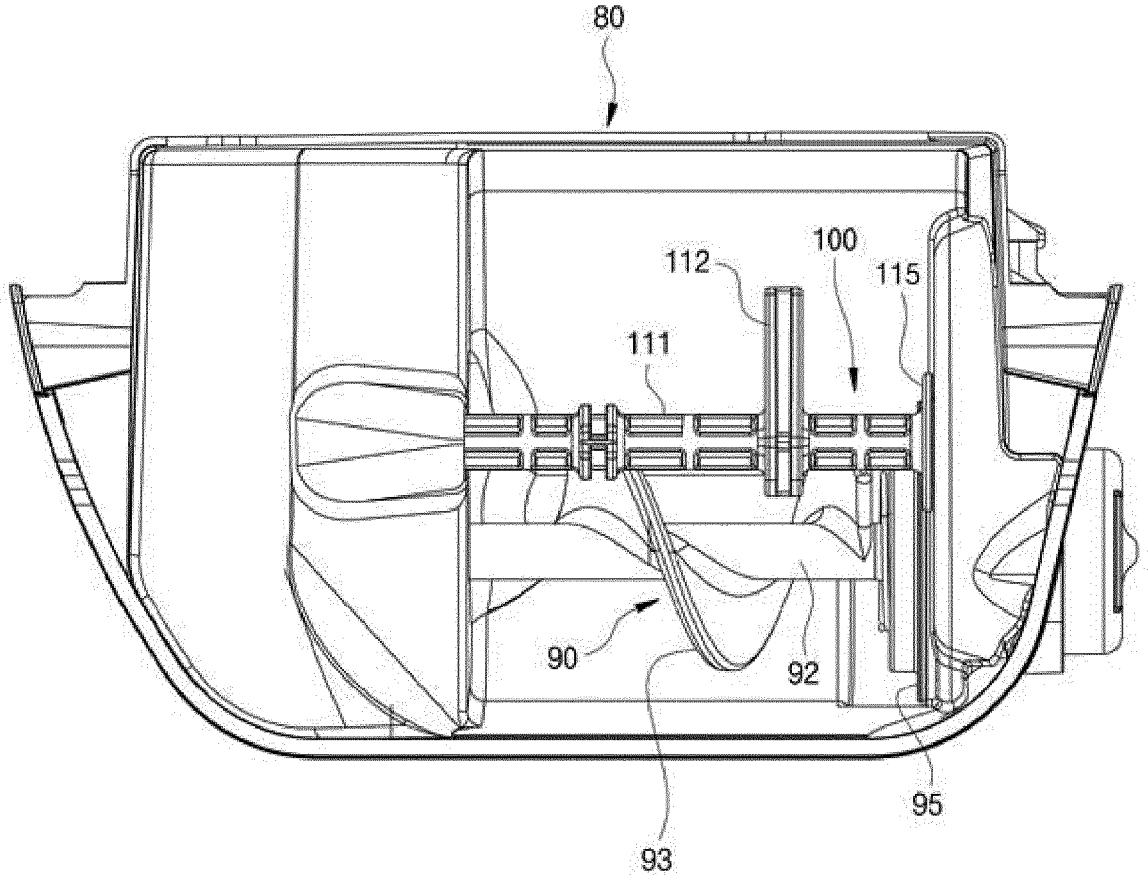

FIG. 5

