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Description

[0001] The present application claims priority to Chinese Patent Application No. 201910240518.5, filed to the Chinese Patent Office on March 28, 2019 and titled "Ice Crushing Device and Refrigerator Having the Same".

TECHNICAL FIELD

[0002] The present invention relates to the field of household appliances and particularly to an ice crushing device and a refrigerator having the same.

BACKGROUND

[0003] As science and technology develops continuously and people's living standard improves continuously, in order to adapt for people's higher and higher requirements for life quality, household appliances also have more and more functions, e.g., an ice maker is added to the refrigerator. Generally, the ice maker of the refrigerator comprises an ice making device and an ice crushing device. The ice making device prepares ice cubes and then stores them in a barrel-shaped container. The ice crushing device is used to crush ice to facilitate access by users.

[0004] At present, a transmission mode adopted by the ice maker of the refrigerator is that a motor drives a rotatable bucket of the ice crushing device to rotate through the transmission of a bevel gear and a spur gear, with a low transmission efficiency. Since the ice crushing motor and the transmission mechanism are located below the ice storage box, crushed ice is liable to fall into a gap between the gears, which will affect the transmission and cause the gears to adhere. When the ice maker fails when water is filled, the failure is prone to cause continuous water filling into the ice maker. At this time, water is prone to accumulate in an installation cavity of the ice crushing motor, thereby causing motor failure and safety hazards. Furthermore, after the water level rises, the accumulated water will flow along an air duct of the refrigerator to the cabinet and is prone to cause damages to an evaporator of the refrigerator. In addition, since the ice maker is in a freezing environment and the external of the ice maker is in a refrigerated environment, the surface of the ice maker is prone to condensation, which reduces the user experience.

[0005] US 2013/104587 A1 discloses an ice dispenser for a refrigeration appliance is provided that can deliver both crushed ice and whole or non-crushed ice. A rotating drum or cylinder carries one or more blades that can crush ice against non-rotating blades carried on an axis or rod that extends into the drum. The direction of rotation of the drum can be selected so as to determine whether crushed or non-crushed ice is dispensed. The dispensing system can be located on the door of the refrigerator. An ice maker can also be positioned with the ice dispenser on the door of the appliance or, optionally, can be located

in a compartment of the refrigerator.

[0006] Therefore, in view of the above-mentioned existing problems, it is necessary to further improve the prior art to improve the convenience in using the refrigerator.

SUMMARY

[0007] An object of the present invention is to provide an ice crushing device and a refrigerator having the same, to solve problems with conventional refrigerators that the ice maker has a low transmission efficiency, the crushed ice is prone to cause adhesion of gears, and the accumulated water is apt to cause damages to the motor and evaporator, and thereby improving the convenience in using the refrigerator.

[0008] To achieve one of the above objects of the invention, the present invention provides a refrigerator according to the appended set of claims.

[0009] As compared with the prior art, the present invention has the following advantageous effects: improve the transmission efficiency of the motor, and prevent crushed ice from causing the adhesion of gears and prevent the accumulated air from causing damages to the motor and evaporator, thereby improving the convenience in using the refrigerator.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010]

FIG. 1 is a schematic structural view of a refrigerator door body in an embodiment of the present invention; FIG. 2 is a schematic structural view of a first accommodation cavity and an ice crushing device; FIG. 3 is an exploded view of the ice crushing device; FIG. 4 is a schematic structural view of a driving unit; FIG. 5 is a schematic structural view of a connection box; FIG. 6 is a schematic structural view of a cover plate; FIG. 7 is a cross-sectional view of the cover plate; FIG. 8 is a cross-sectional view taken along line X-X in a frame A of FIG. 2; FIG. 9 is an enlarged schematic structural view of a portion in a circle C of FIG. 8; FIG. 10 is an enlarged schematic structural view of a portion in a circle D of FIG. 8; FIG. 11 is a cross-sectional view taken along line Y-Y in the frame A of FIG. 2; FIG. 12 is an enlarged schematic structural view of a portion in a dashed-line box B of FIG. 2; FIG. 13 is a schematic view of a back side of a door body; FIG. 14 is an enlarged schematic structural view of a portion in a circle E of FIG. 13.

[0011] In the figures: 1. door body; 11. first accommodation cavity; 12. second accommodation cavity; 121.

opening; 1211. waterproof flange; 13. heating wire; 14. sealing ring; 15. first gap; 16. second gap; 2. refrigeration compartment; 3. lower air duct; 4. ice crushing bucket; 5. cutter head; 6. drive unit; 61. driving rod; 62. gear set; 621. first gear; 622. second gear; 623. connection box; 6231. first box body; 6232. second box body; 6232a. upper cover; 6232b. lower cover; 6233. side wall; 6233A. hollow portion; 63. motor; 7. cover plate; 71. cover plate body; 72. extension wall; 73. first waterproof block; 74. second waterproof block; 75. waterproof groove; 8. first water drain pipe; 9. ice outlet channel; 10. second water drain pipe; 11. third water drain pipe.

DETAILED DESCRIPTION

[0012] To make the objectives, technical solutions and advantages of the present invention clearer, technical solutions of the present application will be described below in conjunction with specific embodiments of the present application with reference to figures.

[0013] Embodiments of the present invention will be described in detail. Examples of the embodiments are shown in the figures, wherein the same or like reference signs always denote the same or similar elements or elements having the same or similar functions. The embodiments described hereunder with reference to figures are exemplary, and are only intended to illustrate the present invention, and cannot be construed as limiting the present invention.

[0014] The terms "above", "below", "in", "out", and the like as used here, which denote spatial relative positions, describe the relationship of a component relative to another component in the accompanying drawings for the purpose of illustration. The terms of the spatial relative positions may be intended to comprise different orientations of the device in use or operation other than the orientations shown in the accompanying drawings. For example, the units that are described as being located "below" or "above" other units or features will be located "above" or "below" other units or features if the device in the accompanying drawings is turned upside down. Thus, the exemplary term "below" can encompass both two spatial orientations, namely, below and above.

[0015] The device can be oriented in other ways (rotated by 90 degrees or other orientations), and the space-related descriptors used herein are explained accordingly. As in the present invention, for ease of description, when the refrigerator is in normal use, the direction toward the ground is downward, the direction away from the ground is upward, the direction parallel to the ground is a horizontal direction, and the direction perpendicular to the ground is a vertical direction.

[0016] As shown in FIG. 1 through FIG. 12, an embodiment of the present invention provides an ice crushing device, which is disposed on a door body 1 of the refrigerator. The door body 1 is provided with a first accommodation cavity 11 and a second accommodation cavity 12 with an opening 121; the ice crushing device comprises:

an ice crushing bucket 4 disposed in the first accommodation cavity 11, a cutter head 5 disposed in the ice crushing bucket 4, and a driving unit 6 at least partially disposed in the second accommodation cavity 12. The driving unit 6 comprises: a driving rod 61 connected to the cutter head 5 and driving the cutter head 5 to rotate in the ice crushing bucket 4, a gear set 62 connected to and acting on the driving rod 61, and a motor 63 for driving the gear set 62 to operate; wherein an edge of the door body 1 is provided with a heating wire 13; the ice crushing device further comprises: a cover plate 7 for closing the opening 121 of the second accommodation cavity 12 so that the second accommodation cavity 12 is formed as a closed space, and a first drain pipe 8 communicating the second accommodation cavity 12 with the refrigeration compartment 2 of the refrigerator; the cover plate 7 is sealingly connected with the opening 121 by a waterproof flange 1211 and a waterproof groove 75 that fit with each other; one of end holes of the first drain pipe 8 is disposed at the bottom of the second accommodation cavity 12, and the other of the end holes is exposed to the refrigeration compartment 2 and disposed close to the heating wire 13.

