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(54) **ICE STORAGE BOX**

(57) The present invention discloses an ice storage box, which comprises: a box that is provided with a pad plate therein, the pad plate having an ice dropping portion and an ice guiding portion connected to the ice dropping portion. The ice guiding portion is gradually lowered from the ice dropping portion in a direction away from the ice dropping portion, and the ice dropping portion can move downward under an external force. By providing on the pad plate the ice dropping portion capable of moving vertically and the ice guiding portion being gradually lowered on two sides of the ice dropping portion, ice cubes can be firstly accumulated on two sides of the ice dropping portion and then accumulated at the ice dropping portion, such that the ice cubes can fill up the entire ice storage box along with the gradual downward movement of the ice dropping portion, thereby increasing the utilization rate of the ice storage space.

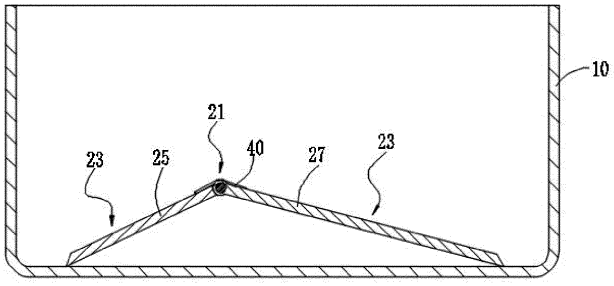

FIG. 2

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Description

TECHNICAL FIELD

[0001] The present invention relates to the field of refrigeration technologies, in particular to an ice storage box.

BACKGROUND ART

[0002] A refrigerator may be provided with an ice maker inside for making ice, and the ice maker is generally provided in a freezer liner of the refrigerator to make ice with the help of cold air in the freezer liner. After ice cubes are made, an ice turning device is utilized to pour the ice cubes from an ice box into a lower ice storage box for storage and access. Then, the ice maker may stop working when an ice probe rod within the ice maker detects that the ice cubes in the ice storage box are accumulated to a certain height.

[0003] However, after the ice cubes in the ice box drop into the ice storage box, the ice cubes may be firstly accumulated at the ice dropping point, forming a mountain-shaped ice pile structure. Then, the ice maker stops working until the ice probe rod detects the highest point of the ice pile. However, there is still a great space in the ice storage box, so the ice storage space of the ice storage box cannot be fully utilized.

SUMMARY OF THE INVENTION

[0004] An object of the present invention is to provide an ice storage box for increasing a utilization rate of an ice storage space.

[0005] In order to fulfil one of the above objects of the invention,a embodiment of the present invention provides an ice storage box, comprising: a box that is provided with a pad plate therein, the pad plate having an ice dropping portion and an ice guiding portion connected to the ice dropping portion, wherein the ice guiding portion is gradually lowered from the ice dropping portion in a direction away from the ice dropping portion, and the ice dropping portion can move downward under an external force.

[0006] As a further improvement of embodiments of the present invention,wherein the ice guiding portion is connected to two sides of the ice dropping portion; the pad plate comprises a first pad plate and a second pad plate connected to each other; the ice dropping portion is formed at a junction between the first pad plate and the second pad plate; and the ice guiding portion is formed on upper surfaces of the first pad plate and the second pad plate.

[0007] As a further improvement of embodiments of the present invention,wherein the first pad plate is fixedly connected to the second pad plate, and both the first pad plate and the second pad plate are made of a flexible material.

[0008] As a further improvement of embodiments of the present invention,wherein the first pad plate and the second pad plate are hinged to each other, and a resilient mechanism is provided at the junction between the first pad plate and the second pad plate.

[0009] As a further improvement of embodiments of the present invention,wherein a position limiting mechanism is provided between the box and a side of the ice guiding portion away from the ice dropping portion, such that the side of the ice guiding portion away from the ice dropping portion is kept within a certain distance from an inner bottom wall of the box.

[0010] As a further improvement of embodiments of the present invention,wherein the position limiting mechanism has a guiding plate provided at an end of the side of the ice guiding portion away from the ice dropping portion, and a guiding groove provided in the box and matching the guiding plate.

