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

(11) EP 3 653 968 A2

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
20.05.2020 Bulletin 2020/21

(21) Application number: **19209361.5**

(22) Date of filing: **15.11.2019**

(51) Int Cl.:
F25C 1/18 *(2006.01)* ***F25C 5/20*** *(2018.01)*
F25C 5/185 *(2018.01)* ***F25D 25/02*** *(2006.01)*

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
KH MA MD TN

(30) Priority: **16.11.2018 KR 20180142079**
02.09.2019 KR 20190108449

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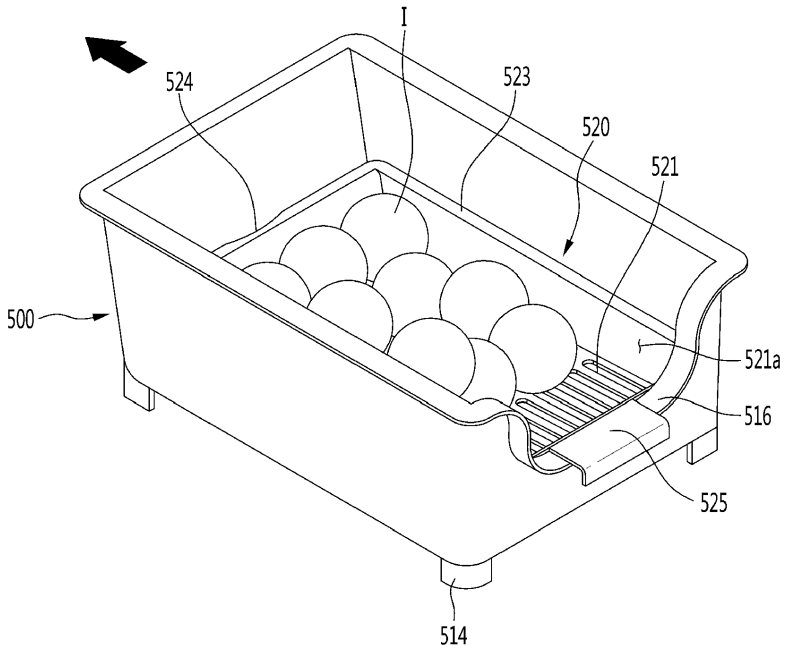
(54) HOME APPLIANCE WITH AN ICE MAKER

(57) Provided is a refrigerator comprising: a cabinet having a freezing compartment defined therein; an ice-maker disposed in the freezing compartment to make spherical ice, wherein the ice is removed from falls down from the ice maker; an ice bin (500) disposed below the ice-maker for storing ice removed from the ice-maker; and an ice tray (520) disposed inside the ice bin, wherein at least a portion of a bottom face (521) of the ice tray for receiving the ice is spaced apart from a bottom face of the ice bin, wherein a plurality of tray holes (521a) are defined to pass through the bottom face of the ice tray.

【Fig. 14】



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Description

BACKGROUND

Field of the Disclosure

[0001] The present disclosure relates to a home appliance, in particular a refrigerator or a freezer.

Discussion of the Related Art

[0002] In general, a refrigerator or freezer is a home appliance for storing foods at a low temperature by low temperature air.

[0003] The refrigerator or freezer uses cold-air to cool inside of a storage space, so that the stored food may be stored in a refrigerated or frozen state.

[0004] Typically, an ice-maker for making ice is provided inside the refrigerator or a freezer.

[0005] The ice-maker is configured to receive water from a water source or a water tank in a tray to make ice.

[0006] Further, the ice-maker is configured to remove the ice from the ice tray in a heating or twisting manner after the ice-making is completed.

[0007] As such, the ice-maker, which automatically receives the water and removes the ice, has an open top to scoop molded ice.

[0008] As described above, the ice made in the ice maker having a structure as described above may have at least one flat surface such as crescent or cubic shape.

[0009] When the ice has a spherical shape, it is more convenient to ice the ice, and also, it is possible to provide different feeling of use to a user. Also, even when the made ice is stored, a contact area between the ice cubes may be minimized to minimize sticking between ices with each other.

[0010] Korean Patent Registration No. 10-1850918 as Prior Art document discloses an ice maker.

[0011] The ice maker of Prior Art document includes an upper tray in which a plurality of upper cells of a hemispherical shape are arranged and a pair of link guides extending upwardly from both sides are disposed, a lower tray in which a plurality of lower cells of a hemispherical shape are arranged and which is pivotally connected to the upper tray, a pivoting shaft connected to rear ends of the lower tray and the upper tray to allow the lower tray to pivot relative to the upper tray, a pair of links having one end thereof connected to the lower tray and the other end thereof connected to the link guide, and an ejecting pin assembly having both ends thereof respectively connected to the pair of links while being respectively inserted into the link guides, wherein the ejecting pin assembly ascends and descends together with the link.

[0012] In the prior art, after the spherical ice is made, the ice falls down while being removed from the ice maker. Further, the removed ice may be stored in an ice bin. However, poor appearance of the spherical ice may occur when the ice debris generated during the ice-removal process is attached to the spherical ice.

[0013] Further, the spherical ice may roll during the ice-removal process. When the door of the refrigerator or the freezer is opened and closed, there is a problem that the ice rolls such that more ice debris may be generated due to the collisions between the ices.

SUMMARY OF THE DISCLOSURE

[0014] An object of the present disclosure is to provide a home appliance, in particular a refrigerator or freezer, that prevents an outer shape of ice from being deteriorated by ice debris during storage of spherical ice.

[0015] Another object of the present disclosure is to provide a home appliance, in particular a refrigerator or freezer, in which spherical ice and ice debris may be stored separately in an ice bin.

[0016] Another object of the present disclosure is to provide a home appliance, in particular a refrigerator or freezer, in which ice is stored in an aligned manner, so that the ice may be easily discharged from an ice bin, which is retracted and extended.

[0017] Another object of the present disclosure is to provide a home appliance, in particular a refrigerator or freezer, that prevents spherical ice from moving and being damaged in an ice bin, which is retracted and extended.

[0018] At least one of these objects is solved by the subject-matter of the independent claim. Further advantageous embodiments and refinements are described in the respective dependent claims.

In one aspect of the present disclosure, there is provided a home appliance, in particular a refrigerator or freezer, comprising: a cabinet having a freezing compartment defined therein; an ice-maker disposed in the freezing compartment to make spherical ice, wherein the ice is removed from falls down from the ice maker; and an ice bin disposed below the ice-maker for storing ice removed from the ice-maker. An ice tray may be disposed inside the ice bin, wherein at least a portion of a bottom face of the ice tray for receiving the ice is spaced apart from a bottom face of the ice bin. A plurality of tray holes may be defined to pass through the bottom face of the ice tray. At least a portion of a bottom surface of the ice tray for receiving the ice is spaced apart from a bottom surface of the ice bin. A plurality of tray holes may be defined to pass through the bottom surface of the ice tray. The ice bin and /or the ice tray may be open in an upward direction.

[0019] In one embodiment, the ice bin may be configured to extend or retract in a front direction. The bottom face of the ice tray may be inclined so that a vertical level a front end thereof is lower than a vertical level of a rear end thereof. An inner surface of the bottom of the ice tray may be inclined in a forward direction and/or wherein a spacing between an outer surface of the bottom of the ice tray and an inner surface of the bottom of the ice bin may increase in a rearward direction of the ice tray. In

the present disclosure, front direction may be the direction towards a door or opening of the home appliance or a withdrawal direction of a drawer of the home appliance. In other words, a front side o rend may refer to a side or end facing a user, while a rear side or end may refer to a side or end opposite thereto. Also, upwards and downwards may be defined with respect to gravity.

[0020] In one embodiment, a freezing compartment contains a drawer disposed below the ice-maker and configured to extend or retract. The ice bin may be mounted inside the drawer and may move together with a movement of the drawer.

[0021] In one embodiment, a bin mounting guide to guide a mounting position of the ice bin may be formed on a bottom face of the drawer facing the ice-maker.

[0022] In one embodiment, the bin mounting guide may protrude to constrain a side wall of the ice bin.

[0023] The bin mounting guide for defining a mounting position of the ice bin within the drawer may be formed on a bottom of the drawer facing the ice-maker. The bin mounting guide may protrude upwards from the bottom of the drawer. The ice bin may comprise a plurality of legs extending downwards from a bottom of the ice bin. The bin mounting guide may contact an outer surface of each of the legs.

[0024] In one embodiment, each of the four corners of the ice bin may have each leg extending downwards. The bin mounting guide may contact an outer face of the leg to constrain the ice bin.

[0025] In one embodiment, the bottom face of the ice tray may be inclined such that a vertical level thereof is gradually higher in a retracting direction of the drawer.

[0026] In one embodiment, a size of each of the tray holes may be smaller than a size of a single spherical ice. The plurality of the tray holes may be arranged in an entire area of the bottom face of the ice tray. The plurality of the tray holes may be continuously arranged at a regular spacing in a first horizontal direction and/or a second horizontal direction.

[0027] A bin opening is formed by a downward recess in a rear wall of the ice bin.

[0028] In one embodiment, at least a portion of the ice-maker may be inserted through an opening in a top face of the ice bin and is received inside the ice bin. The bin opening may be recessed in a rear face of the ice bin such that a bottom level of the bin opening is lower than a bottom level of the ice-maker.

[0029] In one embodiment, a cover plate may extend downwards from the ice maker and shields at least a portion of the bin opening.

[0030] In one embodiment, the ice tray may have a handle protruding outward and receiving in the bin opening. The handle may be formed at a rear portion of the ice tray and may protrude rearward through the bin opening of the ice bin. The handle may be seated on a bin opening guide extending in a rearward direction along the circumference of the bin opening.

[0031] In one embodiment, the ice tray may have a handle groove defined in one end of the ice tray opposite to the handle, wherein the groove is spaced apart from an inner wall face of the ice bin. The handle groove may be formed at a front portion of the ice tray. The handle groove and may be spaced apart from an inner surface of a side wall the ice bin.

[0032] In one embodiment, a spacing between the bottom face of the ice tray and the bottom face of the ice bin may increase in a rearward direction of the ice tray.

[0033] In one embodiment, a front end of the bottom face of the ice tray may contact and be supported on the ice bin.

[0034] In one embodiment, the ice tray may include: the bottom defining the bottom face of the ice tray; a front portion extending upwardly from a front end of the bottom; a rear portion extending upwardly from a rear end of the bottom face; and lateral portions respectively extending upwardly from left and right ends of the bottom, and connecting the front portion and the rear portion. A height of the front portion may be larger than a height of the rear portion so that the bottom thereof is inclined relative to the bottom face of the ice bin.

[0035] In one embodiment, the rear portion may have a handle extending rearward and seated on an end of the ice bin.

[0036] In one embodiment, the handle may include: a first extension extending rearward from a top of the rear portion; and a second extension extending downward from a distal end of the first extension.

[0037] In one embodiment, a bin opening may be recessed downward in a top of a rear face of the ice bin. The first extension may be received in the bin opening. The second extension may be exposed to an outside of the bin opening. The first extension may be seated on the bin opening guide. The second extension may be exposed to an outside of the bin opening and/or the ice bin.

[0038] In one embodiment, a rim may be formed along and bent outwardly from a perimeter of a top of the ice tray, wherein the rim contacts an inner face of the ice bin. In one embodiment, a handle groove may be recessed in an outer portion of the rim to define a space between the rim and the ice bin. The rim may extend outward from a top portion of the ice tray. The rim may contact an inner surface of a side wall the ice bin.

[0039] The home appliance, in particular the refrigerator or freezer, according to the present disclosure has one or more of the following effects.

[0040] According to this embodiment, when the spherical ice is removed from the ice-maker and falls downward, the ice may be accommodated in the ice bin. In this connection, the spherical ice may be placed in the ice tray while an ice tray with the multiple holes defined therein is mounted in the ice bin.

[0041] In one example, the ice-maker may generate ice debris in the process of ice-removal of the ice. The ice debris may be placed on the bottom of the ice bin through the tray holes formed in the ice tray even when

the ice debris falls downs. Therefore, the spherical ice may be placed on the ice tray while not being affected by the ice debris.

[0042] In other words, the ice debris may be prevented from adhering to the surface of the spherical ice during the storage of the spherical ice. Therefore, this may always provide the user with the spherical ice having a smooth surface.

[0043] Further, inside the ice bin, the spherical ice may be placed on the ice tray. The ice debris may be placed and stored inside the ice bin in a separated manner from the spherical ice. Thus, the user may take the spherical ice out of the ice tray and use the ice. The ice debris inside the ice bin are stored on the bottom of the ice bin, and may be easily removed after the ice tray is removed.

[0044] Further, the ice bin may be configured to extend or retract in a front direction. The bottom of the ice tray may be shaped to have an inclined slope such that a front portion is lower than a rear portion. Thus, the spherical ice may fall and roll and stored in the front half of the tray.