[0017] Specifically, the door body 1 of the refrigerator is provided with a first accommodation cavity 11 and a second accommodation cavity 12; the second accommodation cavity 12 is located below the first accommodation cavity 11 and provided with an upward opening 121. The first accommodation cavity 11 is communicated with the second accommodation cavity 12 through the opening 121, and the two accommodation cavities are located in an upper half of the door body 1 to facilitate the user to stand and use the crushed ice prepared the refrigerator. The edge of the door body 1 is also provided with a heating wire 13, the heating wire 13 extends along the periphery of the first accommodation cavity 11, and the heating wire 13 can prevent condensation.

[0018] The ice crushing device comprises an ice crushing bucket 4, a cutter head 5, and a driving unit 6. The driving unit 6 comprises a driving rod 61, a gear set 62 and a motor 63; the ice crushing bucket 4 is located in the first accommodation cavity 11, and the cutter head 5 is disposed in the ice crushing bucket 4; the motor 63 is placed in the second accommodation cavity 12 with an output shaft vertically upward, the output shaft of the motor 63 is connected to and drives the gear set 62 to operate, the gear set 62 is connected to and drives the driving rod 61 to rotate, the driving rod 61 is connected to the cutter head 5 and drives the cutter head 5 to rotate in the ice crushing bucket 4, thereby realizing ice crushing.

[0019] The ice crushing device further comprises a cover plate 7 and a first drain pipe 8; the cover plate 7 is provided with a waterproof groove 75, the opening 121 of the second accommodation cavity 12 is provided with a waterproof flange 1211, the waterproof flange 1211 and the waterproof groove 75 engage with each other to sealingly connect the cover plate 7 with the opening 121,

thereby forming a closed space in the second accommodation cavity 12 to prevent water and ice slag from entering the second accommodation cavity 12 to affect normal operation of the motor 63; one of end holes of the first drain pipe 8 is disposed at the bottom of the second accommodation cavity 12, and the other of the end holes is exposed to the refrigeration compartment 2 and close to the heating wire 13, thereby communicating the second accommodation cavity 12 with the refrigeration compartment 2 of the refrigerator, to drain the accumulated water inside the second accommodation cavity 12 and prevent the accumulated water from affecting the motor 63 and causing damages.

[0020] Further, the gear set 62 comprises: a first gear 621 sleeved on an outer circumference of the ice crushing bucket 4, and a second gear 622 that meshes with the first gear 621 to indirectly drive the cutter head 5 to rotate; wherein the first gear 621 is disposed at an upper end of the ice crushing bucket 4 and coaxial with the driving rod 61, a central axis of the second gear 622 is parallel to the driving rod 61, and the motor 63 drives the second gear 622 to rotate.

[0021] As shown in FIG. 3 and FIG. 4, the gear set 62 comprises the first gear 621 and the second gear 622; the first gear 621 is sleeved on an upper end of the outer circumference of the ice crushing bucket 4 and is coaxial with the driving rod 61, and the second gear 622 and the first gear 621 mesh with each other and the central axis of the second gear 622 is parallel to the driving rod 61. When the motor 63 is connected to and drives the second gear 622 to rotate, the second gear 622 indirectly drives the cutter head 5 to rotate via the first gear 621 and the ice crushing bucket 4, thereby performing the ice crushing function.

[0022] Preferably, the first gear 621 and the second gear 622 may be configured as spur gears. By improving the transmission manner with two bevel gears in the prior art, the motor 63 is mounted below the ice crushing bucket 4, and the direct transmission through the spur gears may greatly improve the transmission efficiency of the motor 63 and reduce the transmission loss.

[0023] Furthermore, the gear set 62 further comprises: a connection box 623 fixedly disposed in the first accommodation cavity 11, and the connection box 623 comprises: a first box body 6231 receiving the first gear 621 and a second box body 6232 receiving the second gear 622 and connected to the first box body 6231; the first box body 6231 and the second box body 6232 share a side wall 6233, and the side wall 6233 is at least partially hollowed out to form a hollow portion 6233A, and the first gear 621 and the second gear 622 are in meshing connection with each other through the hollow portion 6233A.

[0024] Furthermore, the second box body 6232 comprises an upper cover 6232a and a lower cover 6232b that are detachably provided with each other. An upper edge of the lower cover 6232b is disposed lower than the upper edge of the first box body 6231, and the second gear 622 is disposed in the accommodation cavity formed

between the upper cover 6232a and the lower cover 6232b.

[0025] As shown in FIG. 5, the gear set 62 further comprises a connection box 623 which is fixedly disposed in the first accommodation cavity 11; the connection box 623 comprises a first box body 6231 and a second box body 6232; the first box body 6231 is received in the first gear 621, and the second box body 6232 is received in the second gear 622; the first box body 6231 and the second box body 6232 share a side wall 6233 for fixed connection, and a portion of the side wall 6233 is hollowed out to form a hollow portion 6233A, and the first gear 621 and the second gear 622 are in meshing connection with each other in a space where the hollow portion 6233A is located.

[0026] The second box body 6232 further comprises an upper cover 6232a and a lower cover 6232b which are detachably disposed; the second gear 622 is disposed in the accommodation cavity formed after the upper cover 6232a and the lower cover 6232b are sealingly connected; an upper edge of the lower cover 6232b is lower than an upper edge of the first box body 6231; after the upper cover 6232a and the lower cover 6232b are connected, the upper cover 6232a abuts against the side wall 6233, which may ensure the sealing performance of the connection between the upper cover 6232a and the lower cover 6232b and effectively prevent adhesion of the gears as ice slag falls into the gap between the gears.

[0027] Further, an upper end edge of the opening 121 constitutes a waterproof flange 1211; the cover plate 7 comprises: a cover plate body 71, an extension wall 72 extending from the edge of the cover plate body 71 perpendicularly towards the opening 121, a first waterproof block 73 disposed extending from the extension wall 72 away from the end of the cover plate body 71, and a second waterproof block 74 disposed on an end face of the first waterproof block 73 away from the opening 121; a waterproof groove 75 is provided in a portion shared by the first waterproof block 73 and second waterproof block 74, and provided on an end face of the first waterproof block 73 towards the opening 121; a depth of the waterproof groove 75 is not smaller than a height of the first waterproof block 73.

[0028] Specifically, the upper end edge of the opening 121 protrudes vertically upwards to form a closed waterproof flange 1211. The downward side of the cover plate 7 is provided with the waterproof groove 75, and the waterproof flange 1211 is hermetically connected with the waterproof groove 75.

[0029] As shown in FIG. 6 and FIG. 7, the cover 7 comprises a cover plate body 71, an extension wall 72, a first waterproof block 73 and a second waterproof block 74; the cover plate body 71 is disposed in a horizontal direction, the edge of the cover plate body 71 extends vertically downward to form the extension wall 72, the edge of the extension wall 72 extends horizontally outward to form the first waterproof block 73, and the second waterproof block 74 is stacked on top of the first waterproof block

73; the waterproof groove 75 is provided in an overlapping region of the first waterproof block 73 and the second waterproof block 74 and opens downward, and the depth of the waterproof groove 75 is not smaller than the height of the first waterproof block 73.

[0030] It can be seen that the cover plate 7 can not only shield the motor 63 to prevent ice slag from falling into the motor 63, but also effectively block the accumulated water outside the waterproof flange 1211 to prevent the accumulated water from flowing into the second accommodation cavity 12 and affecting the motor 63.

[0031] Furthermore, a sealing ring 14 is provided on the peripheral side of the door body 1, the heating wire 13 is arranged around the sealing ring 14 and at least partially forms a first gap 15 with the sealing ring 14, and the other end hole of the first drain pipe 8 is disposed in the first gap 15.