[0011] As a further improvement of embodiments of the present invention,wherein the box has a box body and a position limiting plate connected to an inner wall of the box body, a groove-shaped space formed between the box body and the position limiting plate forms the guiding groove, and the guiding plate penetrates into the guiding groove.

[0012] As a further improvement of embodiments of the present invention, wherein the box body has a sidewall surface on a side of the guiding plate away from the ice dropping portion, the position limiting plate is connected to the sidewall surface and is disposed parallel to the sidewall surface, the guiding groove opens downward, and a total unfolding length of the pad plate is not less than a corresponding length of a bottom wall of the box body.

[0013] As a further improvement of embodiments of the present invention,wherein the position limiting plates connected to the same sidewall surface are provided at intervals in pair and are provided along two side edges of the sidewall surface respectively, so as to provide a position-limiting guide to positions at two sides of the guiding plate approximating the edges, respectively.

[0014] As a further improvement of embodiments of the present invention,wherein an inclined guiding surface is formed at an open end of the guiding groove towards the guiding plate, a guiding portion is formed at an end of the guiding plate away from the ice dropping portion, and a thickness of the guiding portion is gradually decreasing from an end approximating the ice dropping portion towards the interior of the guiding groove.

[0015] As a further improvement of embodiments of the present invention, a guiding plate is detachably provided at an end of an ice guiding portion, a thickness of the guiding plate is smaller than a thickness of the ice guiding portion, and the guiding plate is made of a flexible material.

[0016] As a further improvement of embodiments of the present invention, a position limiting mechanism is provided at an end of a first pad plate and/or a second

pad plate.

[0017] As a further improvement of embodiments of the present invention, the ice guiding portion includes a fixed end connected to a side of an ice dropping portion and a free end away from the side of the ice dropping portion; the ice guiding portion is gradually lowered in height from the fixed end towards the free end of the ice guiding portion; and the position limiting mechanism is provided between two sides of the free end of the ice guiding portion and a sidewall of the adjacent box, such that the free end of the ice guiding portion is guided by the position limiting mechanism to move within the box when the ice dropping portion is moved vertically under an external force.

[0018] As a further improvement of embodiments of the present invention,wherein the position limiting mechanism has sliding means provided on two sides of a free end of the ice guiding portion, and a slide rail provided inside the box for matching the sliding means.

[0019] As a further improvement of embodiments of the present invention, sliding means has a connecting portion provided in a sidewall of the ice guiding portion and a sliding portion connected to the connecting portion.

[0020] As a further improvement of embodiments of the present invention,wherein the slide rail has a base provided in an inner wall of the box and a cover plate connected to the base, wherein a sliding space is enclosed between the base and the cover plate for the sliding means to slide, and a position limiting opening is formed in a side of the sliding space to restrict the sliding means from disengaging from the sliding space.

[0021] As a further improvement of embodiments of the present invention,wherein the cover plate is provided with a removable clamping assembly for the sliding means to be disengaged from the sliding space.

[0022] As a further improvement of embodiments of the present invention, wherein the clamping assembly has an opening provided in the cover plate, and a clamping block inserted into the opening; a locating slot is formed in the bottom of the clamping block, and a locating block matching the locating slot is provided on the base at a position of the opening for restricting the disengagement of the clamping block from the opening after the locating slot is docked with the locating block.

[0023] As a further improvement of embodiments of the present invention,wherein a top wall of the cover plate is provided with a beveled structure that gradually decreases in height from a sidewall of the box towards a center of an inner bottom surface of the box.

[0024] Compared to the prior art, the present invention has the following beneficial effects. By providing on the pad plate the ice dropping portion capable of moving vertically and the ice guiding portion being gradually lowered on two sides of the ice dropping portion, the ice cubes can be firstly accumulated on two sides of the ice dropping portion and then accumulated at the ice dropping portion, such that the ice cubes can fill up the entire ice storage box along with the gradual downward movement of the ice dropping portion, thereby increasing the utilization rate of the ice storage space.