[0045] Thus, when withdrawing the ice bin, the user may easily access the ice stored in the ice tray and may easily take out the ice.

[0046] Further, the bottom of the ice tray may be formed obliquely so that the spherical ices may be evenly horizontally distributed in the ice tray. Further, in the movement of the ice bin, the ice may be prevented from excessively rolling or moving inside the ice tray.

[0047] Thus, this may prevent the spherical ice from hitting each other and damaging the surface thereof so that the ice debris does not occur to keep the spherical ice surface smooth.

[0048] Further, the spherical ice removed from the ice maker may fall onto the ice tray and then roll to the front of the ice tray. In this process, the ice contacts the neighboring ice or ice tray such that the burr around the spherical ice may be removed. Thus, the spherical ice may become more spherical. The ice debris caused by the removal of the burr may be discharged through the tray holes onto the bottom of the ice bin so that only the spherical ices may be stored.

BRIEF DESCRIPTION OF THE DRAWINGS

[0049]

FIG. 1 is a perspective view of a refrigerator according to an embodiment of the present disclosure.

FIG. 2 is a view showing a state in which a door is opened.

FIG. 3 is a partial enlarged view illustrating a state in which an ice-maker is mounted according to an embodiment of the present disclosure.

FIG. 4 is a partial perspective view illustrating an interior of a freezing compartment according to an embodiment of the present disclosure.

FIG. 5 is a cross-sectional side view of a freezing compartment in a state in which a freezing compartment drawer and an ice bin are retracted therein, according to an embodiment of the present disclosure.

FIG. 6 is a partially-cut perspective view of a freezing compartment in a state in which a freezing compartment drawer and an ice bin are extended therefrom.

FIG. 7 is a perspective view in a state in which an ice tray is mounted on an ice bin according to the present disclosure embodiment.

FIG. 8 is an exploded perspective view of the ice bin and ice tray.

FIG. 9 is a cross-sectional view in a state in which the ice tray is mounted on the ice bin.

FIG. 10 is a perspective view of an ice-maker viewed from above.

FIG. 11 is a perspective view of an ice-maker viewed from below.

FIG. 12 is an exploded perspective view of an ice-maker.

FIG. 13 shows a state in which spherical ices are removed from the ice-maker and distributed inside the ice bin.

Figure 14 is a perspective view of a state in which the ices are distributed inside the ice bin.

DESCRIPTION OF SPECIFIC EMBODIMENTS

[0050] Hereinafter, some embodiments of the present disclosure will be described in detail with reference to the accompanying drawings. It should be noted that when components in the drawings are designated by reference numerals, the same components have the same reference numerals as far as possible even though the components are illustrated in different drawings. Further, in description of embodiments of the present disclosure, when it is determined that detailed descriptions of well-known configurations or functions disturb understanding of the embodiments of the present disclosure, the detailed descriptions will be omitted.

[0051] Also, in the description of the embodiments of the present disclosure, the terms such as first, second, A, B, (a) and (b) may be used. Each of the terms is merely used to distinguish the corresponding component from other components, and does not delimit an essence, an order or a sequence of the corresponding component. It should be understood that when one component is "connected", "coupled" or "joined" to another component, the former may be directly connected or jointed to the latter or may be "connected", coupled" or "joined" to the latter with a third component interposed therebetween.

[0052] In the following, embodiments of a refrigerator are described. The embodiments may also be applied to a freezer or a home appliance according to the present disclosure.

[0053] FIG. 1 is a perspective view of a refrigerator according to an embodiment of the present disclosure. Further, FIG. 2 is a view showing a state in which a door is opened. Further, FIG. 3 is a partial enlarged view of

an ice-maker according to an embodiment of the present disclosure.

[0054] For convenience of description and understanding, directions will be defined. Hereinafter, based on a bottom face or floor surface on which the refrigerator is installed, a direction toward the bottom face or floor surface may be referred to as a downward direction, and a direction from the bottom face or floor surface toward a top surface or portion of a cabinet 2 of the refrigerator may be referred to as an upward direction. A horizontal direction may be defined as a direction perpendicular to the downward direction or the upward direction. A vertical direction may be defined as a direction in parallel to the downward direction or the upward direction. Moreover, a top, upper surface or portion and a bottom or lower surface or portion of an element may be defined in correspondence with the upward direction and the lower direction, respectively. Moreover, "above" and "below" may be defined in correspondence with the upward direction and the lower direction, respectively. A front or front side of the refrigerator may be defined as a side or surface where a door of the refrigerator is provided. A rear or rear side of the refrigerator may be defined as a side or surface opposite to the front side. A front direction is a direction running from the rear side to the front side of the refrigerator, a rear direction is a direction running from the front side to the rear side of the refrigerator. Further, when an undefined direction is described, the direction may be described by being defined based on each drawing. Further, in the context of this disclosure "face" may correspond to "surface".

[0055] Referring to FIGS. 1 to 3, a refrigerator 1 according to an embodiment of the present disclosure may include a cabinet 2 for defining a storage space therein, and a door for opening and closing the storage space.

[0056] In detail, the cabinet 2 defines the storage space. The storage space may be vertically divided by a barrier. A refrigerating compartment 3 may be defined at an upper portion of the storage space, and a freezing compartment 4 may be defined at a lower portion of the storage space.

[0057] An accommodation member such as a drawer, a shelf, a basket, and the like may be disposed in each of the refrigerating compartment 3 and the freezing compartment 4.

[0058] The door may include a refrigerating compartment door 5 shielding the refrigerating compartment 3 and a freezing compartment door 6 shielding the freezing compartment 4.

[0059] The refrigerating compartment door 5 includes a pair of left and right doors, which may be opened and closed by pivoting. Further, the freezing compartment door 6 may be disposed to be retractable or extendable like a drawer.

[0060] In another example, the arrangement of the refrigerating compartment 3 and the freezing compartment 4 and the shape of the door may be changed based on kinds of the refrigerators. However, the present disclosure may not be limited thereto, and may be applied to various kinds of refrigerators. For example, the freezing compartment 4 and the refrigerating compartment 3 may be arranged horizontally, or the freezing compartment 4 may be disposed above the refrigerating compartment 3.

[0061] In one example, at least one of the pair of refrigerating compartment doors 5 may have an ice-making chamber 8 defined therein for receiving a main ice-maker 81. The ice-making chamber 8 may receive cold-air from an evaporator (not shown) in the cabinet 2 to allow ice to be made in the main ice-maker 81, and may define an insulated space together with the refrigerating compartment 3. In another example, depending on a structure of the refrigerator, the ice-making chamber 8 may be defined inside the refrigerating compartment 3 rather than the refrigerating compartment door 5, and the main ice-maker 81 may be disposed inside the ice-making chamber 8.

[0062] A dispenser 7 may be disposed on one side of the refrigerating compartment door 5, which corresponds to a position of the ice-making chamber 8. The dispenser 7 may be capable of dispensing water or ice, and may have a structure in communication with the ice-making chamber 8 to enable dispensing of ice made in the ice-maker 81.

[0063] In one example, the freezing compartment 4 may be equipped with an ice-maker 100. The ice-maker 100, which makes ice using water supplied, may produce ice in a spherical shape. The ice-maker 100 may be referred to as an auxiliary ice-maker because the ice-maker 100 usually generates less ice than the main ice-maker 81 or is used less than the main ice-maker 81. The ice-maker 100 may be disposed inside the freezing compartment 4.

[0064] The freezing compartment 4 may be equipped with a duct 44 (see Figs. 4-6) for supplying cold-air to the ice-maker 100. Thus, a portion of the cold-air generated in the evaporator and supplied to the freezing compartment 4 may be flowed toward the ice-maker 100 to make ice in an indirect cooling manner.

[0065] Further, an ice bin 500 in which the made ice is stored after being transferred from the ice maker 100 may be further provided below the ice maker 100. Further, the ice bin 500 may be disposed in a freezing compartment drawer 41 which is extended from the freezing compartment 4. Further, the ice bin 500 may be configured to be retracted and extended together with the freezing compartment drawer 41 to allow a user to take out the stored ice.

[0066] Thus, the ice-maker 100 and the ice bin 500 may be viewed as at least a portion of which is received in the freezing compartment drawer 41. Further, a large portion of the ice-maker 100 and the ice bin 500 may be hidden when viewed from the outside. Further, the ice stored in the ice bin 500 may be easily taken out by the retraction and extension of the freezing compartment drawer 41.

[0067] In another example, the ice made in the ice-

maker 100 or the ice stored in the ice bin 500 may be transferred to the dispenser 7 by transfer means and dispensed through the dispenser 7.

[0068] In another example, the refrigerator 1 may not include the dispenser 7 and the main ice-maker 81, but include only the ice-maker 100. The ice-maker 100 may be disposed in the ice-making chamber 8 in place of the main ice-maker 81.

[0069] Hereinafter, the mounting structure of the ice-maker 100 will be described in detail with reference to the accompanying drawings.

[0070] Hereinafter, a mounting structure of the ice-maker 100 will be described in detail with reference to the accompanying drawings.

[0071] FIG. 4 is a partial perspective view illustrating an interior of a freezing compartment according to an embodiment of the present disclosure. FIG. 5 is a cross-sectional side view of a freezing compartment in a state in which a freezing compartment drawer and an ice bin are retracted therein, according to an embodiment of the present disclosure. FIG. 6 is a partially-cut perspective view of a freezing compartment in a state in which a freezing compartment drawer and an ice bin are extended therefrom.

[0072] As shown in FIGS. 4 to 6, the storage space inside the cabinet 2 may be defined by an inner casing 21. That is, the inner casing 21 may vertically divide storage space inside the cabinet 2. That is, the inner casing 21 may define the refrigerating compartment 3 and freezing compartment 4 with regard to a vertical direction.

[0073] A portion of a top face of the freezing compartment 4 may be opened, and a mounting cover 43 may be formed at a position corresponding to a position where the ice-maker 100 is mounted. The mounting cover 43 may be coupled and fixed to the inner casing 21, and define a space further recessed upwardly from the top face of the freezing compartment 4 to secure a space in which the ice-maker 100 is disposed. Further, the mounting cover 43 may include a structure for fixing and mounting the ice-maker 100.

[0074] Further, the mounting cover 43 may further include a cover recess 431 defined therein, which may be further recessed upwards to receive an upper ejector 300 to be described below. Since the upper ejector 300 has a structure that protrudes upward from the top face of the ice-maker 100, the upper ejector 300 may be received in the cover recess 431 to minimize a space used by the ice-maker 100.

[0075] A rear wall of the freezing compartment 4 may be formed by a grill pan 42. The grill pan 42 may divide the space in the inner casing 21 with regard to a horizontal direction, and may define, at a rear side of the freezing compartment, a space for receiving an evaporator (not shown) that generates the cold-air and a blower fan (not shown) that circulates the cold-air therein.

[0076] The grill pan 42 may include cold-air ejectors 421 and 422 and a cold-air absorber 423. Thus, the cold-air ejectors 421 and 422 and the cold-air absorber 423 may allow air circulation between the freezing compartment 4 and the space in which the evaporator is placed, and may cool the freezing compartment 4. The cold-air ejectors 421 and 422 may be formed in a grill shape. The cold-air may be evenly discharged into the freezing compartment 4 through the upper cold-air ejector 421 and the lower cold-air ejector 422.

[0077] In particular, the upper cold-air ejector 421 may be disposed at a top or a top portion of the freezing compartment 4. Further, the cold-air discharged from the upper cold-air ejector 421 may be used to cool the ice-maker 100 and the ice bin 500 arranged at an upper portion of the freezing compartment 4. In particular, the upper cold-air ejector 421 may include the cold-air duct 44 for supplying the cold-air to the ice-maker 100. Specifically, the upper cold-air ejector 421 may be located at a center of the freezing compartment 4 in the horizontal direction and/or the ice-maker 100 may be located at an upper end or an upper portion of the freezing compartment 4.

[0078] The cold-air duct 44 may connect the upper cold-air ejector 421 to the cold-air hole 134 of the ice-maker 100. That is, the cold-air duct 44 may connect the upper cold-air ejector 421 and the ice-maker 100 so that a portion of the cold-air discharged from the upper cold-air ejector 421 may be supplied directly into the ice-maker 100.