[0032] As shown in FIG. 8 and FIG. 9, the first accommodation cavity 11 is provided with a matching small door (not shown in the figures). The small door may close the first accommodation cavity 11 to seal it, thereby isolating a freezing space in the first accommodation cavity 11 from an external refrigeration space; the sealing ring 14 extends along the periphery of the opening of the first accommodation cavity 11. After the small door is closed, the sealing ring 14 abuts against the small door to ensure the sealing performance of the small door relative to the first accommodation cavity 11 and prevent the circulation of the cold air. The heating wire 13 is disposed around the outer periphery of the sealing ring 14 and forms several gaps with the sealing ring 14. The end hole of the first drain pipe 8 is disposed in the first gap 15, i.e., the end hole of the first drain pipe 8 is disposed between the sealing ring 14 the heating wire 13, thereby effectively suppressing occurrence of condensation in the first drain pipe 8.

[0033] Preferably, the heating wire 13 surrounds the end hole of the first drain pipe 8 in an arcuate shape, which may expand the heated area and greatly suppress the condensation phenomenon.

[0034] Furthermore, the ice crushing device further comprises an ice outlet channel 9 communicating the ice crushing bucket 4 with the outside of the door body 1; a second drain pipe 10 communicated with the ice outlet channel 9 is provided on the side wall 6233 of the ice outlet channel 9, and the other end hole of the second drain pipe 10 is exposed to the refrigeration compartment 2 and disposed close to the heating wire 13.

[0035] Furthermore, the heating wire 13 and the sealing ring 14 further form a second gap 16, and the other end hole of the second drain pipe 10 is disposed in the second gap 16.

[0036] As shown in FIG. 11 and FIG. 12, the ice crushing device further comprises an ice outlet channel 9, the ice outlet channel 9 communicates the ice crushing bucket 4 with the outside of the door body 1 and transports ice cubes to the outside of the refrigerator to facilitate the user to use ice; a second drain pipe 10 is provided on

the side wall 6233 of the ice outlet channel 9, and the other end hole of the second drain pipe 10 is also exposed to the refrigeration compartment 2 and close to the heating wire 13, i.e., located in the second gap 16 formed by the heating wire 13 and the sealing ring 14.

[0037] Therefore, when an abnormal water fill process of the ice maker of the refrigerator causes continuous water fill or large water accumulation in the ice crushing bucket 4, since the first accommodation cavity 11 is sealed by the small door and the sealing ring 14 and the ice outlet channel 9 is sealed by an ice outlet cover plate (not shown), water will accumulate in the ice outlet channel 9 and spread to the first accommodation cavity 11. At this time, the second drain pipe 10 may drain the accumulated water to prevent the accumulated water from entering the first accommodation cavity 11 to cause damages to the motor 63, and also prevent the accumulated water from flowing to the cabinet along the air duct of the refrigerator, thereby causing damages to the evaporator in the cabinet, after the water level rises.

[0038] Preferably, the second drain pipe 10 is disposed at the top of the ice outlet channel 9 to quickly discharge the accumulated water spreading into the first accommodation cavity 11 in time.

[0039] Further, a third drain pipe 21 communicated with the first accommodation cavity 11 is provided at the bottom of the first accommodation cavity 11, and the other end hole of the third drain pipe 21 is exposed to the lower air duct 3 on the door body 1.

[0040] As shown in FIG. 13 and FIG. 14, the bottom of the first accommodation cavity 11 is also provided with the third drain pipe 21 which communicates the first accommodation cavity 11 with the lower air duct 3 disposed on the door body 1 of the refrigerator, thereby further draining the water accumulated in the first accommodation cavity 11 and preventing the damages caused by the accumulated water entering the evaporator.

[0041] In order to achieve one of the above-mentioned objects of the present invention, the present invention provides a refrigerator comprising a door body 1 and the ice crushing device which is disposed on the door body 1 so that the user can conveniently take ice from the outside of the door body 1.

[0042] To conclude, in the refrigerator having the ice crushing device according to the present invention, the transmission mode of the motor 63 is improved, the cover plate 7 prevents ice slag and water from entering the motor 63 and affecting the motor 63 in the ice crushing process, and meanwhile a plurality of water drain pipes are provided to drain the possible accumulated water as soon as possible in time, thereby solving problems with the conventional refrigerator that the ice maker has a low transmission efficiency, the crushed ice is prone to cause adhesion of gears, and the accumulated water is apt to cause damages to the motor 63 and evaporator, and thereby improving the convenience in using the refrigerator.

[0043] The detailed descriptions set forth above are

merely specific illustrations of feasible embodiments of the present invention, and are not intended to limit the scope of protection of the present invention. The scope of protection of the present invention is defined by the appended claims.

Claims

1. A refrigerator comprising a door body (1) and

an ice crushing device, the ice crushing device being disposed on the door body (1), wherein the door body (1) is provided with a first accommodation cavity (11) and a second accommodation cavity (12) with an opening (121); the ice crushing device comprises: an ice crushing bucket (4) disposed in the first accommodation cavity (11), a cutter head (5) disposed in the ice crushing bucket (4), and a driving unit (6) at least partially disposed in the second accommodation cavity (12), the driving unit (6) comprising: a driving rod (61) connected to the cutter head (5) and driving the cutter head (5) to rotate in the ice crushing bucket (4), a gear set (62) connected to and acting on the driving rod (61), and a motor (63) for driving the gear set (62) to operate;

the ice crushing device further comprises: a cover plate (7) for closing the opening of the second accommodation cavity (12) so that the second accommodation cavity (12) is formed as a closed space,

characterized by:

a first drain pipe (8) communicating the second accommodation cavity (12) with a refrigeration compartment of the refrigerator; wherein an edge of the door body (1) is provided with a heating wire (13);

the cover plate (7) is sealingly connected with the opening (121) by a waterproof flange (1211) and a waterproof groove (75) that fit with each other;

one of end holes of the first drain pipe (8) is disposed at a bottom of the second accommodation cavity (12), and the other of the end holes is exposed to the refrigeration compartment and disposed close to the heating wire (13); and wherein

a sealing ring (14) is provided on a peripheral side of the door body (1), the heating wire (13) is arranged around the sealing ring (14) and at least partially forms a first gap (15) with the sealing ring (14), and the other end hole of the first drain pipe (8) is disposed in the first gap (15).

2. The refrigerator according to claim 1, wherein the gear set (62) comprises:

a first gear (621) sleeved on an outer circumference of the ice crushing bucket (4), and a second gear (622) that meshes with the first gear (621) to indirectly drive the cutter head (5) to rotate; wherein the first gear (621) is disposed at an upper end of the ice crushing bucket (4) and coaxial with the driving rod (61), a central axis of the second gear (622) is parallel to the driving rod (61), and the motor drives the second gear (622) to rotate.

3. The refrigerator according to claim 2, wherein the gear set (62) further comprises:

a connection box (623) fixedly disposed in the first accommodation cavity (11), the connection box (623) comprising: a first box body (6231) receiving the first gear (621), and a second box body (6232) receiving the second gear (622) and connected to the first box body (6231);

the first box body (6231) and the second box body (6232) share a side wall (6233), and the side wall (6233) is at least partially hollowed out to form a hollow portion (6233A), and the first gear (621) and the second gear (622) are in meshing connection with each other through the hollow portion (6233A).

4. The refrigerator according to claim 3, wherein the second box body (6232) comprises an upper cover (6232a) and a lower cover (6232b) that are detachably provided with each other, an upper edge of the lower cover (6232b) is disposed lower than an upper edge of the first box body (6231), and the second gear (622) is disposed in the accommodation cavity formed between the upper cover (6232a) and the lower cover (6232b).