BRIEF DESCRIPTION OF THE DRAWINGS

[0025]

FIG. 1 is a three-dimensional schematic diagram of an ice storage box according to a specific embodiment of the present invention;

FIG. 2 is a sectional view of the ice storage box in FIG. 1 at A-A;

FIG. 3 is a three-dimensional schematic diagram of an ice storage box according to another specific embodiment of the present invention;

FIG. 4 is a sectional view of the ice storage box in FIG. 3 at A-A;

FIG. 5 is an enlarged view of Part a in FIG. 4;

FIG. 6 is a three-dimensional schematic diagram of an ice storage box according to another specific embodiment of the present invention;

FIG. 7 is a sectional view of the ice storage box in FIG. 6 at A-A;

FIG. 8 is a sectional view of the ice storage box in FIG. 6 at B-B;

FIG. 9 is an enlarged view of Part a in FIG. 8;

FIG. 10 is a schematic exploded view of the ice storage box in FIG. 6; and

FIG. 11 is a three-dimensional schematic diagram of a clamping block in FIG. 10.

DETAILED DESCRIPTION

[0026] The present invention will be described hereinafter in detail with reference to the specific embodiments shown in the drawings. However, these embodiments do not limit the present invention, and the changes in structures, methods or functions made by those skilled in the art according to the embodiments are all included in the protection scope of the present invention.

[0027] It should be understood that terms such as "up", "down", "outside" and "inside" which are adopted herein to denote relative positions in space are used for ease of illustration and aim to describe the relationship of one unit or feature shown in the drawings relative to another unit or feature. The terms describing the relative positions in space may intend to include different orientations of equipment in use or operation other than the orientations shown in the drawings.

Embodiment 1

[0028] With reference to FIGs. 1 and 2, an embodiment of the utility model provides an ice storage box comprising a box 10, the box 10 being provided with a pad plate 20 therein. In this embodiment, the pad plate 20 may be provided on the bottom wall and/or the surrounding sidewalls of the box, can protect an ice dropping box when

ice cubes drop into the box 10, and can facilitate subsequent cleaning of the ice storage box.

[0029] Specifically, with reference to FIG. 2, the pad plate 20 has an ice dropping portion 21 and an ice guiding portion 23 connected to the ice dropping portion 21. The ice guiding portion 23 is gradually lowered from the ice dropping portion 21 in a direction away from the ice dropping portion 21, and the ice dropping portion 21 can move downward under an external force.

[0030] In this embodiment, the ice dropping portion 21 is located directly below a dropping point of ice cubes in an ice maker. That is, after the ice maker finishes making ice, the ice cubes may drop at the ice dropping portion 21 of the pad plate 20 when the ice cubes are poured into the ice storage box. Since the ice guiding portion 23 connected to the ice dropping portion 21 is gradually lowered from the ice dropping portion 21 in a direction away from the ice dropping portion 21, the ice cubes, after dropping to the ice dropping portion 21, may roll down to the ice guiding portion 23 by their own gravity, and finally drop into the box 10 under the guidance of the ice guiding portion 23. As a result, the ice cubes can be firstly accumulated on two sides of the ice dropping portion 21 and then accumulated at the ice dropping portion. In addition, with the gradual downward movement of the ice dropping portion, the ice cubes can fill up the entire ice storage box, thereby increasing the utilization rate of the ice storage space and increasing the amount of ice stored in the ice maker of the refrigerator.

[0031] In order to enable the ice dropping portion 21 to move downward and further utilize the ice storage space of the ice storage box, the pad plate 20 may be designed as a resiliently deformable structure. That is, the ice dropping portion 21 can be forced to move downward when the ice cubes are accumulated at the ice dropping portion 21, such that an overhead space between the box 10 and the underside of the pad plate 20 can ultimately be utilized for storing the ice cubes. As for a specific shape of the pad plate, it may be of a triangular cone structure, a quadrangular cone and other polygonal conical structures, or may be of a circular conical structure, as long as it is a raised structure that enables the ice cubes to start accumulating from the periphery of the ice dropping portion 21.