[0079] In one example, the ice bin 500 may be mounted or disposed inside the freezing compartment drawer 41. The ice bin 500 may be positioned under the ice-maker 100, in particular while the freezing compartment drawer 41 is retracted. Moreover, the freezing compartment drawer 41 may be provided with a bin mounting guide 411 which defines and/or guides the mounting position of the ice bin 500. The bin mounting guide 411 protrudes upward in a position corresponding to each leg 514 protruding from each of the four corners of the bottom of the ice bin 500, and may be configured to surround and/or contact an outer surface of the leg 514. Thus, a position of the ice bin 500 within the freezing compartment drawer 41 may be maintained while being mounted to the freezing compartment drawer 41, in particular even when the freezing compartment drawer 41 is being drawn by a user or is in an extended state. Further, while the freezing compartment drawer 41 is in a retracted state, the ice bin 500 may be located vertically below the ice-maker 100. Thus, the ice that is removed from the ice-maker 100 may fall into the ice bin 500 and be stored therein.

[0080] The bottom of the ice-maker 100 may be housed inside the ice bin 500 while the freezing compartment drawer 41 is in a retracted state. That is, the bottom of the ice-maker 100 may be located in an inner region of the ice bin 500 and the freezing compartment drawer 41. In other words, at least a portion of the ice-maker 100 may be located in a space formed by the ice bin 500 and/or a space formed by the freezing compartment drawer 41. Thus, ice that is removed from the ice-maker 100 may fall and be stored in the ice bin 500. Further, minimizing the space between the ice-maker 100 and

the ice bin 500 may minimize the volume loss inside the freezing compartment 4 due to the presence of the ice-maker 100 and ice bin 500. In another example, the bottom of the ice-maker 100 and a bottom of the ice bin 500 may be spaced apart by an appropriate distance to ensure that an appropriate amount of ice may be stored. In particular, an outer surface of the bottom or a lower end of the ice maker 100 and an inner surface of the bottom of the ice bin 500 may be spaced apart by an appropriate distance to ensure that an appropriate amount of ice may be stored.

[0081] The freezer compartment drawer 41 may be withdrawn as shown in FIG. 6. At this time, at least a portion of a rear portion or surface of each of the ice bin 500 and the freezer compartment drawer 41 may be opened or recessed to prevent interference with the ice maker 100.

[0082] In detail, a drawer opening 412 and a bin opening 518 may be respectively defined in the rear portion or surfaces of the freezing compartment drawer 41 and the ice bin 500 corresponding to the position of the ice-maker 100. Specifically, the drawer opening 412 and the bin opening 518 may be formed by a recess extending from a top or a top portion of a rear portion or a rear wall of the freezing compartment drawer 41 and the ice bin 500, respectively. The drawer opening 412 and the bin opening 518 may be respectively defined at positions facing each other. That is, the drawer opening 412 and the bin opening 518 may overlap each other or may correspond to each other with respect to a horizontal direction or a front or rear direction. Further, the drawer opening 412 and the bin opening 518 may be respectively defined to open from the top of the freezing compartment drawer 41 and the top of the ice bin 500 to positions lower than the bottom of the ice-maker 100.

[0083] Thus, even when the freezing compartment drawer 41 is drawn or is extended in a state in which the ice-maker 100 is mounted therein, the ice-maker 100 may be prevented from interfering with the ice bin 500 and the freezing compartment drawer 41.

[0084] In particular, even in a state in which the ice-maker 100 removes the ice and a lower assembly 200 thereof (see Fig. 11) is pivoted, or in a state in which an ice-full state detection lever 700 (see Fig. 11 and 12) is pivoted to detect an ice-full state, the drawer opening 412 and the bin opening 518 may be in a shape of being recessed further downward than the bottom of the ice-maker 100 to prevent interference with the freezing compartment drawer 41 or the ice bin 500. A drawer opening guide 412a may extend in a rearward direction along a perimeter of the drawer opening 412.

[0085] Further, a bin opening guide 516 may extend in a rearward direction along the circumference of the bin opening 518. The bin opening 518 may be defined in a recessed manner by the bin opening guide 516.

[0086] In one example, a cover plate 130 in a plate shape may be disposed on a rear face of an upper casing 120 of the ice-maker 100. The cover plate 130 may be formed to cover at least a portion of the ice bin opening 518 such that the ice inside the ice bin 500 does not fall downward through the bin opening 518 and the drawer opening 412.

[0087] Hereinafter, the structure of the ice bin 500 will be described in more detail with reference to the accompanying drawings.

[0088] FIG. 7 is a perspective view in a state in which an ice tray is mounted on an ice bin according to the present disclosure embodiment. FIG. 8 is an exploded perspective view of the ice bin and ice tray. FIG. 9 is a cross-sectional view in a state in which the ice tray is mounted on the ice bin.

[0089] Referring to the drawings, the ice bin 500 may be formed in a box shape and may be opened upwards. An accommodating space 501 may be formed therein to provide a space in which ice may be stored. That is, the ice bin 500 may comprise a bottom, and may comprise a side wall or portion extending upwards from an outer edge of the bottom. The bottom may be formed in a plate shape, and the side wall or portion may be formed in a ring shape. Together, the bottom and the side wall or portion may define the accommodation space 501. The accommodation space 501 may be open in an upward direction. That is, the ice bin 500 may have an open top or top portion. An outer surface of the bottom of the ice bin 500 and an inner surface of the bottom of the ice bin 500 may be defined as a surface of the bottom facing upwards and a surface of the bottom facing downwards, respectively, and may simply by referred to as "bottom face".

[0090] Around the opened top of the ice bin 500, an outwardly extending bin edge 512 may be formed. In one example, the bin opening 518 as recessed downward may be formed at the top of the bin edge 512 corresponding to the rear face of the ice bin 500. corresponding That is, the bin opening guide 516 may correspond to or may constitute a portion of the bin edge 512 along the circumference of the bin opening 518.

[0091] Further, each of four corners of the bottom of the ice bin 500 may have a leg 514 extending downwards. Specifically, the legs 514 may be arranged at an outer or exterior surface of the bottom of the ice bin 500 and may extend downward. The leg 514 may be extended to have a predetermined length and may be formed to be round. When the ice bin 500 is mounted on the freezing compartment drawer 41, each of the legs 514 may be in contact with an inner surface of the bin mounting guide 411 so that the ice bin 500 is mounted at a correct position.

[0092] An ice tray 520 may be formed or disposed inside the ice bin 500. The ice tray 520 may partition the inner space, in particular the accommodation space 501, of the ice bin 500 with respect to a vertical direction. Ice falling from the ice-maker 100 may settle on the ice tray 520. The ice tray 520 may be formed in a box shape and may be opened upwards and may include a bottom 521 and a side wall 522 extending upward from an outer edge

of the bottom 521. The bottom 521 may be formed in a plate shape, and the side wall 522 may be formed in a ring shape. Together, the bottom 521 and the side wall 522 may define a space for receiving the ice. The space may be open in an upward direction. That is, the ice tray 520 may have an open top or top portion. An outer surface of the bottom of the ice tray 520 and an inner surface of the bottom of the ice tray 520 may be defined as a surface of the bottom facing upwards and a surface of the bottom facing downwards, respectively, and may simply by referred to as "bottom face".

[0093] The bottom 521 of the ice tray 520 may be at least partially spaced apart from the bottom of the ice bin 500. Specifically, the outer bottom surface of the ice tray 520 may be at least partially spaced apart from the inner bottom surface of the ice bin 500. Further, tray holes 521a may be formed in the bottom of the ice tray 520. That is, the tray holes 521a may be formed as through-holes from the inner surface of the bottom 521 to the outer surface of the bottom 521 of the ice tray 520. The tray holes 521a may be formed in an entirety of the bottom 521.

[0094] A size of each of the tray holes 521a may be smaller than the size of the spherical ice. The tray holes 521a may be arranged horizontally throughout the bottom of the ice tray 520.

[0095] In one example, each of the tray holes 521a may be formed in an elongate hole shape. A plurality of the tray holes 521a may be continuously arranged at a regular spacing in a left and right direction and the front and rear direction. That is, the plurality of tray holes 521a may be arranged in a matrix or array pattern, in particular in the entirety of the bottom 521. Further, in another example, the bottom 521 of the ice tray 520 may be formed in a mesh or grill shape through which ice debris may pass downwards.

[0096] Further, the side wall 522 may include a rear portion 522c extending upward from the rear end or edge of the bottom 521, and a front portion 522b extending upward from the front end or edge of the bottom 521, and lateral or side portions 522a extending from the left and right sides or edges of the bottom 521.

[0097] A top surface of the ice tray 520 may be non-inclined when mounted on the ice bin 500. In other words, the top surface of the ice tray 520 may be arranged substantially horizontally. Further, a length or height L1 of the rear portion 522c of the ice tray 520 may be smaller than a length or height L2 of the front portion 522b. That is, the front portion 522b may extend more downwardly from the top surface than the rear portion 522c extends. As a result, the bottom 521 of the ice tray 520 may be formed to be inclined. Specifically, the outer surface of the bottom 521 may be arranged or formed inclined in the forward direction.

[0098] Further, a spacing between the bottom 521 of the ice tray 521 and the bottom of the ice bin 500 may be formed. The spacing may increase as it goes from front to back, that is the spacing may increase in the rearward direction. Specifically, the spacing between the outer surface of the bottom 521 of the ice tray and the inner surface of the bottom of the ice bin 500 may increase in the rearward direction or may decrease in the forward direction.

[0099] While the ice tray 520 is mounted inside the ice bin 500, an angle α approximately 7 ° to 15 ° between the inner surface of the bottom of the ice bin 500 and the outer surface of the bottom 521 of the ice tray 520 may be formed or maintained. the front end or front portion of the ice tray 520, specifically the front portion or front end or edge of the bottom 521 of the ice tray 520, may contact the bottom of the ice bin 500, specifically the inner surface of the bottom of the ice bin 500, while the rear end of the ice tray 520, specifically the rear portion or rear end or edge of the bottom 521 of the ice tray 520, may be spaced apart by a predefined height H from the bottom of the ice bin 500, specifically the inner surface of the bottom of the ice bin 500.

[0100] Thus, the spherical ice that is removed from the ice maker 100 falls downward and rolls and/or moves along the bottom 521 towards a front end or front portion of the ice tray 520 and/or the ice bin 500. That is, the spherical ice moving along the bottom 521 may stop at the front end or edge of the bottom 521, and then first fill therein. Then, the continuously repeated ice-making and ice-removal of the ice-maker 100 may fill the spherical ices into the ice tray 520 sequentially in a rearward direction. In other words, the spherical ices removed from the ice maker 100 first fill a front portion of the accommodation space 501 of the ice tray 500. The spherical ices gradually and/or sequentially fill the accommodation space 501 in a rearward direction. Moreover, the spherical ices settle on or in the ice tray 520.

[0101] In particular, the bottom 521 may have the tray holes 521a defined therein. Ice debris generated during the ice-removal operation of the ice-maker 100 or during the process of moving the spherical ice may be discharged downward through the tray holes 521a. Thus, the spherical ices may be arranged in the ice tray 520 sequentially in a reward direction while the ice debris may not attach to the spherical ices.

[0102] The lateral portions 522a extend upwards respectively from both left and right sides of the bottom 521 of the ice tray 520. The lateral portions 522a may connect the front portion 522b and the rear portion 522c to each other to define the side wall 522 of the ice tray 520.

[0103] In one example, a tray rim 523 extending outwards may be formed around the opened top of the ice tray 520. The tray rim 523 may extend outwards, and may be in contact with the inner surface of the ice bin 500 while the ice tray 520 is mounted inside the ice bin 500. Thus, when the ice tray 520 is accommodated inside the ice bin 500, the ice tray 520 may not move and maintain a stable mounting state. Specifically, the tray rim 523 may extend outwards from a top portion of the side wall 522, specifically from each of the portions 522a, 522b and 522c. Specifically, the tray rim 523 may be formed circumferentially surrounding the open top or top portion

of the ice tray 520.

[0104] A handle 525 may be formed at the rear end or rear portion of the ice tray 520. The handle 525 may protrude rearward from the rear portion 522c. Specifically, the handle 525 may protrude rearwards from a top or a top portion of the rear portion 522a. The handle 525 may be formed at a rear edge of the tray rim 523. The handle 525 may be gripped by the user when the ice tray 520 is removed. The handle 525 may protrude through the bin opening 518 of the ice bin 500. Further, the handle 525 may be disposed and/or seated in the bin opening 518 and/or on the bin opening guide 516 while the ice tray 520 is mounted into the ice bin 500. Thus, the handle 525 may have a left and right width such that the handle may be received in the bin opening 518.

[0105] The bin opening guide 516 may define or constitute a portion of the tray rim 523. In other words, a rear portion of the tray rim 523 may be recessed. The rear portion may define the bin opening 518. The bin opening guide 516 may define a portion of the recessed rear portion of the tray rim 523.

[0106] The handle 525 may include a first extension 525a extending rearward from the top or the top portion of the rear portion 522c and a second extension 525a extending downward from a distal end of the first extension 525a. Specifically, the first extension 525a may extend rearward from the tray rim 523. The first extension 525a may extend rearward from a rear edge of the tray rim 523.