5. The refrigerator according to claim 1, wherein an upper end edge of the opening (121) constitutes the waterproof flange (1211);

the cover plate (7) comprises: a cover plate body (71), an extension wall (72) extending from the edge of the cover plate body (71) perpendicularly towards the opening (121), a first waterproof block (73) disposed extending from the extension wall (72) away from the end of the cover plate body (71), and a second waterproof block (74) disposed on an end face of the first waterproof block (73) away from the opening (121); the waterproof groove (75) is provided in a portion shared by the first waterproof block (73) and second waterproof block (74), and provided on an end face of the first waterproof block (73)

towards the opening (121);
a depth of the waterproof groove (75) is not smaller than a height of the first waterproof block (74).

6. The refrigerator according to claim 1, wherein the ice crushing device further comprises an ice outlet channel (9) communicating the ice crushing bucket (4) with the outside of the door body (1); a second drain pipe (10) communicated with the ice outlet channel (9) is provided on the side wall (6233) of the ice outlet channel (9), and the other end hole of the second drain pipe (10) is exposed to the refrigeration compartment and disposed close to the heating wire (13).
7. The refrigerator according to claim 6, wherein the heating wire (13) and the sealing ring (14) further form a second gap (16), and the other end hole of the second drain pipe (10) is disposed in the second gap (16).
8. The refrigerator according to claim 1, wherein a third drain pipe (21) communicated with the first accommodation cavity (11) is provided at the bottom of the first accommodation cavity (11), and the other end hole of the third drain pipe (21) is exposed to a lower air duct (3) on the door body (1).

Patentansprüche

1. Kühlschrank mit einem Türkörper (1) und einer Eiszerkleinerungsvorrichtung, wobei die Eiszerkleinerungsvorrichtung an dem Türkörper (1) angeordnet ist, wobei der Türkörper (1) mit einem ersten Aufnahmehohlraum (11) und einem zweiten Aufnahmehohlraum (12) mit einer Öffnung (121) versehen ist;

die Eiszerkleinerungsvorrichtung umfasst: einen Eiszerkleinerungseimer (4), der in dem ersten Aufnahmehohlraum (11) angeordnet ist, einen Schneidkopf (5), der in dem Eiszerkleinerungseimer (4) angeordnet ist, und eine Antriebseinheit (6), die zumindest teilweise in dem zweiten Aufnahmehohlraum (12) angeordnet ist, wobei die Antriebseinheit (6) umfasst: eine Antriebsstange (61), die mit dem Schneidkopf (5) verbunden ist und den Schneidkopf (5) antreibt, um sich in dem Eiszerkleinerungseimer (4) zu drehen, einen Getriebeatz (62), der mit der Antriebsstange (61) verbunden ist und auf diese einwirkt, und einen Motor (63) zum Antreiben des Getriebeatzes (62), um zu arbeiten; die Eiszerkleinerungsvorrichtung ferner umfasst: eine Abdeckplatte (7) zum Verschließen der Öffnung des zweiten Aufnahmehohlraums (12), so dass der zweite Aufnahmehohlraum

(12) als ein geschlossener Raum ausgebildet ist, **gekennzeichnet durch:**

ein erstes Abflussrohr (8), das den zweiten Aufnahmehohlraum (12) mit einem Kühlfach des Kühlschranks verbindet; wobei ein Rand des Türkörpers (1) mit einem Heizdraht (13) versehen ist; die Abdeckplatte (7) mit der Öffnung (121) durch einen wasserdichten Flansch (1211) und eine wasserdichte Nut (75), die zueinander passen, dicht verbunden ist; eines der Endlöcher des ersten Abflussrohrs (8) an einem Boden des zweiten Aufnahmehohlraums (12) angeordnet ist und das andere der Endlöcher dem Kühlraum ausgesetzt ist und nahe dem Heizdraht (13) angeordnet ist; und wobei ein Dichtungsring (14) an einer Umfangsseite des Türkörpers (1) vorgesehen ist, der Heizdraht (13) um den Dichtungsring (14) herum angeordnet ist und zumindest teilweise einen ersten Spalt (15) mit dem Dichtungsring (14) bildet, und das andere Endloch des ersten Abflussrohrs (8) in dem ersten Spalt (15) angeordnet ist.

2. Kühlschrank nach Anspruch 1, wobei der Getriebeatz (62) Folgendes umfasst:

ein erstes Zahnrad (621), das an einem Außenumfang des Eiszerkleinerungseimers (4) angebracht ist, und ein zweites Zahnrad (622), das in das erste Zahnrad (621) eingreift, um den Schneidkopf (5) indirekt in Drehung zu versetzen; wobei das erste Zahnrad (621) an einem oberen Ende des Eiszerkleinerungseimers (4) und koaxial mit der Antriebsstange (61) angeordnet ist, eine Mittelachse des zweiten Zahnrads (622) parallel zu der Antriebsstange (61) verläuft und der Motor das zweite Zahnrad (622) zum Drehen antreibt.

3. Kühlschrank nach Anspruch 2, wobei der Getriebeatz (62) ferner Folgendes umfasst:

einen Verbindungskasten (623), der fest in dem ersten Aufnahmehohlraum (11) angeordnet ist, wobei der Verbindungskasten (623) umfasst: einen ersten Kastenkörper (6231), der das erste Zahnrad (621) aufnimmt, und einen zweiten Kastenkörper (6232), der das zweite Zahnrad (622) aufnimmt und mit dem ersten Kastenkörper (6231) verbunden ist; der erste Gehäusekörper (6231) und der zweite Gehäusekörper (6232) eine Seitenwand (6233) gemeinsam haben und die Seitenwand (6233)

zumindest teilweise ausgehöhlt ist, um einen hohlen Abschnitt (6233A) zu bilden, und das erste Zahnrad (621) und das zweite Zahnrad (622) durch den hohlen Abschnitt (6233A) in Eingriffsverbindung miteinander stehen.

4. Kühlschrank nach Anspruch 3, wobei der zweite Gehäusekörper (6232) eine obere Abdeckung (6232a) und eine untere Abdeckung (6232b) umfasst, die abnehmbar miteinander verbunden sind, wobei eine obere Kante der unteren Abdeckung (6232b) niedriger als eine obere Kante des ersten Gehäusekörpers (6231) angeordnet ist und das zweite Zahnrad (622) in dem Aufnahmehohlraum angeordnet ist, der zwischen der oberen Abdeckung (6232a) und der unteren Abdeckung (6232b) gebildet wird.

5. Kühlschrank nach Anspruch 1, wobei eine obere Endkante der Öffnung (121) den wasserdichten Flansch (1211) bildet;

die Abdeckplatte (7) umfasst: einen Abdeckplattenkörper (71), eine Verlängerungswand (72), die sich von der Kante des Abdeckplattenkörpers (71) senkrecht zu der Öffnung (121) erstreckt, einen ersten wasserdichten Block (73), der so angeordnet ist, dass er sich von der Verlängerungswand (72) weg von dem Ende des Abdeckplattenkörpers (71) erstreckt, und einen zweiten wasserdichten Block (74), der an einer Endfläche des ersten wasserdichten Blocks (73) weg von der Öffnung (121) angeordnet ist; die wasserdichte Nut (75) in einem Abschnitt vorgesehen ist, der von dem ersten wasserdichten Block (73) und dem zweiten wasserdichten Block (74) gemeinsam genutzt wird, und an einer Endfläche des ersten wasserdichten Blocks (73) in Richtung der Öffnung (121) vorgesehen ist;

eine Tiefe der wasserdichten Nut (75) nicht geringer ist als eine Höhe des ersten wasserdichten Blocks (74).

6. Kühlschrank nach Anspruch 1, wobei die Eiszerkleinerungsvorrichtung ferner einen Eisauslasskanal (9) umfasst, der den Eiszerkleinerungseimer (4) mit der Außenseite des Türkörpers (1) verbindet; ein zweites Abflussrohr (10), das mit dem Eisauslasskanal (9) in Verbindung steht, an der Seitenwand (6233) des Eisauslasskanals (9) vorgesehen ist, und das andere Endloch des zweiten Abflussrohrs (10) dem Kühlfach ausgesetzt und in der Nähe des Heizdrahts (13) angeordnet ist.