[0032] Further, the ice guiding portion 23 is connected to two sides of the ice dropping portion 21. In this embodiment, the pad plate 20 is formed in a "herringbone" structure, which has a simple structure and reduces the manufacturing cost compared to the pad plate 20 of a polygonal conical structure. In addition, the pad plate 20 is formed with the ice dropping portion 21 and the ice guiding portion 23, which can thereby enable the ice cubes to be firstly accumulated from the periphery of the ice dropping portion 21.

[0033] Specifically, the pad plate 20 includes a first pad plate 25 and a second pad plate 27 connected to each other; the ice dropping portion 21 is formed at the junction between the first pad plate 25 and the second pad plate 27; and the ice guiding portion 23 is formed on upper surfaces of the first pad plate 25 and the second pad plate 27.

[0034] In this embodiment, the length and width of each of the first pad plate 25 and the second pad plate 27 may be set according to an inner diameter of the box 10. That is, the sum of the widths of the first pad plate 25 and the second pad plate 27 after unfolding is less than or equal to the inner width of the box 10. In addition, the length of each of the first pad plate 25 and the second pad plate 27 is preferably equal to the inner length of the box 10, such that the first pad plate 25 and the second pad plate 27 after unfolding can be ensured to match the inner bottom surface of the box 10, and the ice cubes can also be prevented from dropping into the underside of the first pad plate 25 and the second pad plate 27, thereby maximizing the ice storage space for the ice cubes.

[0035] Further, there is no requirement for the width of each of the first pad plate 25 and the second pad plate 27, as long as it is ensured that the ice dropping portion 21 formed at the junction between the first pad plate 25 and the second pad plate 27 is positioned directly below the ice dropping point in the ice maker.

[0036] Further, the first pad plate 25 is fixedly connected to the second pad plate 27, and both the first pad plate 25 and the second pad plate 27 are made of a flexible material.

[0037] In this embodiment, the first pad plate 25 and the second pad plate 27 are integrally molded to form the pad plate 20, forming a "herringbone" structure. The pad plate 20, which is made of the flexible material, can resiliently deform itself to ensure the vertical movement of the ice dropping portion 21, which can drive the ice cubes to be firstly accumulated on two sides of the ice dropping portion 21 and then at the ice dropping portion 21, and thereby further reduce the production cost. Moreover, the first pad plate 25 and the second pad plate 27, which are made of the flexible material, are also capable of providing the dropping ice cubes with a certain resilience, preventing the ice cubes from adhering to each other or to the pad plate 20.

[0038] Further, the first pad plate 25 and the second pad plate 27 are hinged to each other, and a resilient mechanism 40 is provided at the junction between the first pad plate 25 and the second pad plate 27.

[0039] In this embodiment, the first pad plate 25 and the second pad plate 27 are hinged together using a pin, and the resilient mechanism 40 is provided at the hinge position, thereby enabling a more linear and smooth unfolding process of the pad plate 20 during the vertical movement of the ice dropping portion 21. The resilient mechanism 40 may be a torsion spring or of other resilient structure for providing resilience to the hinge position.

Embodiment 2

[0040] With reference to FIGs. 3, 4 and 5, another embodiment of the utility model provides an ice storage box

that, besides the structure of the ice storage box in Embodiment 1, further includes a position limiting mechanism 30a, which can restrict the pad plate 20 from deflecting or flipping inside the box 10 during the ice storage, reduce the resistance borne by the pad plate 20 during unfolding, and prevent water generated by melting of the ice cubes from being frozen twice and from making the ice guiding portion 23 be adhered to the box 10.

[0041] Specifically, with reference to FIG. 3, the position limiting mechanism 30a is provided between the box 10 and a side of the ice guiding portion 23 away from the ice dropping portion 21, such that the side of the ice guiding portion 23 away from the ice dropping portion 21 is kept within a certain distance from the inner bottom wall of the box 10.