[0107] A length of the first extension 525a may be equal to or larger than a width of the bin opening guide 516. The first extension 525a may be seated on the bin opening guide 516 and/or in the bin opening 518. The first extension 525a may be seated in particular on an upper and/or inner side of the bin opening 518. Further, the second extension 525b may extend downwards from the distal end of the first extension 525a, and may be exposed to the outside of the bin opening 518 and/or the bin opening guide 516. The distal end of the first extension 525a may be an end of the first extension 525a disposed outside of the ice tray 500 and/or away from the tray rim 523. Thus, the first extension 525a may allow the handle 525 to stop in the bin opening 518 and thus prevent the ice tray 520 from moving or removing. Further, the second extension 525a extends further downwardly of the bin opening 518 and/or the bin opening guide 516, thereby creating a space in which user may grip the handle 525.

[0108] In one example, a handle groove 524 may be formed in the front end or front portion of the ice tray 520 opposite to the handle 525. That is, the handle 252 may be formed at the rear end of the ice tray 520 and the handle groove 524 may be formed at the front end of the ice tray 520. The handle groove 524 may be formed at the top or the top portion of the front portion 522b and may be formed as a recess in the front end or front portion of the tray rim 523. The handle groove 524 may be formed as a recess in the front edge of the tray rim 523.

[0109] Thus, while the ice tray 520 is mounted to the ice bin 500, the handle groove 524 may be spaced apart from the inner wall of the ice bin 500 to allow a space for the user to put his hand into the ice bin. When the user wishes to detach the ice tray 520 from the ice bin 500, the user may grip the handle 525 and put the hand into the ice bin 500 through the handle groove 524 and may lift up the ice tray 520.

[0110] Hereinafter, the ice-maker 100 will be described in detail with reference to the accompanying drawings.

[0111] FIG. 10 is a top perspective view of the ice-maker. Further, FIG. 11 is a perspective view of the ice-maker from below. Further, FIG. 12 is an exploded perspective view of the ice-maker.

[0112] Referring to the drawings, the ice-maker 100 may include an upper assembly 110 and a lower assembly 200. The lower assembly 200 may be pivotally mounted onto one end or portion of the upper assembly 110. The pivoting motion may open and close an inner space defined by the lower assembly 200 and the upper assembly 110.

[0113] In detail, the lower assembly 200 is in contact with the upper assembly 110 to define at least one spherical ice chamber such that the spherical ice may be generated therein.

[0114] That is, the upper assembly 110 and the lower assembly 200 may define at least one ice chamber 111 (see Fig. 13) for generating spherical ice. The ice chamber 111 is substantially a spherical chamber. The upper assembly 110 and the lower assembly 200 may defined a plurality of ice chambers 111.

[0115] While the upper assembly 110 and the lower assembly 200 define the ice chambers 111, water may be supplied to the ice chamber 111 via a water supply 190.

[0116] After ice is formed, the lower assembly 200 may pivot in the forward direction. Then, the spherical ice formed between the upper assembly 110 and the lower assembly 200 may be separated from the upper assembly 110 and the lower assembly 200 and then may fall into the ice bin 500.

[0117] In one example, the ice-maker 100 may further include a driver 180 such that the lower assembly 200 is pivotable relative to the upper assembly 110. The driver 180 may be composed of a combination of a driving motor and a plurality of gears for transmitting power of the driving motor to the lower assembly 200. Further, the driver 180 may be connected to an ice-full state detection lever 700. The ice-full state detection lever 700 may pivot via the power transmission.

[0118] The ice-maker 100 may further include an upper ejector 300 so that ice may be separated from the upper assembly 110. The upper ejector 300 may cause the ice in close contact with the upper assembly 110 to be released from the upper assembly 110.

[0119] The upper ejector 300 may include an ejector body 310 and one or more ejecting pins 320 extending in a direction intersecting the ejector body 310. The

number of the ejecting pins 320 may be the same as the number of the ice chambers 111. Each pin may allow ice generated in each ice chamber 111 to be removed from each chamber.

[0120] The ice in the ice chamber 111 may be pressurized by the pin in a process where the ejecting pin 320 is inserted into the ice chamber 111 through the upper assembly 110. The ice as pressed by the ejecting pin 320 may be disengaged from the upper assembly 110.

[0121] Further, the ice-maker 100 may further include a lower ejector 400 so that the ice in close contact with the lower assembly 200 may be separated from the lower assembly 120. The lower ejector 400 may include a lower ejector body 410 fixed to the inner side of the upper casing and each lower ejecting rod 420 extending from the lower ejector body 410 toward each ice chamber 111 of the lower tray 250.

[0122] An end of the lower ejecting rod 420 may be located within the pivoting range of the lower assembly 200. In the pivoting process of the lower assembly 200, the ice may be removed from the lower assembly by the rod 420 pressing the bottom of the ice chamber 111, the bottom face of the lower tray.

[0123] In one example, the pivoting force of the lower assembly 200 may be transmitted to the upper ejector 300 in the pivoting process of the lower assembly 200 for ice-removal. To this end, the ice-maker 100 may further include a connector 350 connecting the lower assembly 200 and the upper ejector 300. The connector 350 may include one or more links.

[0124] In one example, the connector 350 may include a pair of a pivoting arm 352 and a link 356. The pivoting arm 352 may pivot together with a lower support 270 connected to the driver 180. Further, an end of the pivoting arm 352 may be connected to a lower support 270 of the lower assembly 200 via an elastic member 360 such that the pivoting 352 arm may be in close contact with the upper assembly 110 while the lower assembly 200 is in a closing state.

[0125] The link 356 connects the lower support 270 with the upper ejector 300 so that the pivoting force of the lower support 270 may be transmitted to the upper ejector 300 when the lower support 270 pivots. The upper ejector 300 may be moved up and down in conjunction with the pivoting motion of the lower support 270 via the link 356.

[0126] Hereinafter, the upper assembly 110 and the lower assembly 200 will be described in more detail.

[0127] The upper assembly 110 may include an upper tray 150 that defines an upper portion of each ice chamber 111 for ice formation. Further, the upper assembly 110 may further include an upper casing 120 and an upper support 170 to fix the position of the upper tray 150.

[0128] In one example, the upper casing 120 may have a horizontal extension 142 and a vertical extension 140. The horizontal extension 142 may define a top face of the upper casing 120.

[0129] The vertical extension 140 may be present inwardly of the horizontal extension 142 and may extend vertically upwards along the perimeter of an upper plate 121 of the upper casing 120. The vertical extension 140 may be combined with the top face of the freezing compartment 4.

[0130] Further, the upper casing 120 may include a side wall 143. The side wall 143 may extend downwards from the horizontal extension 142. The side wall 143 may surround at least a portion of the circumference of the lower assembly 200. In other words, the side wall 143 prevents the lower assembly 200 from being exposed to the outside.

[0131] Further, the lower assembly 200 may be pivotally mounted in a space defined by the side wall 143 of the upper casing 120.

[0132] Further, the side wall 143 may have a cold-air hole 134 defined therein through which the cold-air is supplied into the ice-maker 100. The cold-air hole 134 may extend in an elongate manner in an horizontal direction, in particular the left and right direction.

[0133] A cold-air guide 145 may extend between both side ends of the cold-air hole 134. The cold-air entering the cold-air hole 134 may be directed along the cold-air guide 145 toward a tray opening. Further, a portion of the upper tray 150 exposed through the tray opening may be directly cooled via exposure to the moving cold-air.

[0134] The upper tray 150 is positioned below the upper casing 120. An upper support 170 may be located below the upper tray 150. As such, the upper casing 120, the upper tray 150, and the upper support 170 are arranged in the vertical direction one after the other and may be fastened to each other using fasteners and thus may constitute one assembly.

[0135] Further, the ice-maker 100 may further include a temperature sensor 610 for sensing the temperature of water or ice in the ice chamber 111. The temperature sensor 610 may indirectly detect the temperature of water or ice in the ice chamber 111 by sensing the temperature of the upper tray 150.

[0136] In one example, the lower assembly 200 may include a lower tray 250 that defines the lower portion of each ice chamber 111 for ice formation. Further, the lower assembly 200 may further include a lower support 270 supporting the bottom of the lower tray 250 and a lower casing 210 covering the top of the lower tray 250.

[0137] The lower casing 210, lower tray 250, and the lower support 270 may be arranged vertically and may be fastened with each other using fasteners to form one assembly.

[0138] In one example, the ice-maker 100 may further include a switch for turning the ice-maker 100 on or off.

[0139] One end of the ice-full state detection lever 700 is connected to the driver 180, while the other end of the ice-full state detection lever 700 is pivotally connected to the upper casing 120 so that the ice-full state detection lever 700 may pivot according to the operation of the driver 180.

[0140] The ice-full state detection lever 700 may in-

clude an ice-full state detector 710 that detects ice inside the ice bin 500 while being be moved inside the ice bin 500. The ice-full state detector 710 extends in a straight manner and may extend from one end to the other end of the ice bin 500. Further, both ends of the ice-full state detector 710 are bent such that one end thereof may be connected to the driver 180, while the other end may be rotatably connected to the upper casing 120.

[0141] FIG. 13 shows a state in which spherical ices are removed from the ice-maker and are arranged inside the ice bin. Further, FIG. 14 shows a perspective view of a state in which the ices are arranged inside the ice bin.

[0142] Referring to the drawings, the water supplied from the water supply 190 is fed to each ice chamber for ice-making through an inlet 154 formed in the upper tray 150 of the ice tray 520. Water introduced through one of the plurality of inlets 154 transfers from a corresponding ice chamber to a neighboring ice chamber 111. After the water has been filled up to a set height, the lower tray 250 will pivot in a forward direction to close each chamber defined by the upper tray 150 and lower tray 250 completely.

[0143] In this state, the cold-air supplied from the evaporator inside the freezing compartment 4 is supplied to the ice-maker 100 to cool the water inside the ice chamber 111. In detail, the cold-air passing through the cold-air hole 134 along the cold-air guide 145 may be concentrated on the top face of the upper casing 120.

[0144] When it is detected that the water inside the ice chamber 111 is completely frozen to complete the spherical ice, using the temperature sensor 610, the lower tray 250 will again pivot in the reverse direction. The ice chamber 111 may be open as the lower tray 250 pivots in the reverse direction. Further, in conjunction with the pivoting of the lower tray 250, the pivoting arm 352 pivots to move the upper ejector 300 downwards. The ejecting pin 320 of the upper ejector 300 passes through the inlet 154 to push the spherical ice I located in the upper portion of the ice chamber 111 downwards for the ice-removal.

[0145] In one example, when the lower tray 250 is further pivoted and then fully pivoted in the reverse direction, the lower ejecting rod 420 of the lower ejector 400 penetrates through the lower tray opening 274 and presses a convex portion 251b of the bottom face of the lower tray 250. That is, the lower ejector 400 presses the lower tray 250 made of an elastic material such as silicone so that the spherical ice I located in the lower chamber 250 may be removed out of the lower tray 250.

[0146] The spherical ice I removed from the ice-maker 100 falls downwards and may fall to the bottom 521 of the ice tray 520 mounted in the ice bin 500. Further, the spherical ice I dropped onto the ice tray 520 rolls forwards along the slope of the bottom face of the ice tray 520.

[0147] Further, ice debris generated during the ice-removal process of the ice-maker 100 or during the process of moving the spherical ice I may be separated and stored through the tray holes 521a onto the bottom face of the ice bin 500. That is, only the spherical ice may be disposed on the ice tray 520 while being separated from the ice debris.

[0148] As the ice-making and ice-removal process are repeated in the ice-maker 100, the removed spherical ices I may be arranged sequentially from the front end of the ice tray 520. As shown in FIG. 14, the spherical ices I may be concentrated in a front portion or half of the ice bin 500.

[0149] In this state, when the user intends to use the spherical ices I, the freezing compartment drawer 41 is extended to expose the ice bin 500. Since the spherical ices I have first filled the front half of the ice bin 500, due to the slope of the bottom face of the ice tray 520, the freezing compartment drawer 41 does not need to be fully extended. Thus, when the user withdraws the drawer to an extent that the front half of the ice bin 500 is visible to the user, the user may take out the ice.

[0150] Therefore, the cold-air leakage inside the freezing compartment 4 may be minimized, and at the same time, the ice in the ice bin 500 may be taken out with minimal user manipulation. Further, when the user has taken the ice out of the ice bin 500, the spherical ices I inside the ice tray 520 and/or inside the ice bin 500 may be moved forward, that is a forward direction, along the slope of the bottom face of the ice tray 520 by the taken amount thereof and may fill the front portion or half of the ice bin 500 again.