7. Kühlschrank nach Anspruch 6, wobei der Heizdraht (13) und der Dichtungsring (14) ferner einen zweiten Spalt (16) bilden und das andere Endloch des zwei-

ten Abflussrohrs (10) im zweiten Spalt (16) angeordnet ist.

8. Kühlschrank nach Anspruch 1, wobei ein drittes Abflussrohr (21), das mit dem ersten Aufnahmehohlraum (11) in Verbindung steht, am Boden des ersten Aufnahmehohlraums (11) vorgesehen ist und das andere Endloch des dritten Abflussrohrs (21) einem unteren Luftkanal (3) am Türkörper (1) ausgesetzt ist.

Revendications

1. Réfrigérateur comprenant un corps de porte (1) et un dispositif de broyage de glace, le dispositif de broyage de glace étant disposé sur le corps de porte (1), dans lequel le corps de porte (1) est pourvu d'une première cavité de logement (11) et d'une seconde cavité de logement (12) avec une ouverture (121) ;

le dispositif de broyage de glace comprend : un seau de broyage de glace (4) disposé dans la première cavité de logement (11), une tête de coupe (5) disposée dans le seau de broyage de glace (4), et une unité d'entraînement (6) au moins partiellement disposée dans la seconde cavité de logement (12), l'unité d'entraînement (6) comprenant : une tige d'entraînement (61) reliée à la tête de coupe (5) et entraînant la rotation de la tête de coupe (5) dans le seau de broyage de glace (4), un ensemble d'engrenages (62) relié à la tige d'entraînement (61) et agissant sur celle-ci, et un moteur (63) pour faire fonctionner l'ensemble d'engrenages (62) ; le dispositif de broyage de glace comprend en outre : une plaque de couverture (7) pour fermer l'ouverture de la seconde cavité de logement (12) de sorte que la seconde cavité de logement (12) est formée comme un espace fermé, **caractérisé par :**

un premier tuyau d'évacuation (8) faisant communiquer la seconde cavité de logement (12) avec un compartiment de réfrigération du réfrigérateur ; dans lequel un bord du corps de la porte (1) est pourvu d'un fil chauffant (13) ; la plaque de couverture (7) est reliée de manière étanche à l'ouverture (121) par une bride étanche (1211) et une rainure étanche (75) qui s'emboîtent l'une dans l'autre ; l'un des trous d'extrémité du premier tuyau d'évacuation (8) est situé au fond de la seconde cavité de logement (12), et l'autre trou d'extrémité est exposé au compartiment de réfrigération et situé à proximité du fil chauffant (13) ; et dans lequel

- un joint d'étanchéité (14) est ménagé sur un côté périphérique du corps de porte (1), le câble chauffant (13) est disposé autour du joint d'étanchéité (14) et forme au moins partiellement un premier espace (15) avec le joint d'étanchéité (14), et l'autre trou d'extrémité du premier tuyau d'évacuation (8) est disposé dans le premier espace (15).
2. Réfrigérateur selon la revendication 1, dans lequel l'ensemble d'engrenages (62) comprend :
- un premier engrenage (621) manchonné sur une circonférence extérieure du seau de broyage de glace (4), et un second engrenage (622) qui s'engrène avec le premier engrenage (621) afin d'entraîner indirectement la rotation de la tête de coupe (5) ;
- dans lequel le premier engrenage (621) est disposé à une extrémité supérieure du seau de broyage de glace (4) et coaxial avec la tige d'entraînement (61), un axe central du second engrenage (622) est parallèle à la tige d'entraînement (61), et le moteur entraîne la rotation du second engrenage (622).
3. Réfrigérateur selon la revendication 2, dans lequel l'ensemble d'engrenages (62) comprend en outre :
- une boîte de connexion (623) disposée de manière fixe dans la première cavité de logement (11), la boîte de connexion (623) comprenant : un premier corps de boîte (6231) recevant le premier engrenage (621), et un second corps de boîte (6232) recevant le second engrenage (622) et relié au premier corps de boîte (6231) ; le premier corps de boîte (6231) et le second corps de boîte (6232) partagent une paroi latérale (6233), et la paroi latérale (6233) est au moins partiellement creusée pour former une partie creuse (6233A), et le premier engrenage (621) et le second engrenage (622) sont en connexion d'engrènement l'un avec l'autre à travers la partie creuse (6233A).
4. Réfrigérateur selon la revendication 3, dans lequel le second corps de boîte (6232) comprend un couvercle supérieur (6232a) et un couvercle inférieur (6232b) qui sont détachables l'un de l'autre, un bord supérieur du couvercle inférieur (6232b) est disposé plus bas qu'un bord supérieur du premier corps de boîte (6231), et le second engrenage (622) est disposé dans la cavité de logement formée entre le couvercle supérieur (6232a) et le couvercle inférieur (6232b).
5. Réfrigérateur selon la revendication 1, dans lequel un bord supérieur de l'ouverture (121) constitue la bride étanche (1211) ;
- la plaque de couverture (7) comprend : un corps de plaque de couverture (71), une paroi d'extension (72) s'étendant depuis le bord du corps de plaque de couverture (71) perpendiculairement vers l'ouverture (121), un premier bloc étanche (73) disposé dans le prolongement de la paroi d'extension (72) à l'écart de l'extrémité du corps de plaque de couverture (71), et un second bloc étanche (74) disposé sur une face d'extrémité du premier bloc étanche (73) à l'écart de l'ouverture (121) ;
- la rainure étanche (75) est ménagée dans une partie partagée par le premier bloc étanche (73) et le second bloc étanche (74), et ménagée sur une face d'extrémité du premier bloc étanche (73) vers l'ouverture (121) ;
- la profondeur de la rainure étanche (75) n'est pas inférieure à la hauteur du premier bloc étanche (74).
6. Réfrigérateur selon la revendication 1, dans lequel le dispositif de broyage de la glace comprend en outre un canal de sortie de la glace (9) faisant communiquer le seau de broyage de la glace (4) avec l'extérieur du corps de porte (1) ; un deuxième tuyau d'évacuation (10) communiquant avec le canal de sortie de la glace (9) est ménagé sur la paroi latérale (6233) du canal de sortie de la glace (9), et l'autre trou d'extrémité du deuxième tuyau d'évacuation (10) est exposé au compartiment de réfrigération et disposé à proximité du câble chauffant (13).
7. Réfrigérateur selon la revendication 6, dans lequel le câble chauffant (13) et le joint d'étanchéité (14) forment un second espace (16), et l'autre trou d'extrémité du deuxième tuyau d'évacuation (10) est disposé dans le second espace (16).
8. Réfrigérateur selon la revendication 1, dans lequel un troisième tuyau d'évacuation (21) communiquant avec la première cavité de logement (11) est ménagé au fond de la première cavité de logement (11), et l'autre trou d'extrémité du troisième tuyau d'évacuation (21) est exposé à un conduit d'air inférieur (3) sur le corps de porte (1).