[0042] In this embodiment, the position limiting mechanism 30a is provided between the box 10 and a side of the ice guiding portion 23 away from the ice dropping portion 21. As a result, it is possible to ensure smooth unfolding of the pad plate 20 during the ice storage process and to restrict disengagement of the pad plate 20 from the box 10, realizing a smooth vertical movement of the ice dropping portion 21. Meanwhile, the ice dropping portion 21 is always directly below the ice dropping point of the ice maker, ensuring that the entire ice storage process starts from the accumulation of ice cubes firstly at the periphery of the ice dropping portion 21 and then at the ice dropping portion 21. Moreover, the position limiting mechanism 30a keeps the side of the ice guiding portion 23 away from the ice dropping portion 21 at a certain distance from the inner bottom wall of the box 10, which can reduce the resistance borne by the pad plate 20 during unfolding and also prevent the water generated by melting of the ice cubes from being frozen twice and from making the ice guiding portion 23 be adhered to the box 10.

[0043] Specifically, the position limiting mechanism 30a has a guiding plate 31 provided at an end of the side of the ice guiding portion 23 away from the ice dropping portion 21, and a guiding groove 33 provided in the box 10 to match the guiding plate 31.

[0044] In this embodiment, the guiding groove 33 may be formed in the inner bottom wall or the inner sidewall of the box 10. The guiding plate 31 is provided at an end of the side of the ice guiding portion 23 away from the ice dropping portion 21, and is employed to keep the side of the ice guiding portion 23 away from the ice dropping portion 21 have a certain distance from the inner bottom wall of the box 10. As a result, there is no contact between the box 10 and the side of the ice guiding portion 23 away from the ice dropping portion 21 when the ice dropping portion 21 moves vertically, such that the frictional resistance between the box 10 and the side of the ice guiding portion 23 away from the ice dropping portion 21 can be reduced, and the resistance of the pad plate 20 during the unfolding can be reduced. In order to reduce the frictional resistance between the guiding plate 31 and the box 10, the guiding plate 31 may be designed as a curved arc-shaped structure, allowing a line contact between the guiding plate 31 and the box 10 and further a small sliding friction. Further, the guiding plate 31 is cooperatively provided in the guiding groove 33, which can restrict the pad plate 20 from disengaging from the box 10 and also ensure a smooth unfolding of the pad plate 20 during the ice storage process.

[0045] Specifically, with reference to FIGs. 4 and 5, the box 10 has a box body 11 and a position limiting plate 33a connected to the inner wall of the box body 11, a groove-shaped space formed between the box body 11 and the position limiting plate 33a forms a guiding groove 33, and the guiding plate 31 penetrates into the guiding groove 33.

[0046] In this embodiment, the position limiting plate 33a may be connected to the box body 11 in a split-connection manner, or be integrally molded with the box body 11 to reduce the production cost. Further, the position limiting plate 33a may be provided on the inner sidewall or the inner bottom wall of the box body 11, as long as the groove-shaped space can be formed between the position limiting plate 33a and the box body 11 for the guiding plate 31 to penetrate. The groove-shaped space formed between the box body 11 and the position limiting plate 33a forms the guiding groove 33. When the ice dropping portion 21 moves downward under the gravity of the ice cubes, the ice guiding portion 23 spreads and unfolds around the ice dropping portion 21, thereby driving the guiding plate 31 to penetrate into the guiding groove 33. After the guiding plate 31 is inserted into the guiding groove 33, the guiding plate 31 can only move vertically but not horizontally in the guiding groove 33 because the guiding groove 33 is a vertically oriented groove-type space. That is, the position limiting plate 33a restricts the guiding plate 31 to move horizontally and thereby restricts the entire pad plate 20 to move horizontally in the box, thereby restricting the pad plate 20 from disengaging from the box 10 and ensuring that the ice dropping portion 21 is always positioned directly below the ice dropping point of the ice maker.

[0047] Further, the box body 11 has a sidewall surface on a side of the guiding plate 31 away from the ice dropping portion 21, the position limiting plate 33a is connected to the sidewall surface and is disposed parallel to the sidewall surface, the guiding groove 33 opens downward, and a total unfolding length of the pad plate 20 is not less than a corresponding length of a bottom wall of the box body 11.