[0151] The spherical ice I removed from the ice tray 520 may roll forward in the ice tray 520. In this process, the ice contacts the neighboring spherical ice I or ice tray 520 such that a burr around the spherical ice I may be removed. Thus, the spherical ice I may be in a more spherical state. Ice debris caused by the burr removal may be discharged to the bottom face of the ice bin 500 through the tray holes 512a.

[0152] In one example, even when the freezing compartment drawer 41 or the ice bin 500 is withdrawn out, the spherical ice I inside the ice bin 500 fills the front portion or half of the ice bin 500 due to the inclination of the bottom face of the ice tray 520. Even when small movement of the freezing compartment drawer 41 and ice bin 500 may occur, the spherical ice I will not excessively move or deviate from a position.

[0153] As described above, the present disclosure is described with reference to the drawings. However, the present disclosure is not limited by the embodiments and drawings disclosed in the present specification. It will be apparent that various modifications may be made thereto by those skilled in the art within the scope of the present disclosure. Furthermore, although the effect resulting from the features of the present disclosure has not been explicitly described in the description of the embodiments of the present disclosure, it is obvious that a predictable effect resulting from the features of the present disclosure should be recognized.

Claims

1. A home appliance, in particular a refrigerator (1) or a freezer, comprising:

   a cabinet (2) having a freezing compartment (4) defined therein;
   an ice-maker (100) disposed in the freezing compartment (4) configured to make spherical ice; and
   an ice bin (500) for storing ice, the ice bin (500) being disposed below the ice-maker (100) such that ice removed from the ice-maker (100) falls down from the ice maker (100) into the ice bin (500),
   characterized by further including an ice tray (520) disposed inside the ice bin (520) for receiving the ice,
   wherein at least a portion of a bottom (521) of the ice tray (520) is spaced apart from a bottom of the ice bin (500), wherein a plurality of tray holes (521a) are defined to pass through the bottom of the ice tray (520).

2. The home appliance of claim 1, wherein an inner surface of the bottom (521) of the ice tray (520) is inclined so that the spherical ice rolls to a front end of the ice tray (520), and/or wherein a spacing between the bottom (521) of the ice tray (520) and the bottom of the ice bin (500) increases in a rearward direction of the ice tray (520).

3. The home appliance of claim 1 or 2, wherein the freezing compartment (4) contains a drawer (41) disposed below the ice-maker (100) and configured to be extended or retracted, wherein the ice bin (500) is mounted inside the drawer (41) such that the ice bin (500) moves together with a movement of the drawer (41).

4. The home appliance of claim 3, wherein a bin mounting guide (411) for defining a mounting position of the ice bin (500) within the drawer (41) is formed on a bottom of the drawer (41) and faces the ice-maker (100).

5. The home appliance of claim 4, wherein the bin mounting guide (411) protrudes upwards from the bottom of the drawer (41), and wherein the ice bin (500) comprises a plurality of legs (514) extending downwards from a bottom of the ice bin (500), wherein the bin mounting guide (411) contacts an outer surface of each of the legs (500).

6. The home appliance of any one of the preceding claims, wherein a size of each of the tray holes (521a) is smaller than a size of a single spherical ice made by the ice maker (100), and/or wherein the plurality of the tray holes (521a) are continuously arranged at a regular spacing in a first horizontal direction and/or a second horizontal direction.

7. The home appliance of any one of the preceding claims, wherein a bin opening (518) is formed by a downward recess in a rear wall of the ice bin (500).

8. The home appliance of any one of the preceding claims, wherein at least a portion of the ice-maker (100) is inserted in the ice bin (500), such that a bottom level of the bin opening (518) is lower than a bottom level of the ice-maker (100), wherein a cover plate (130) extends downwards from the ice maker (100) and shields at least a portion of the bin opening (518).

9. The home appliance of claim 7 or 8, wherein the ice tray (520) comprises a handle (525) protruding rearwards through the bin opening (518) of the ice bin (500).

10. The home appliance of claim 9, wherein the handle (525) is seated on a bin opening guide (516) extending rearwards along the circumference of the bin opening (518).

11. The home appliance of any one of the preceding claims, wherein the ice tray (520) comprises a handle groove (524) formed at a front portion thereof, wherein the handle groove (524) is spaced apart from an inner surface of a side wall the ice bin (500).

12. The home appliance of any one of the preceding claims, wherein the ice tray (520) includes:

    a front portion (522b) extending upwardly from a front end of the bottom (521);
    a rear portion (522c) extending upwardly from a rear end of the bottom (521); and
    lateral portions (522a) respectively extending upwardly from left and right ends of the bottom (521), and connecting the front portion (522b) and the rear portion (522c),
    wherein a height of the front portion (522b) is larger than a height of the rear portion (522c).

13. The home appliance of claim 12, wherein the handle (525) includes:

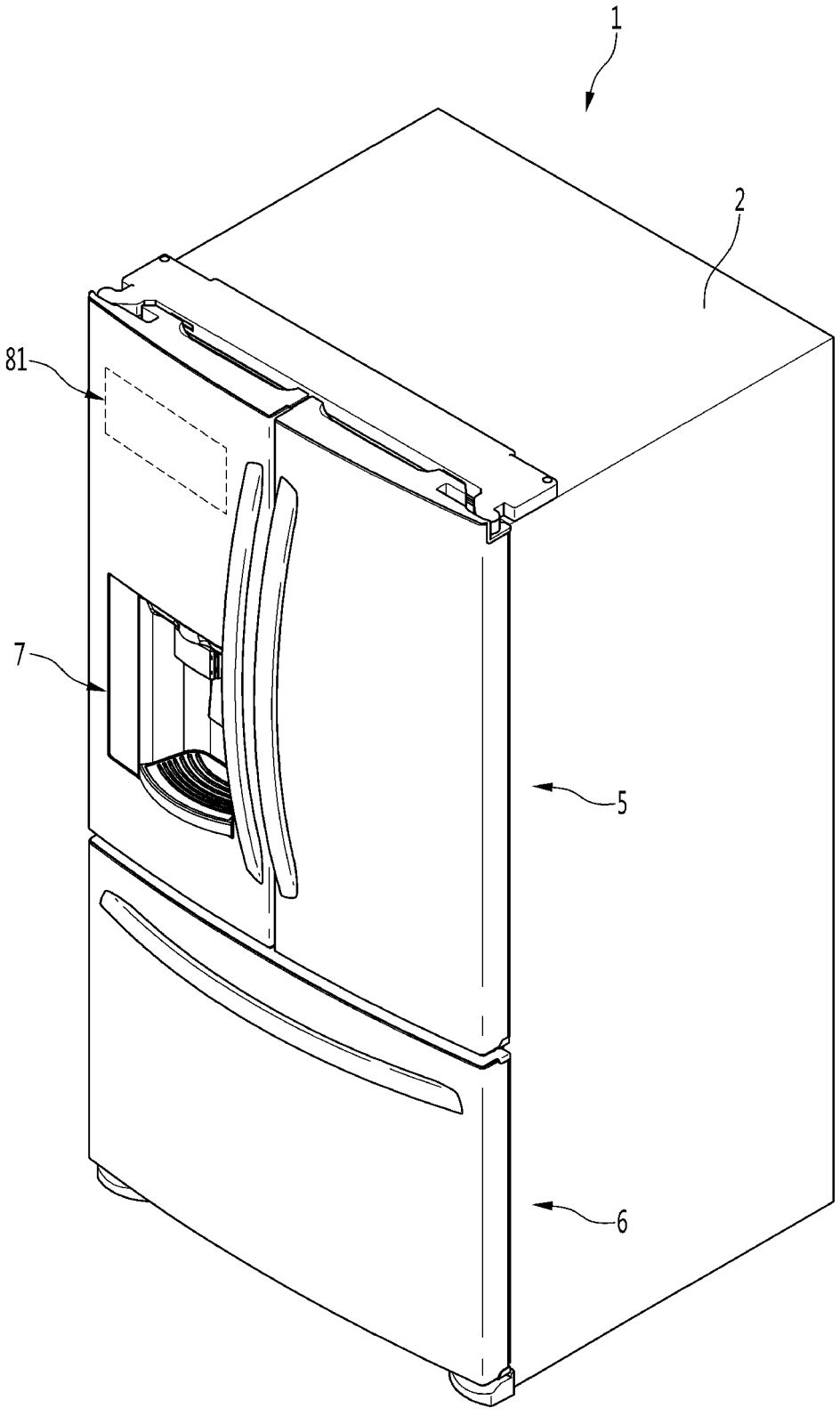
    a first extension (525a) extending rearward from a top of the rear portion (522c); and
    a second extension (525b) extending downward from a distal end of the first extension (525b).

14. The home appliance of claim 13, wherein the first extension (525a) is seated on the bin opening guide (516), and the second extension (525b) is exposed

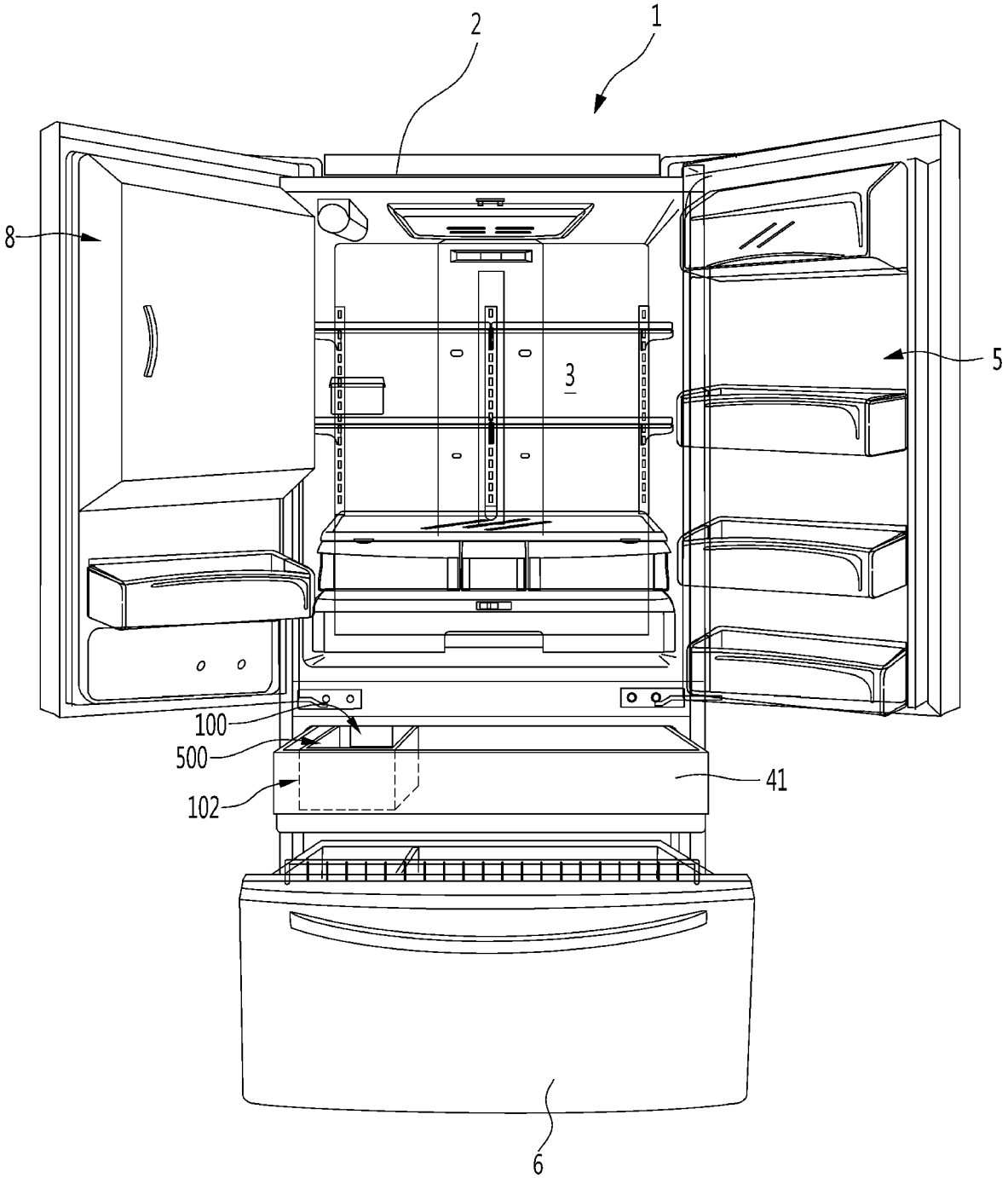
to an outside of the bin opening (518) and/or of the ice bin (500).

15. The home appliance of any one of claims 12 or 13, wherein the ice tray (520) comprises a rim (523) extending outward from a top portion thereof, wherein the rim (523) contacts an inner surface of a side wall the ice bin (500).