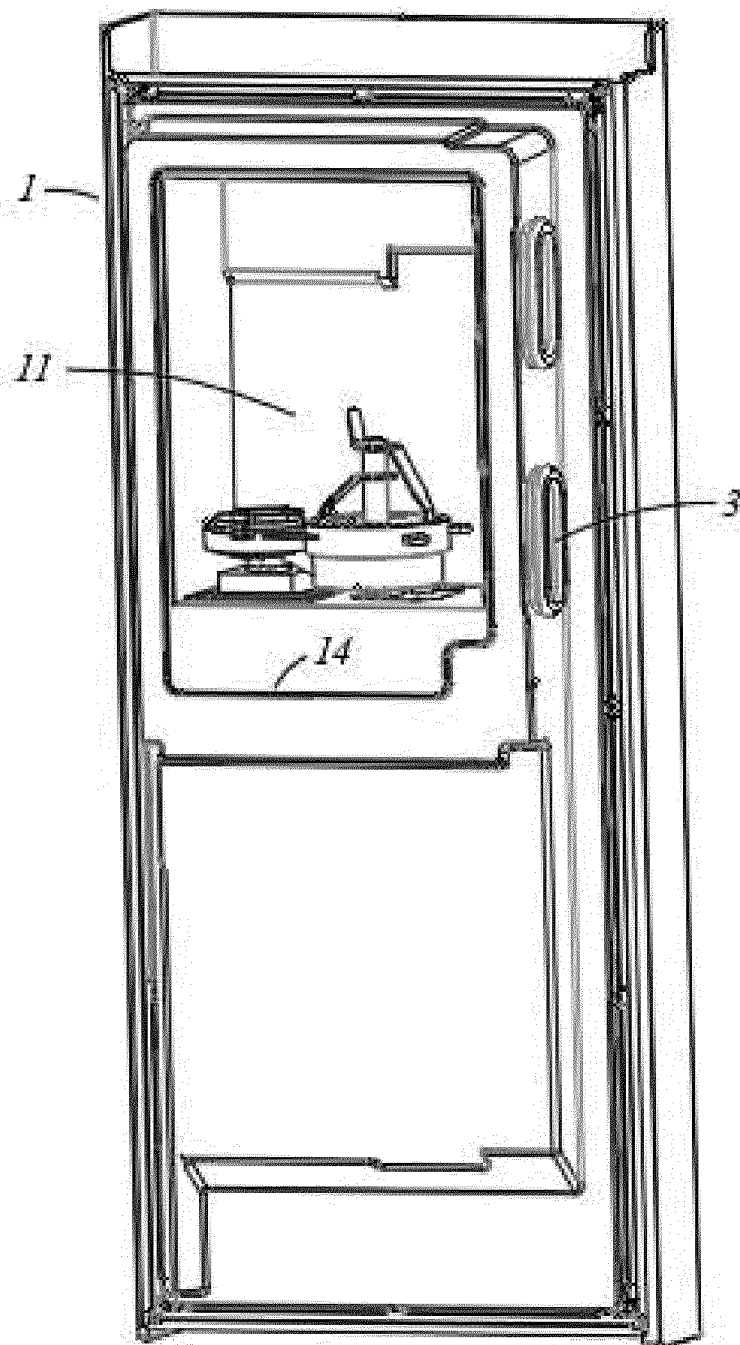


FIG. 1

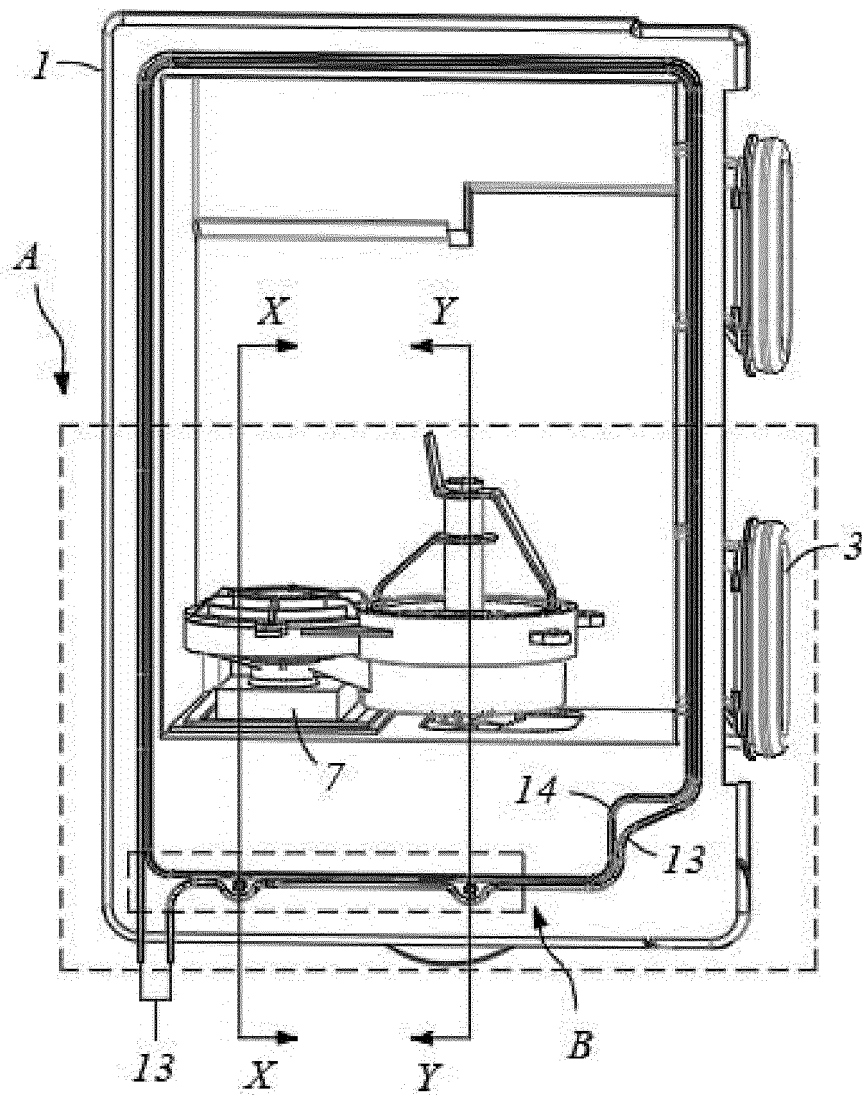


FIG. 2

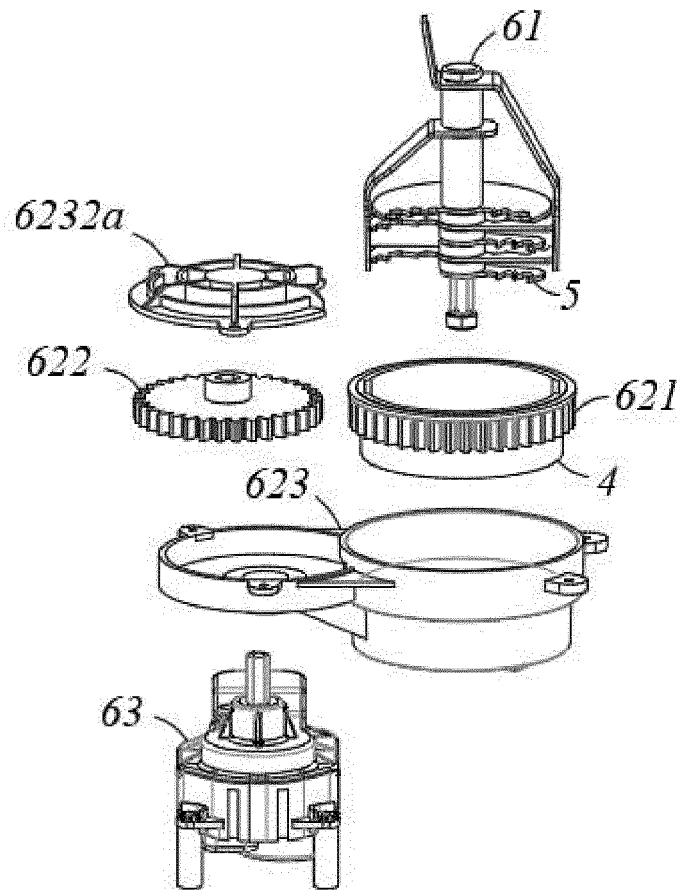


FIG. 3

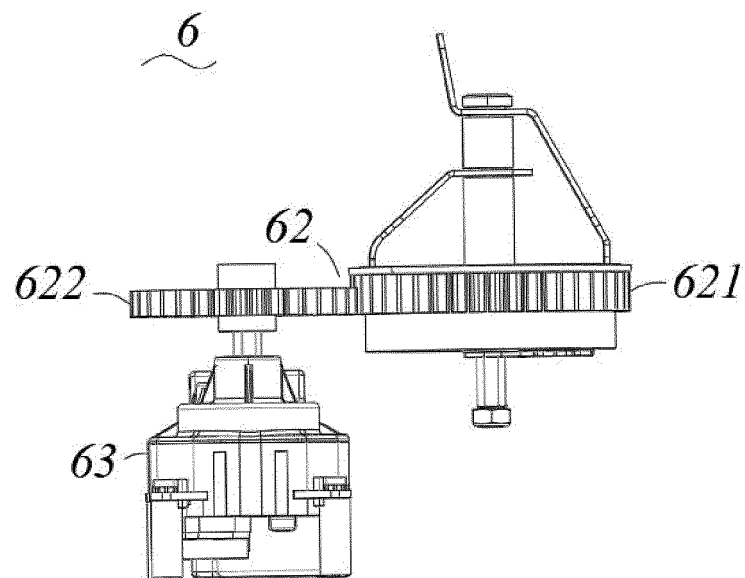


FIG. 4

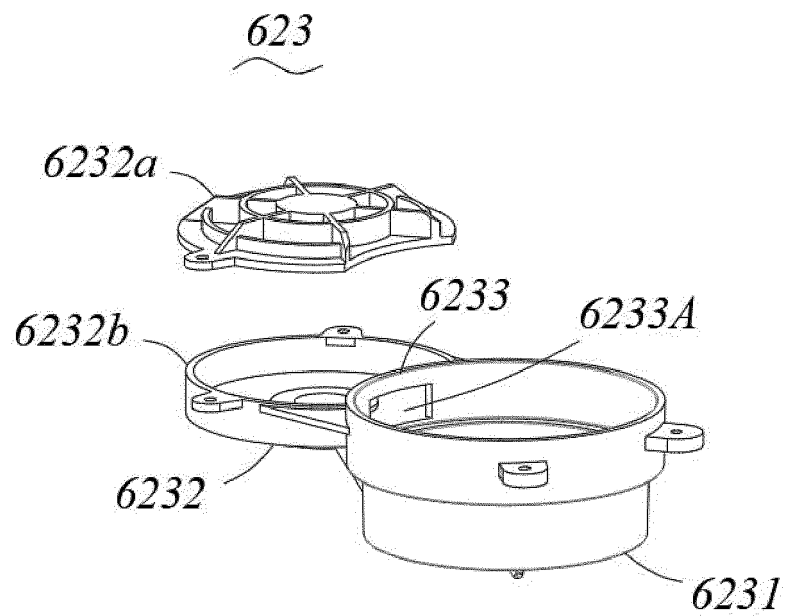


FIG. 5