[0048] In this embodiment, the position limiting plate 33a is provided parallel to two sidewalls in the width direction in FIG. 1, and the guiding groove 33 keeps to open downward, which facilitates the penetration of the guiding plate 31 into the guiding groove 33 from the inner bottom surface of the box 10 and thereby enables the position limiting plate 33a to limit the guiding plate 31 to move horizontally. By providing the position limiting plate 33a in parallel to the sidewall surface, the guiding groove 33 can be ensured to have an identical groove width,

such that the guiding plate 31 can be smoothly inserted in and removed out of the guiding groove 33. In addition, no matter in the length direction or in the width direction, the total unfolding length of the pad plate 20 is greater than or equal to the corresponding length or width of the bottom wall of the box body 11, which can avoid a void from being formed between the pad plate 20 and the box body 11 and causing the ice cubes to drop into the underside of the pad plate. Moreover, the pad plate 20 is always provided with the ice dropping portion 21 projecting over the ice guiding portion 23 to continually and efficiently force the ice cubes to be accumulated at the periphery of the ice guiding portion 21.

[0049] Specifically, the position limiting plates 33a connected to the same sidewall surface are provided at intervals in pair, and provided along two side edges of this sidewall surface respectively, so as to provide a position-limiting guide to positions at two sides of the guiding plate 31 approximating the edges, respectively.

[0050] In this embodiment, the position limiting plate 33a is provided at a side edge of a sidewall of the box body 11 in the width direction, which can save the ice storage space to the utmost extent, and is beneficial to the ice storage of the ice storage box. A pair of position limiting plates 33a is provided at intervals on two sides of one ice guiding portion 23, which allows a better position-limiting guide for the guiding plate 31.

[0051] Further, an inclined guiding surface 33b is formed at an open end of the guiding groove 33 towards the guiding plate 31, a guiding portion 3 1a is formed at an end of the guiding plate 31 away from the ice dropping portion 21, and a thickness of the guiding portion 31a is gradually decreasing from an end approximating the ice dropping portion 31 towards an interior of the guiding groove 33.

[0052] In this embodiment, the provision of the inclined guiding surface 33b facilitates the insertion and removal of the guiding plate 31 of the arc-shaped structure within the guiding groove 33. The guiding portion 31a is provided to gradually decrease in thickness, which likewise facilitates the insertion and removal of the guiding plate 31 of the arc-shaped structure within the guiding groove 33.

[0053] Further, the guiding plate 31 is detachably provided at an end of the ice guiding portion 23, a thickness of the guiding plate 31 is smaller than a thickness of the ice guiding portion 23, and the guiding plate 31 is made of a flexible material. In this embodiment, the guiding plate 31 is detachably provided at the end of the ice guiding portion 23, so as to facilitate subsequent cleaning and replacement of the pad plate 20 and the box 10. In addition, the guiding plate 31 may also be integrally molded with the end of the ice guiding portion to reduce the production cost. Moreover, the thickness of the guiding plate 31 is less than the thickness of the ice guiding portion 23, ensuring that the ice guiding portion 23 is restricted from entering the guiding groove while the guiding plate 31 can enter the guiding groove 33. Moreover, the guiding plate 31 is made of a flexible material, such that the guiding plate 31 itself can undergo a resilient deformation. Since the guiding plate 31 is of a circular arc-shaped structure, the guiding plate 31 may hardly enter the guiding groove 33 continuously if it does not undergo a certain deformation. Therefore, the guiding plate 31 is made of a flexible material, which can support the guiding plate 31 to enter the guiding groove 33 continuously, and can also provide the pad plate 20 with a certain resilience force during the dropping of the ice cubes, thereby preventing the ice cubes from adhering to each other or to the pad plate 20.

[0054] Specifically, the pad plate 20 includes a first pad plate 25 and a second pad plate 27 connected to each other; the ice dropping portion 21 is formed at the junction between the first pad plate 25 and the second pad plate 27; the ice guiding portion 23 is formed on upper surfaces of the first pad plate 25 and the second pad plate 27; and the position limiting mechanism 30a is provided at an end of the first pad plate 25 and/or second pad plate 27.