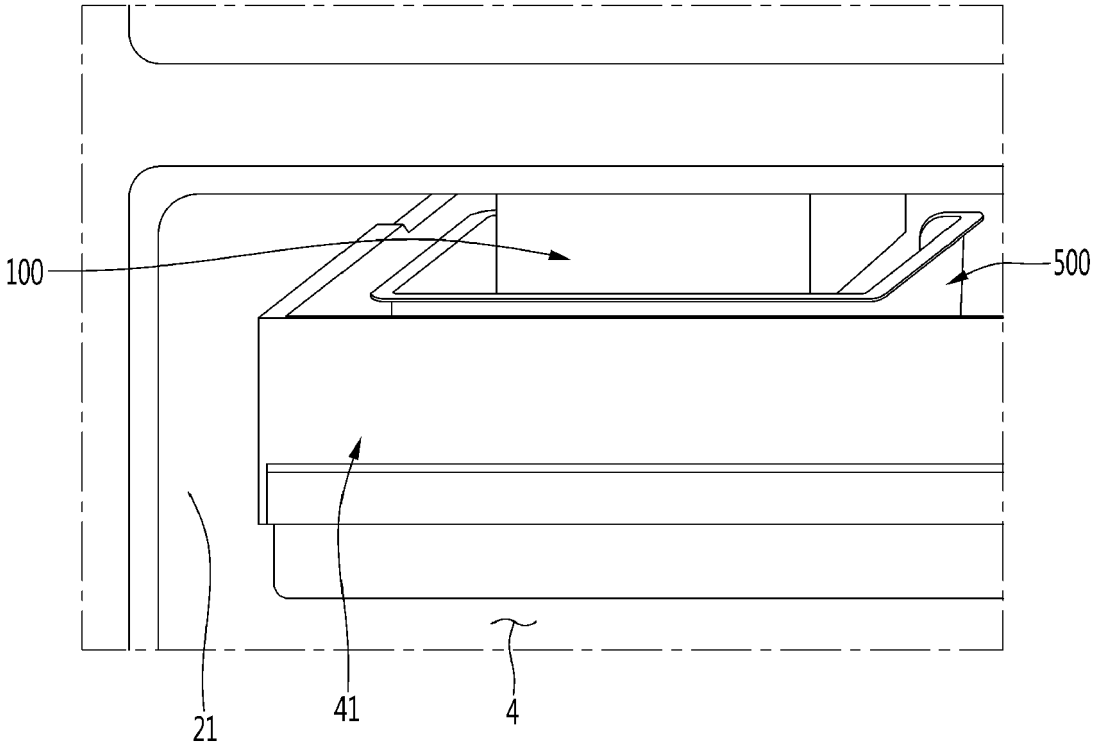
【Fig. 1】



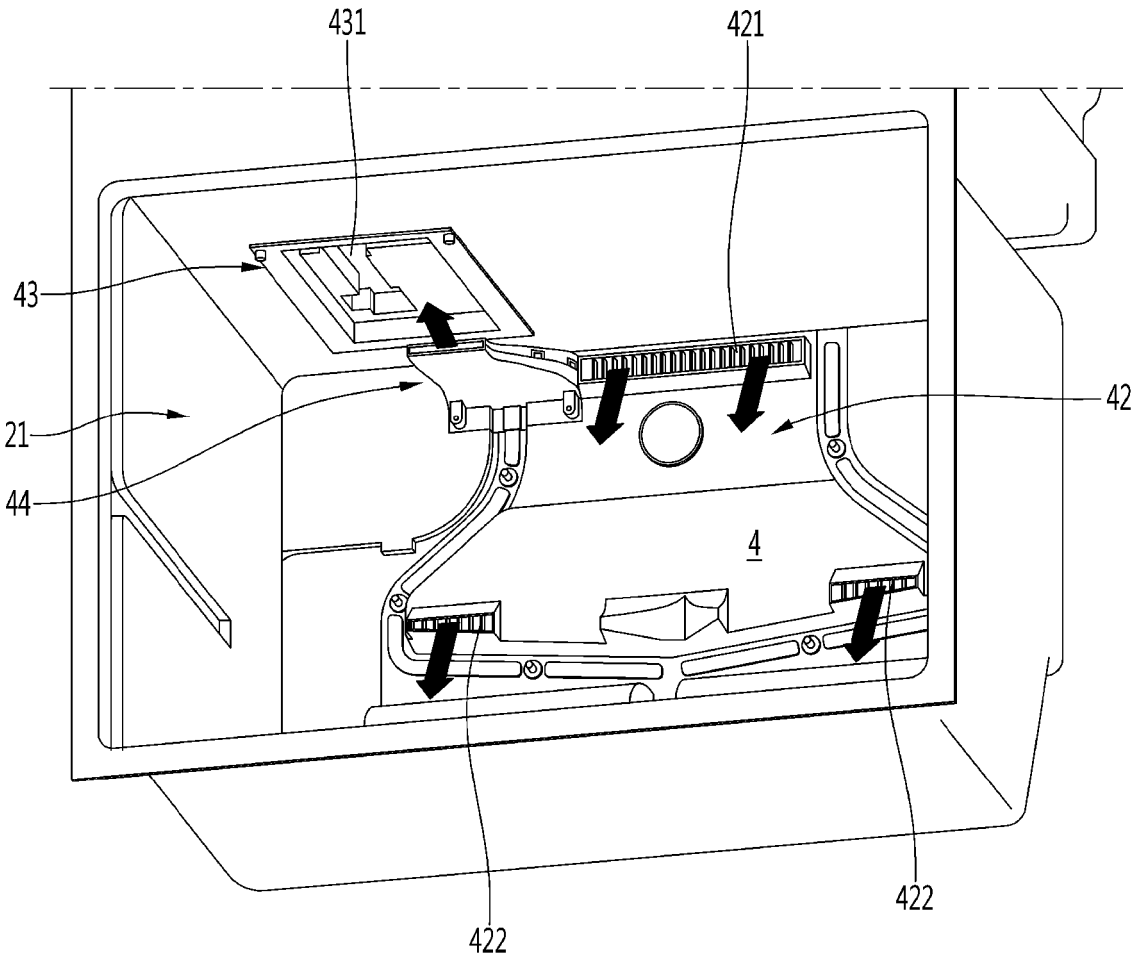
【Fig. 2】



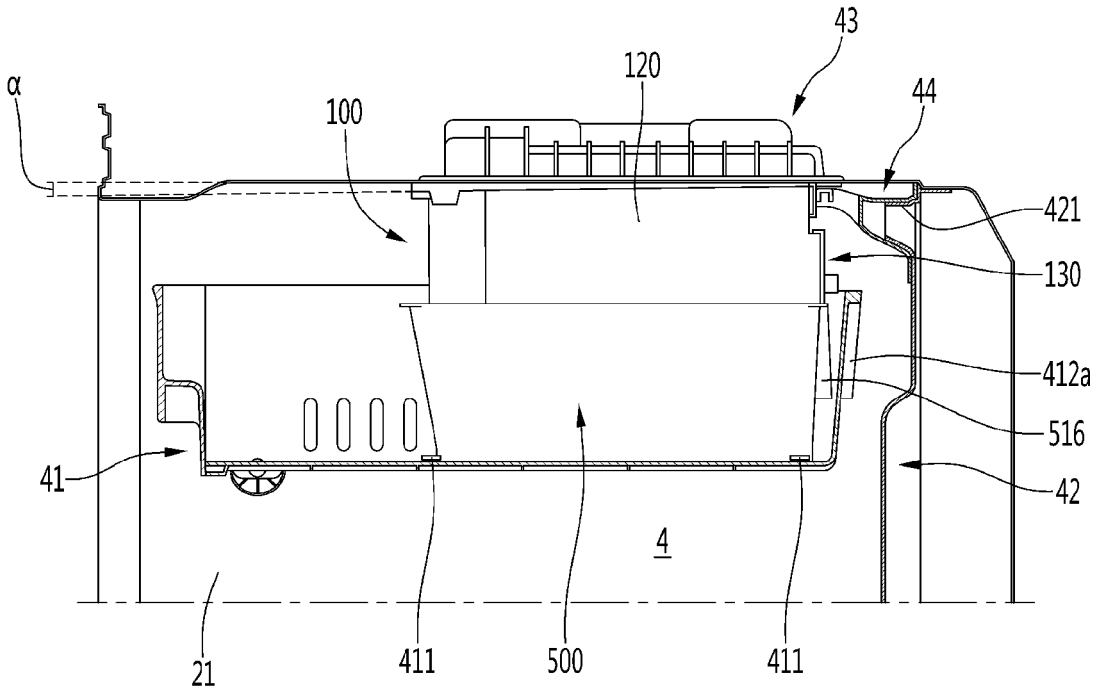
【Fig. 3】



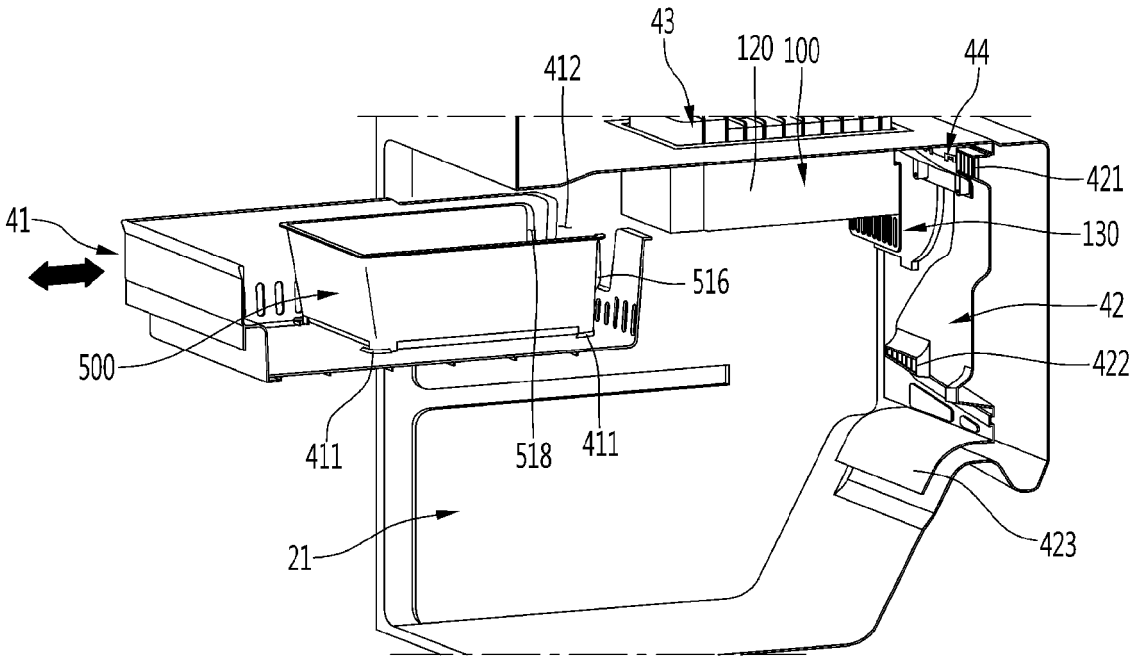
【Fig. 4】



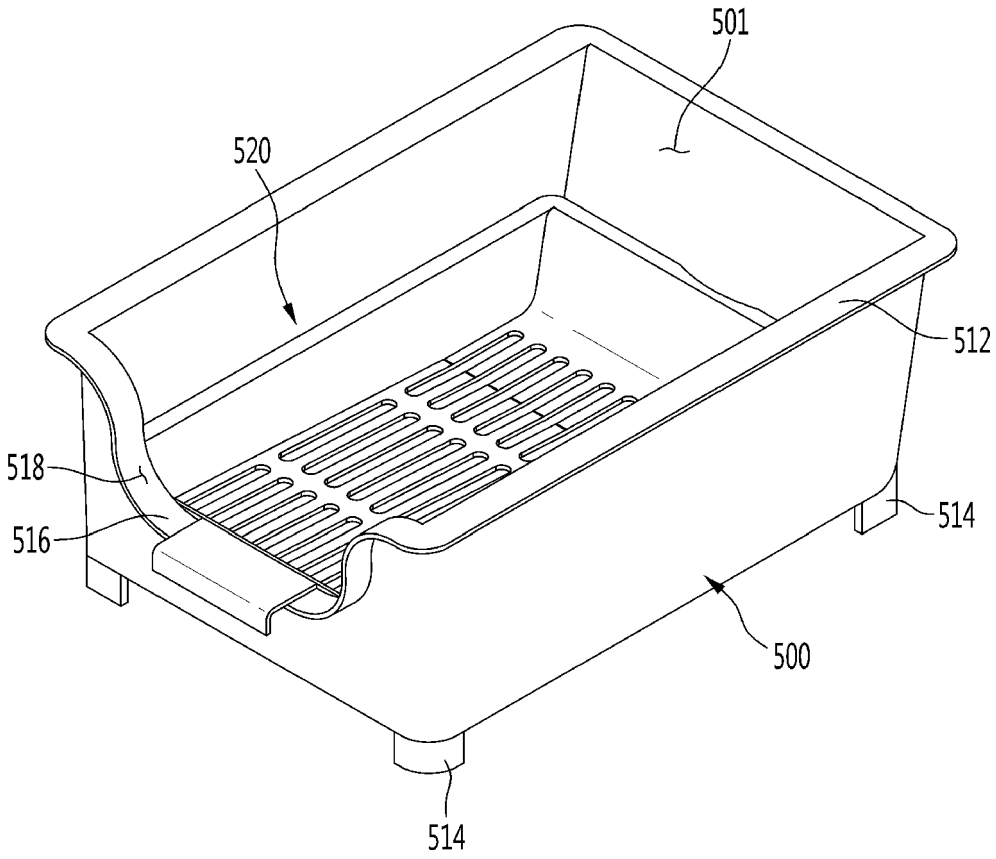
【Fig. 5】


α
100
120
43
44
421
130
412a
516
42
41
4
21
411
500
411

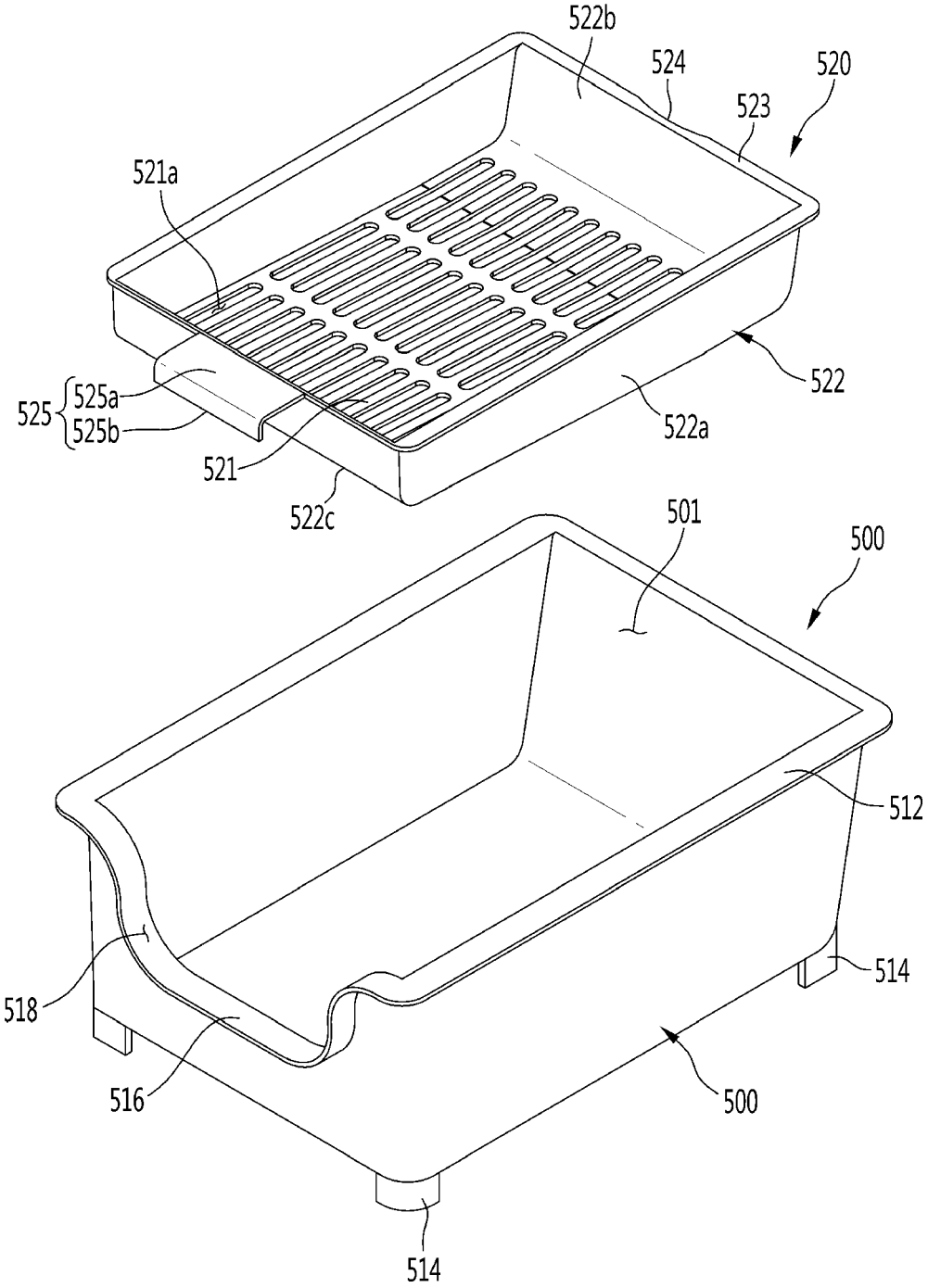
【Fig. 6】


43
412
120
100
44
421
41
130
516
42
422