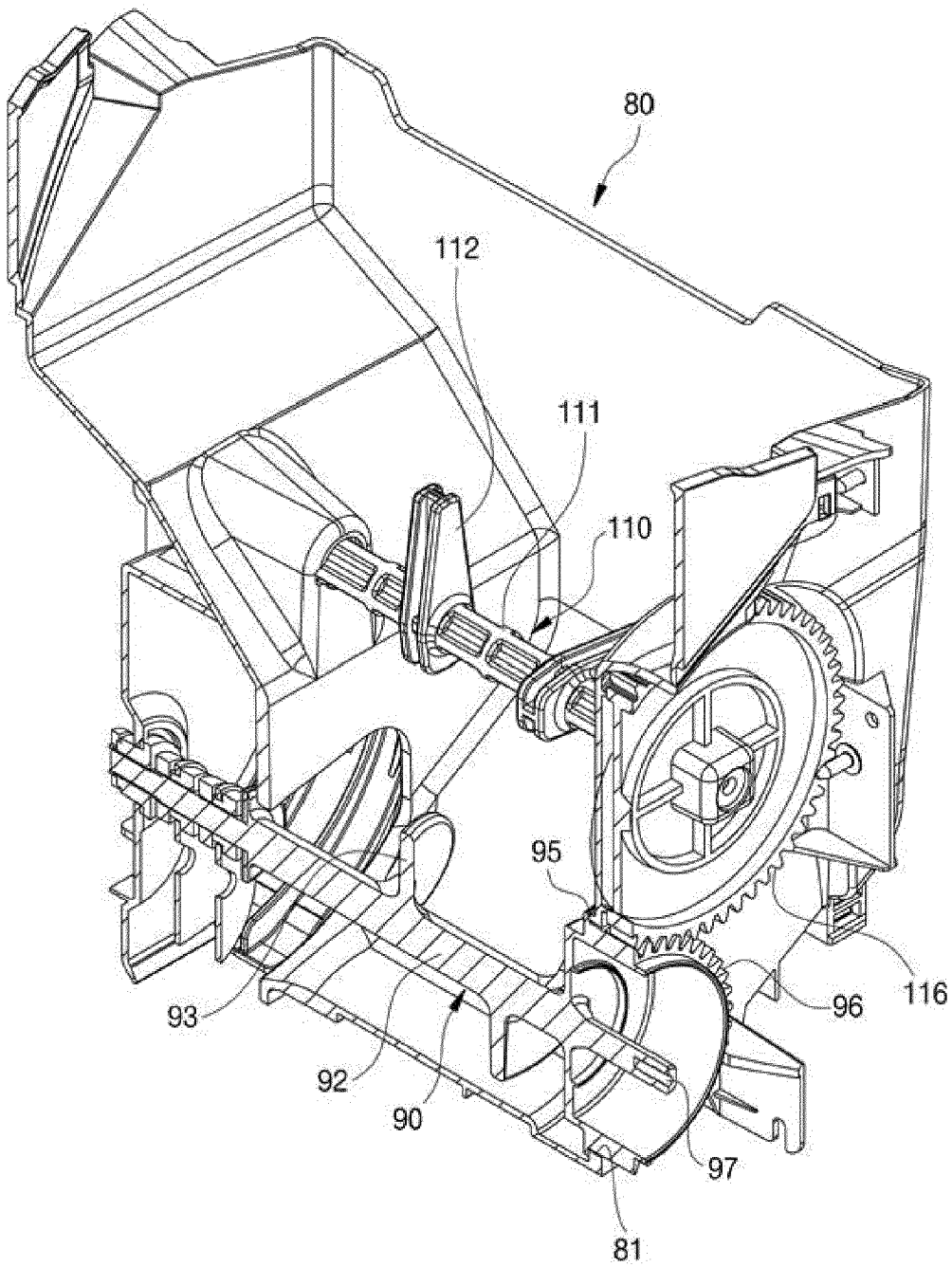

FIG. 6