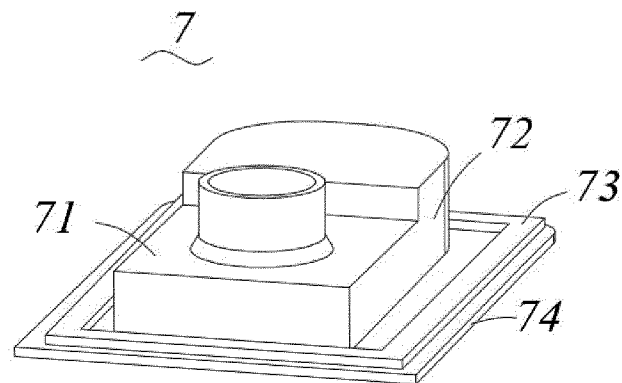


FIG. 6

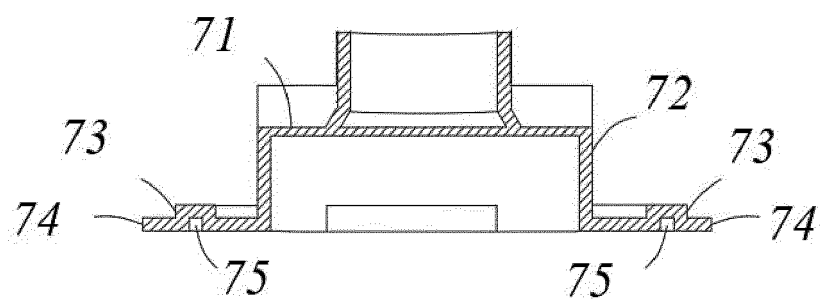


FIG. 7

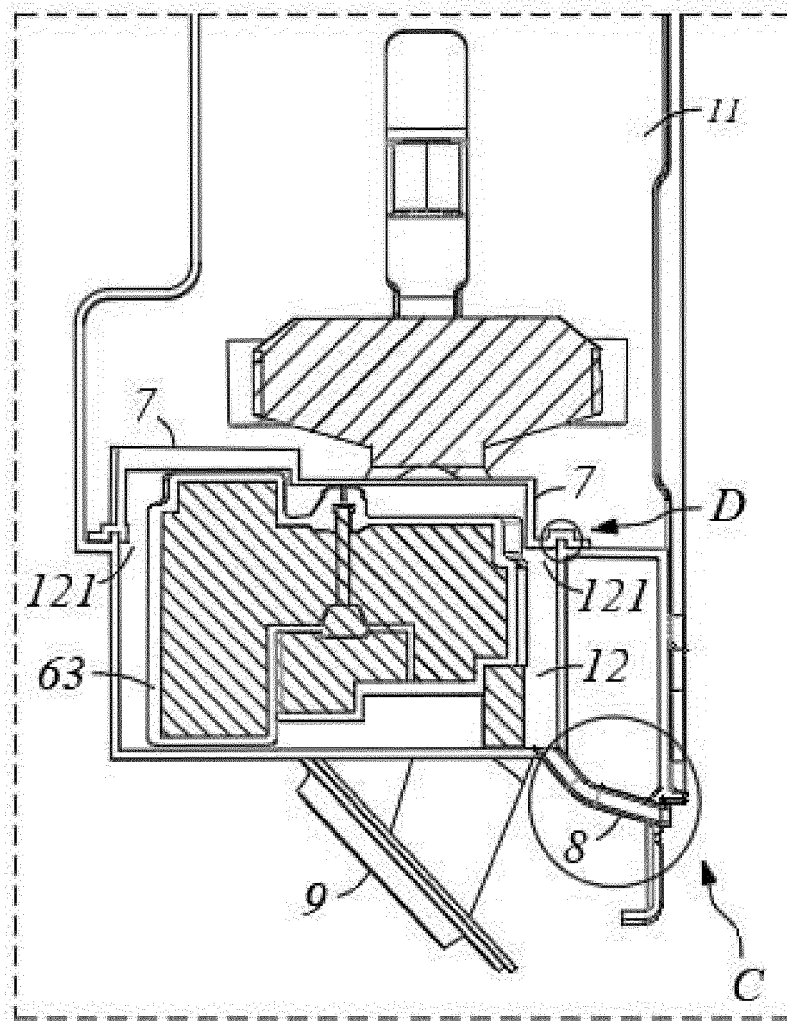


FIG. 8

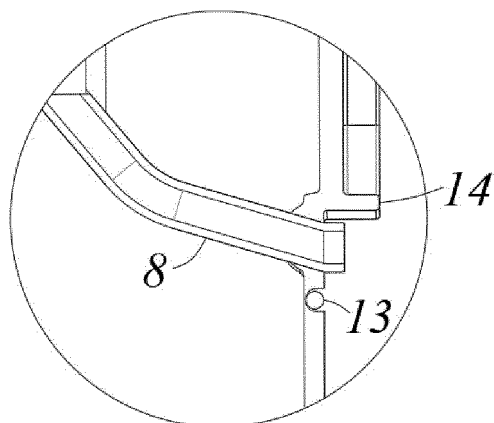


FIG. 9

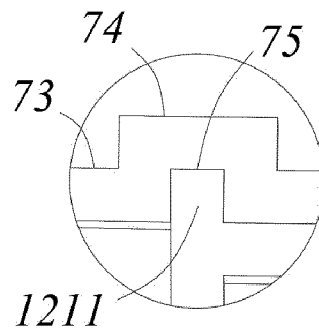


FIG. 10

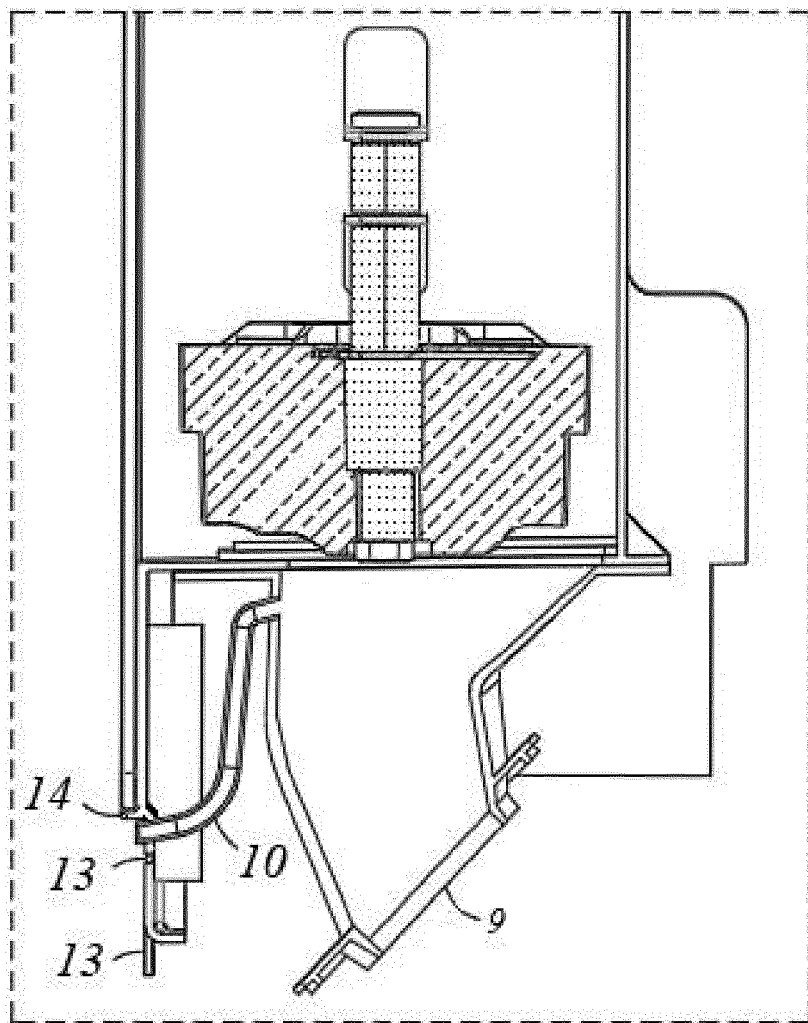