500
411
518
411
21
423

【Fig. 7】



【Fig. 8】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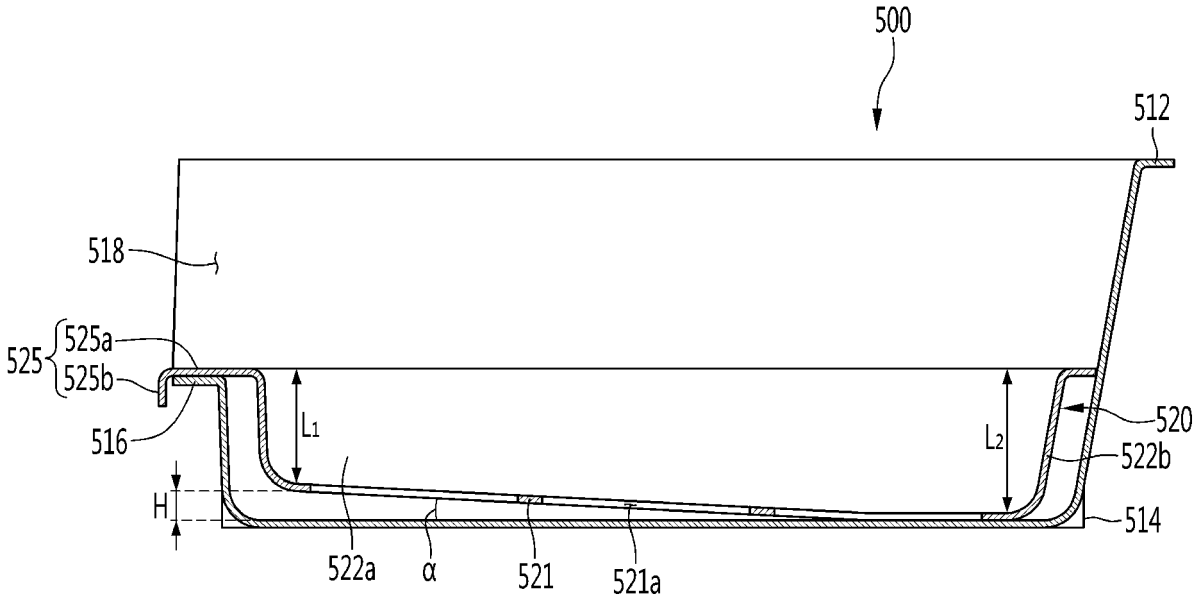
500
514

【Fig. 9】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L2
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H
522a
α
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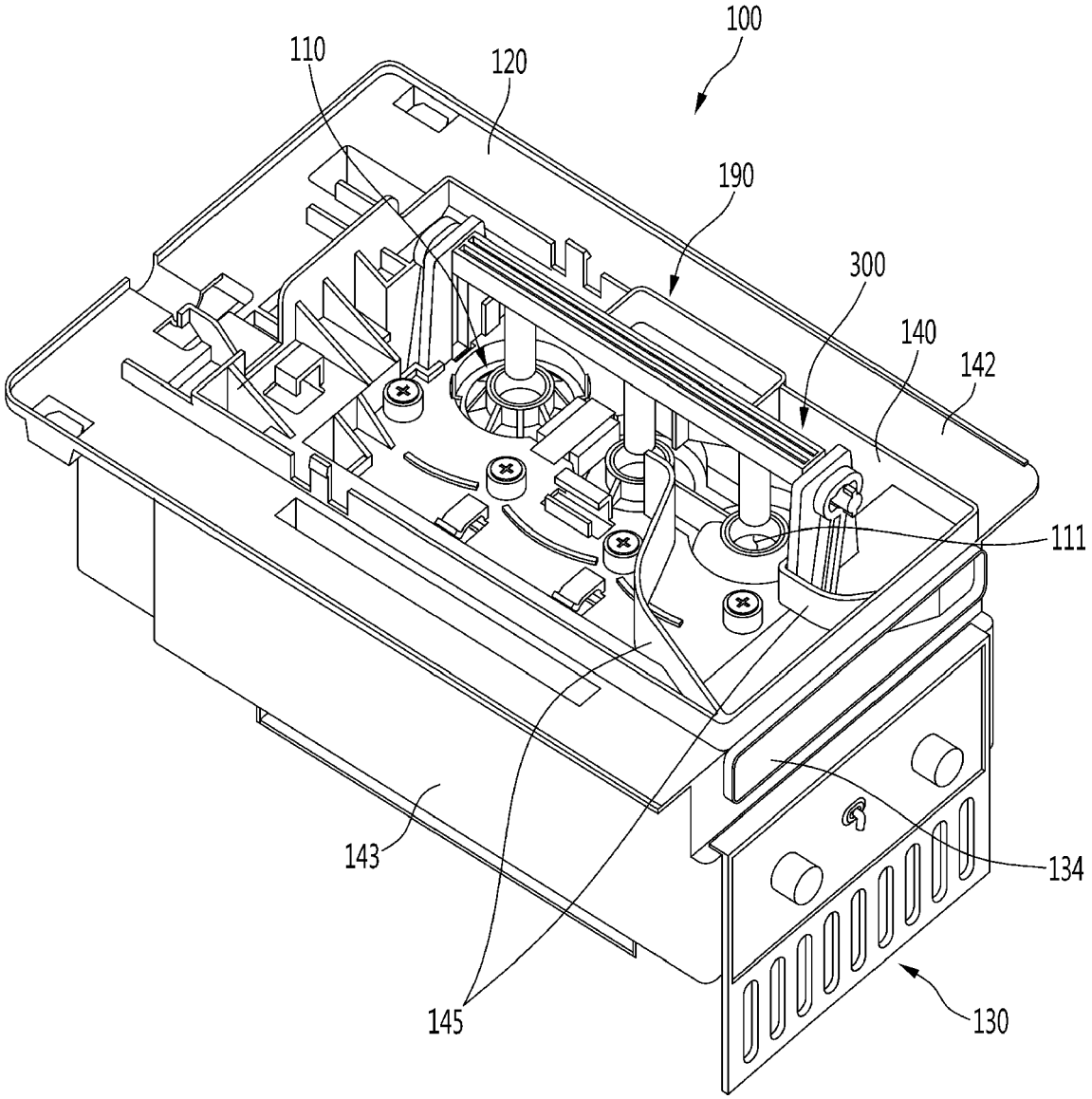
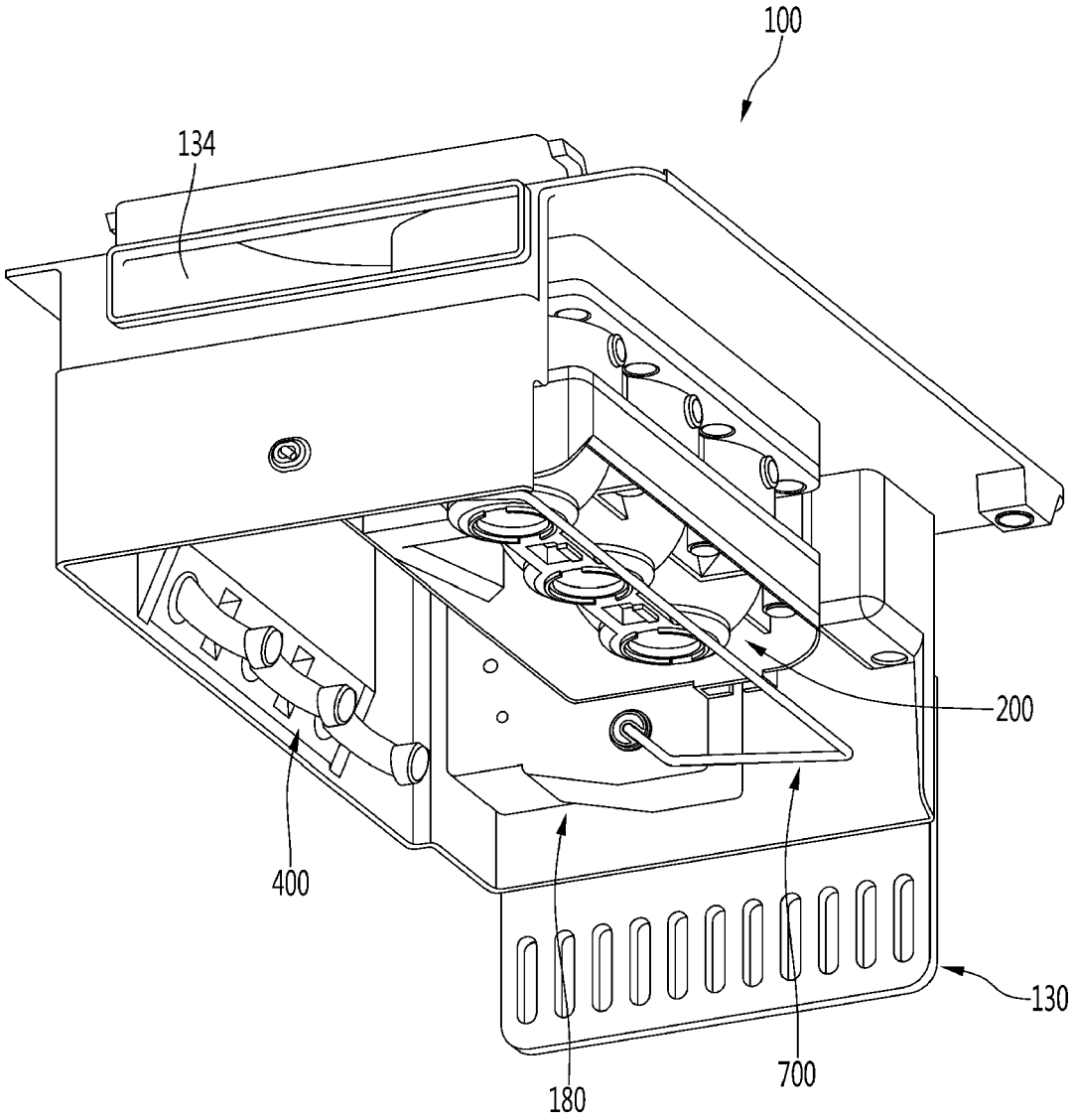
521a