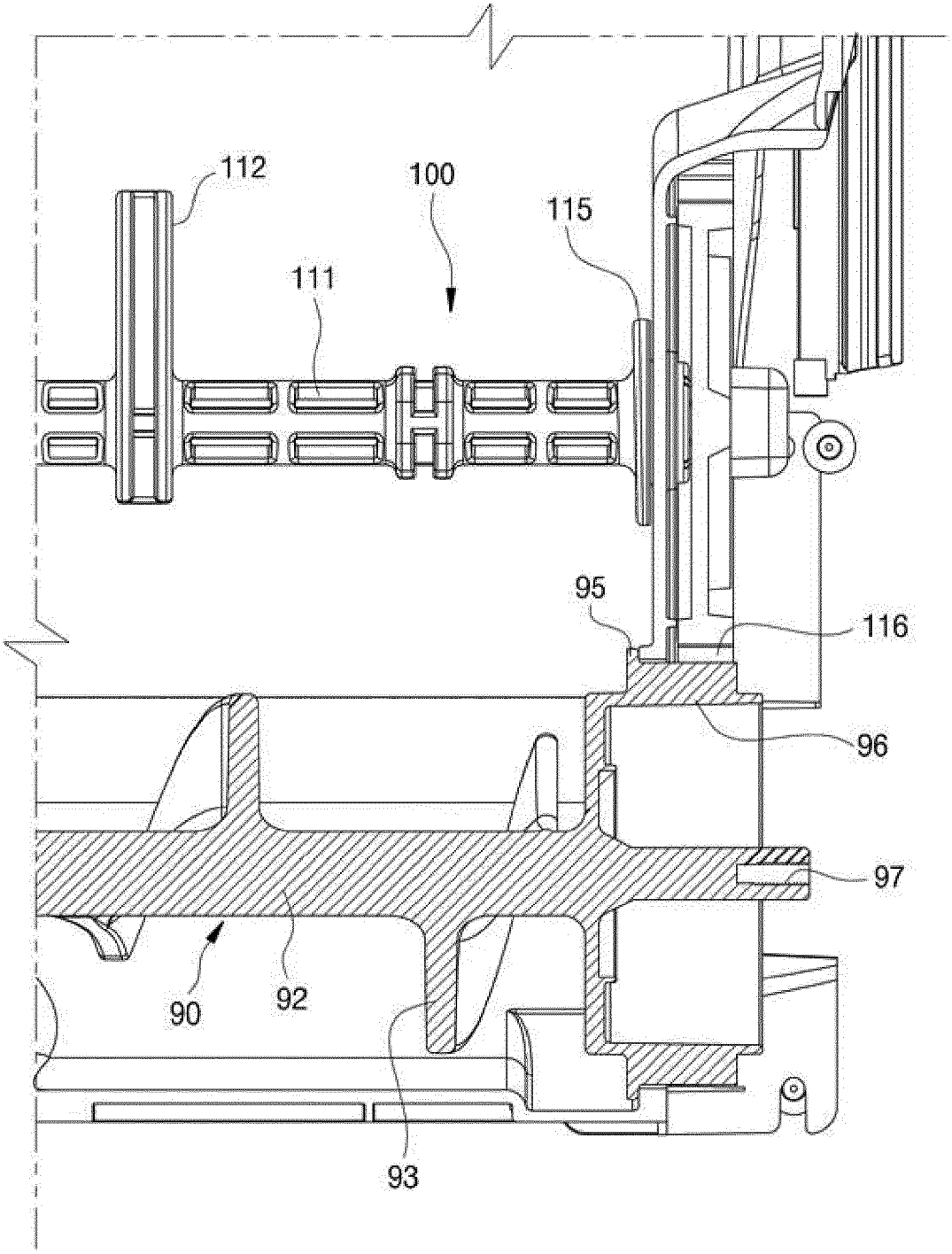

FIG. 7

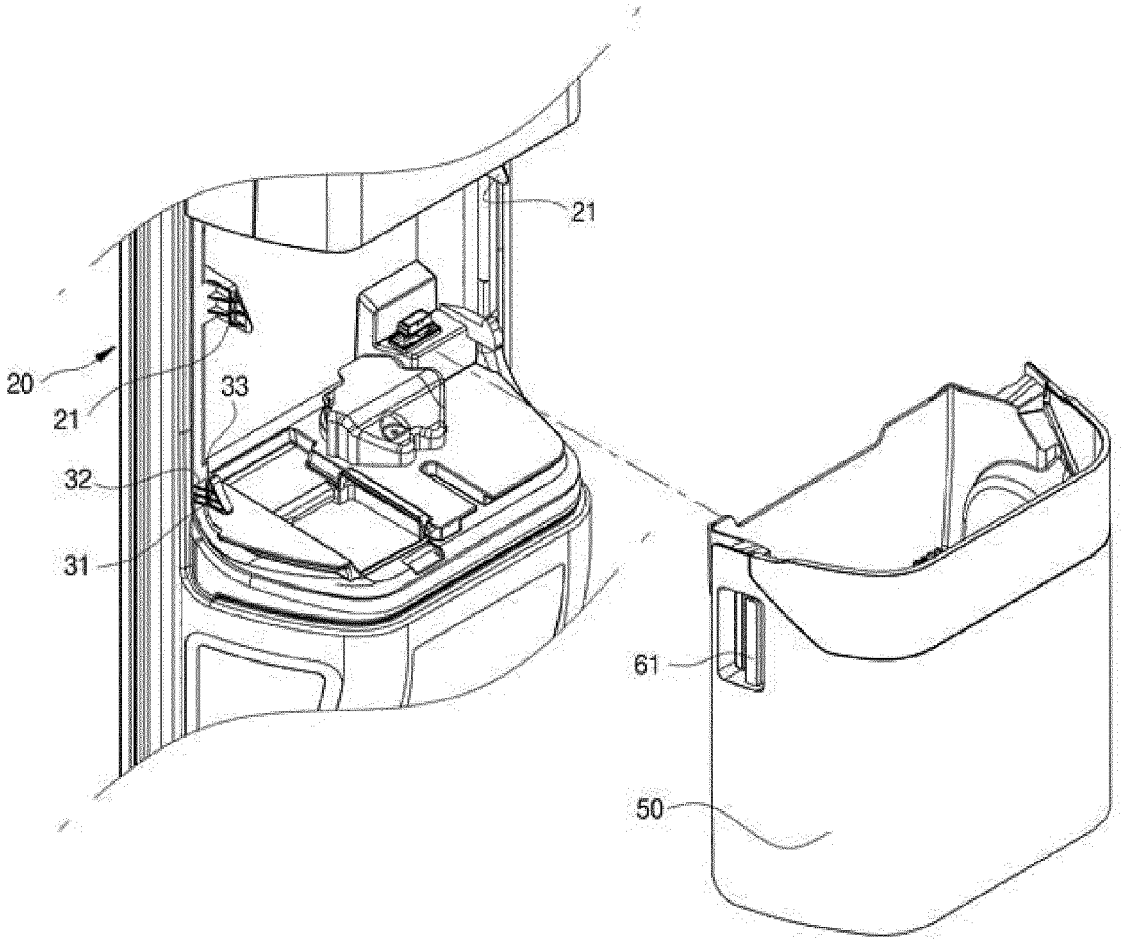