FIG. 11

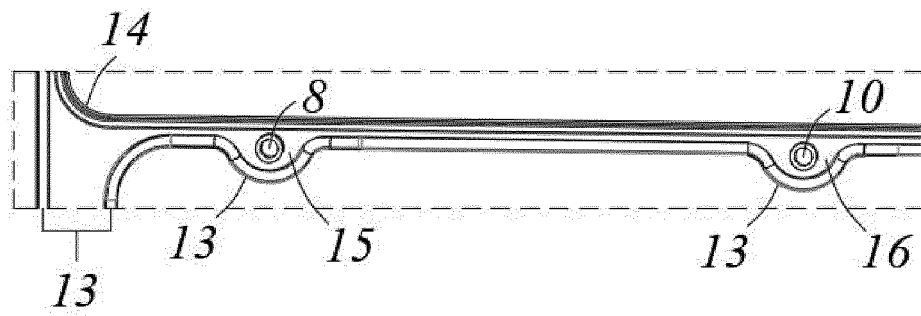


FIG. 12

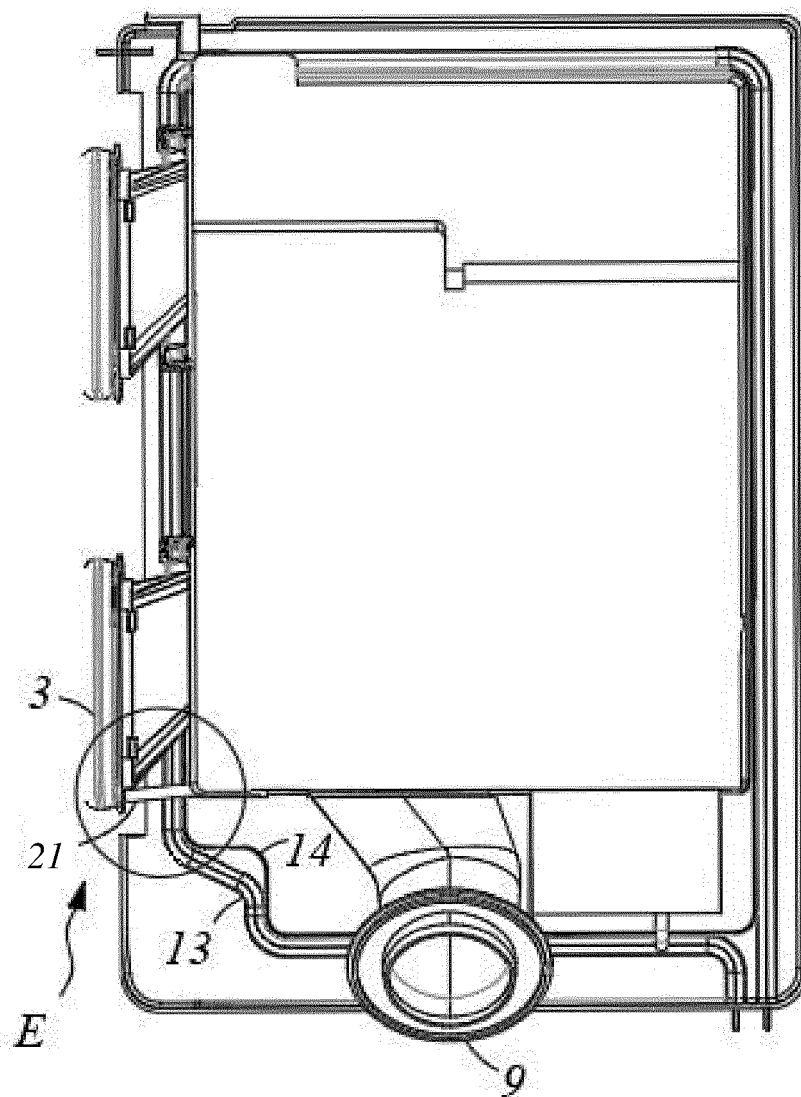


FIG. 13

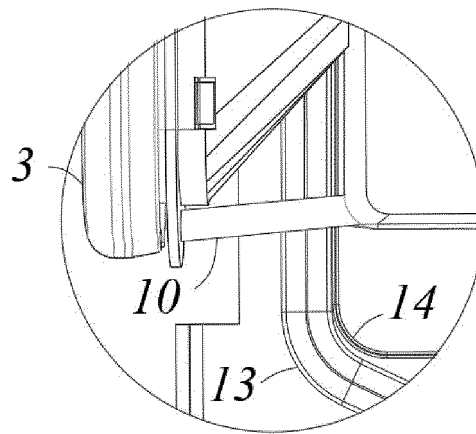


FIG. 14

REFERENCES CITED IN THE DESCRIPTION

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