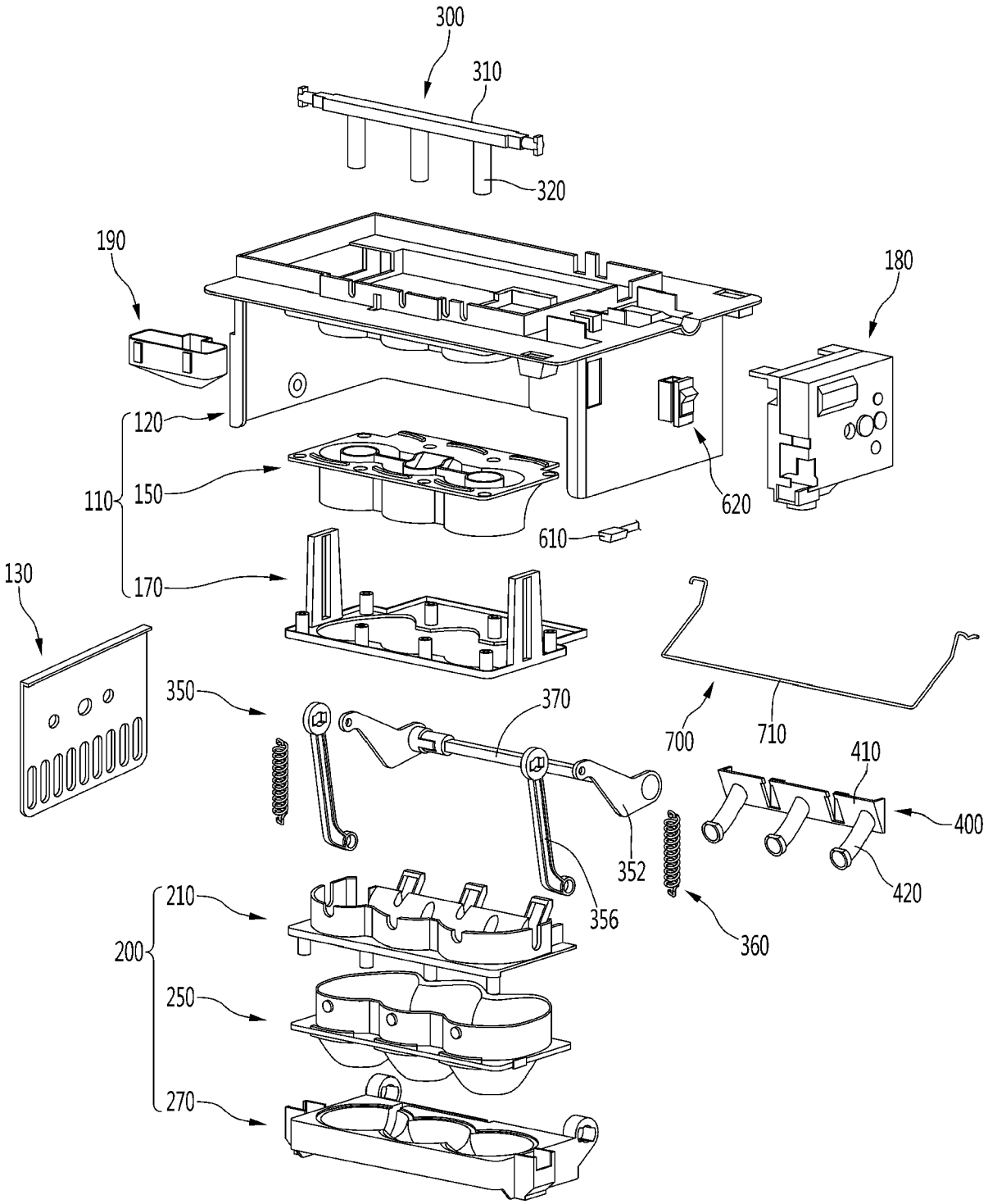
【Fig. 10】



【Fig. 11】



【Fig. 12】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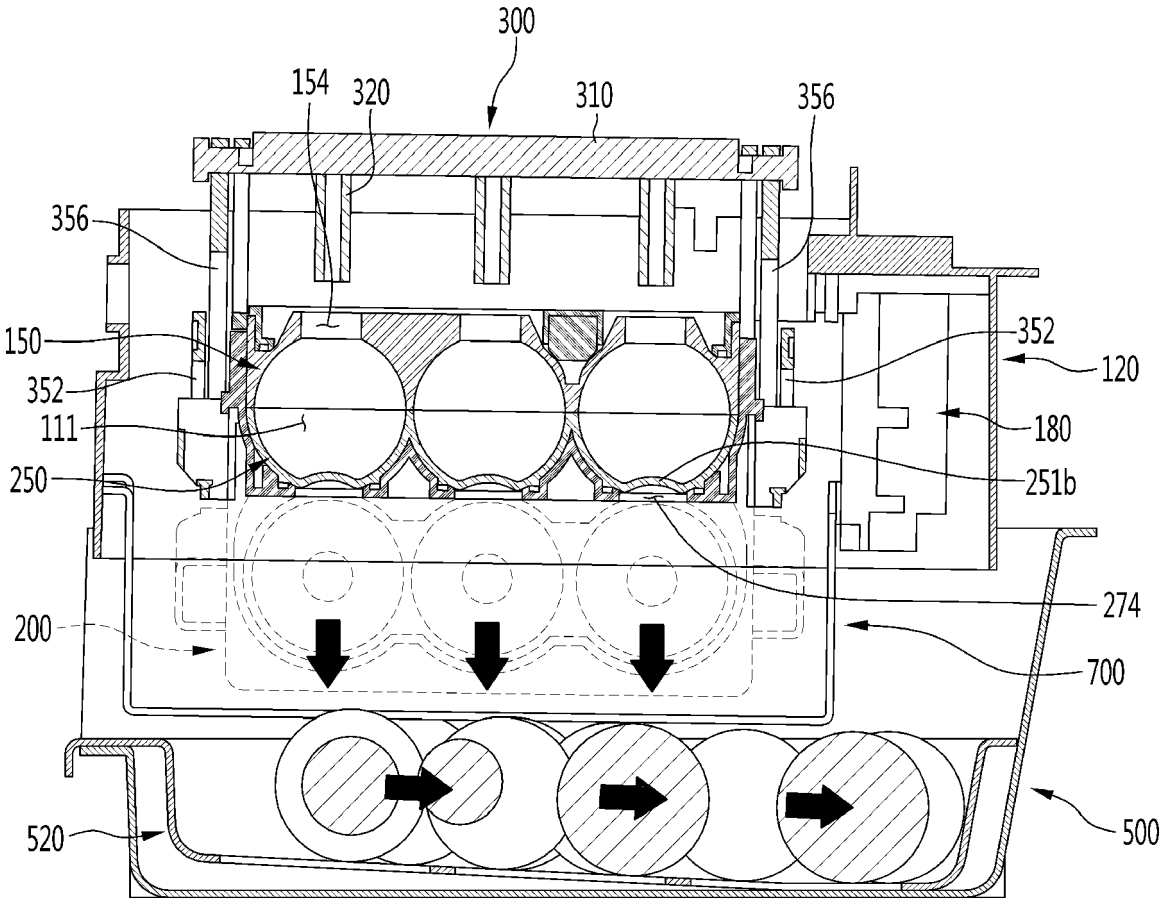
【Fig. 13】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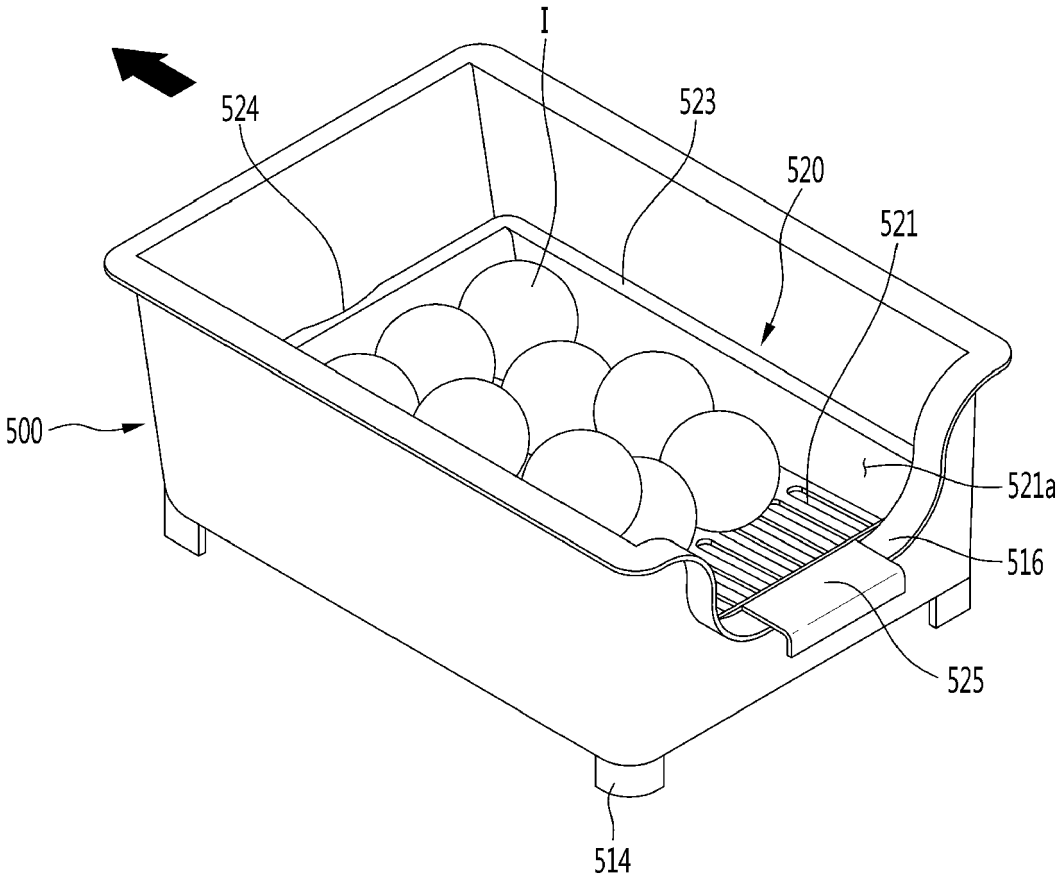
【Fig. 14】



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Patent documents cited in the description

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