FIG. 8

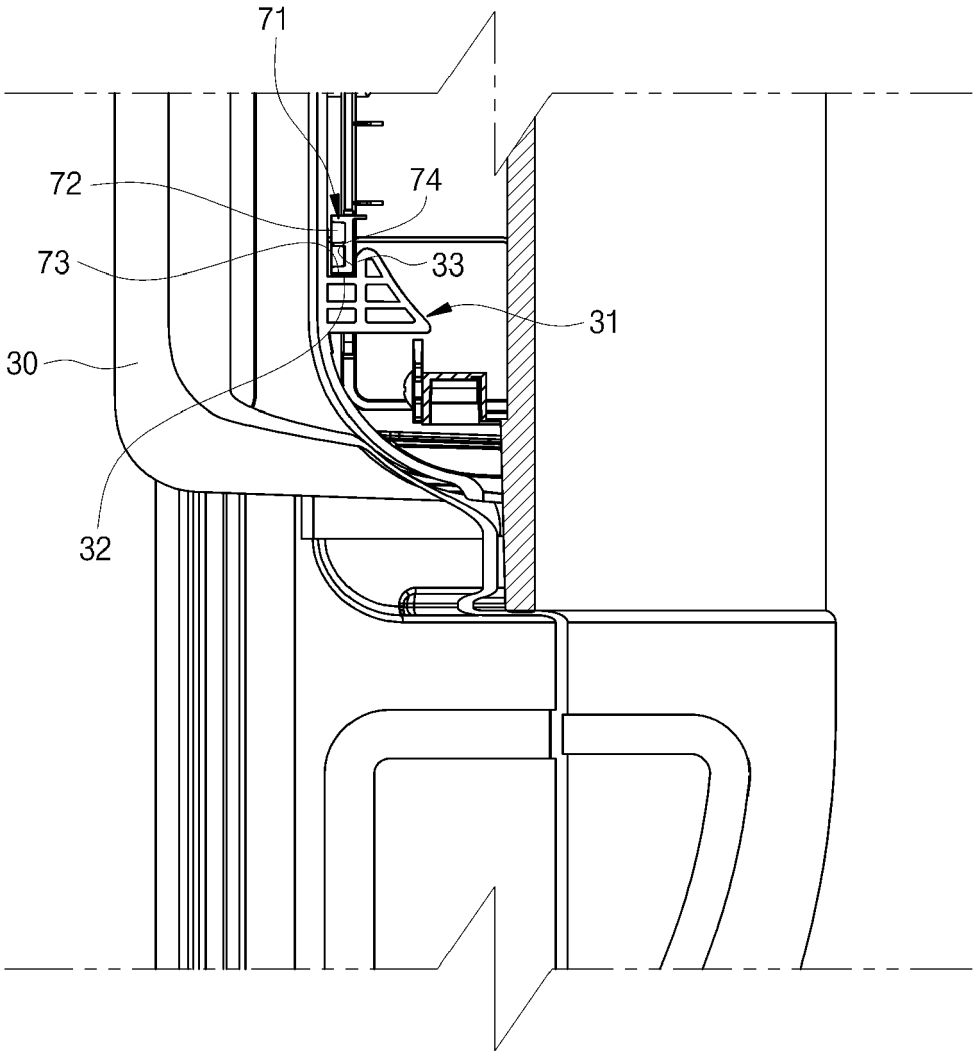

FIG. 9

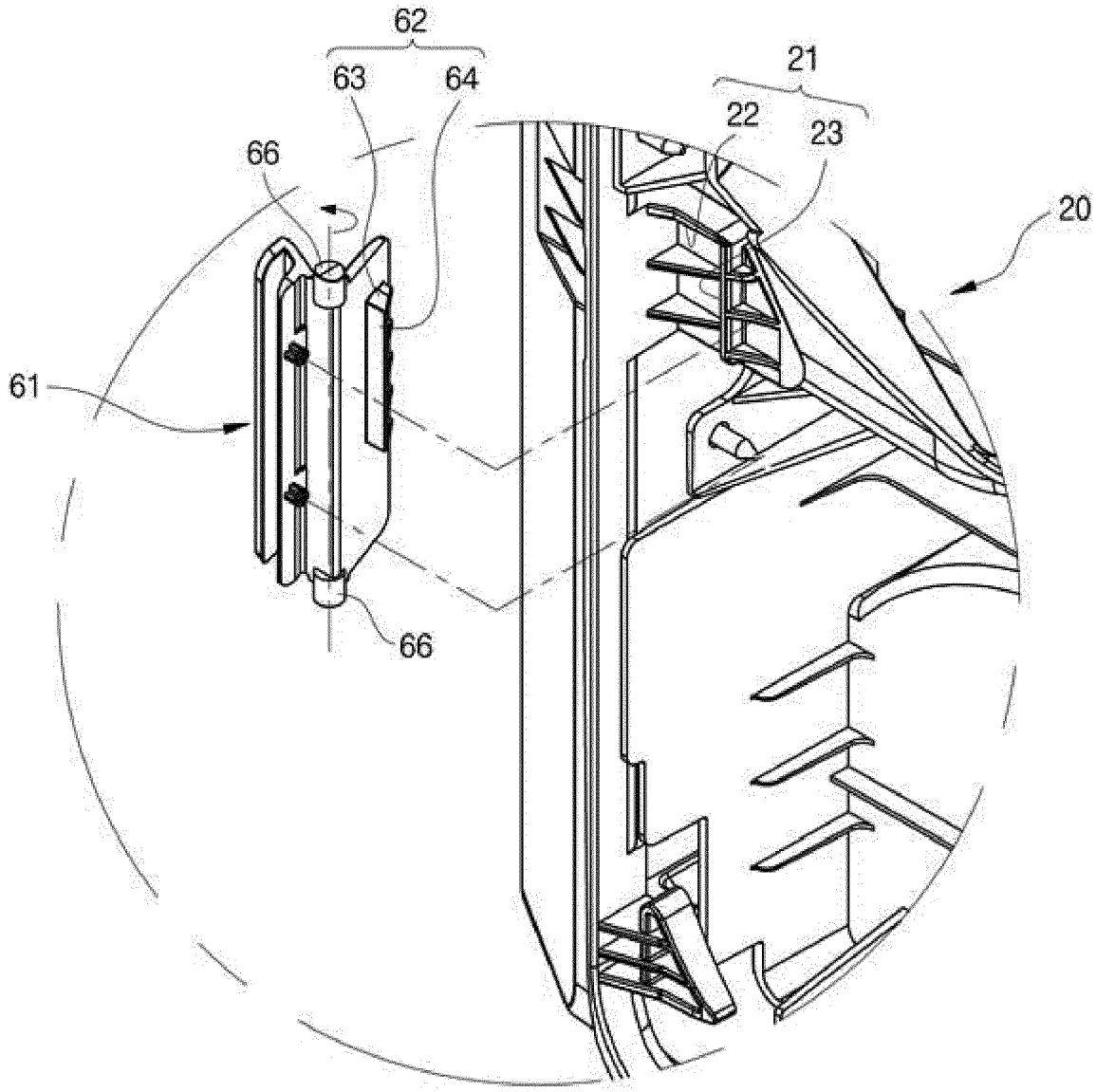

FIG. 10