[0055] In this embodiment, the length and width of the first pad plate 25 and the second pad plate 27 may be set according to the inner diameter of the box 10. That is, the sum of the widths of the first pad plate 25 and the second pad plate 27 after unfolding is greater than or equal to the inner width of the box 10. In addition, the length of each of the first pad plate 25 and the second pad plate 27 is preferably equal to the inner length of the box 10, such that the first pad plate 25 and the second pad plate 27 after unfolding can be ensured to match the inner bottom surface of the box 10, and the ice cubes are prevented from dropping into the underside of the first pad plate 25 and the second pad plate 27, thereby maximizing the ice storage space for the ice cubes. Further, there is no requirement for the width of each of the first pad plate 25 and the second pad plate 27, as long as it is ensured that the ice dropping portion 21 formed at the junction between the first pad plate 25 and the second pad plate 27 is positioned directly below the ice dropping point in the ice maker. As for the position limiting mechanism 30a, it may be provided at an end of the first pad plate 25 or at an end of the second pad plate 27, or provided at an end of each of the first pad plate 25 and the second pad plate 27.

[0056] Therefore, in Embodiment 2, the ice cubes drop at the ice dropping portion 21 of the pad plate 20. Since the ice guiding portion 23 is gradually lowered from the ice dropping portion 21 in the direction away from the ice dropping portion 21, the ice cubes, after dropping to the ice dropping portion 21, may roll down to the ice guiding portion 23 by their own gravity, and finally drop inside the box 10 under the guidance of the ice guiding portion 23. As a result, the accumulation of ice cubes can start from the periphery of the ice dropping portion 21 and then on the ice dropping portion, such that the ice cubes can fill up the entire ice storage box along with the continuous downward movement of the ice dropping portion, thereby increasing the utilization rate of the ice storage space and increasing the ice storage capacity of the ice maker

of the refrigerator. Further, a position limiting mechanism 30a is provided between the box 10 and the side of the ice guiding portion 23 away from the ice dropping portion 21, which can ensure that the pad plate 20 is smoothly unfolded during the ice storage process, and restrict the pad plate 20 from disengaging from the box 10, thereby enabling a smooth vertical movement of the ice dropping portion 21. In addition, the ice dropping portion 21 is always positioned directly below the ice dropping point of the ice maker, which ensures that the entire ice storage process starts with the accumulation of ice cubes from the periphery of the ice dropping portion 21 and then from the ice dropping portion 21. Moreover, the position limiting mechanism 30a keeps a side of the ice guiding portion 23 away from the ice dropping portion 21 have a certain distance from the inner bottom wall of the box 10, which can reduce the resistance borne by the pad plate 20 during the unfolding, and can also prevent water generated by the melting of the ice cubes from being frozen twice and from making the ice guiding portion 23 be adhered to the box 10. Further, the pad plate 20 adopts a "herringbone" structure and is formed with the ice dropping portion 21 and the ice guiding portion 23, which is simple in structure and low in manufacturing cost.

Embodiment 3

[0057] With reference to FIGs. 6-11, another embodiment of the utility model provides an ice storage box that, besides the structure of the ice storage box in Embodiment 1, further includes a position limiting mechanism 30b, which can restrict the pad plate 20 from deflecting or flipping inside the box 10 during the ice storage, reduce the resistance borne by the pad plate 20 during unfolding, and avoid the water generated by melting of the ice cubes from being frozen twice and from making the ice guiding portion 23 be adhered to the box 10.

[0058] Specifically, with reference to FIG. 6, the position limiting mechanism 30b is provided between the box 10 and a side of the ice guiding portion 23 away from the ice dropping portion 21, such that the side of the ice guiding portion 23 away from the ice dropping portion 21 is kept within a certain distance from an inner bottom wall of the box 10.

[0059] The ice guiding portion 23 includes a fixed end connected to a side of the ice dropping portion 21 and a free end away from the side of the ice dropping portion 21; the ice guiding portion 23 is gradually lowered in height from the fixed end towards the free end of the ice guiding portion 23; the position limiting mechanism 30b is provided between two sides of the free end of the ice guiding portion 23 and a sidewall of the adjacent box 10, such that the free end of the ice guiding portion 23 is guided by the position limiting mechanism 30b to move within the box 10 when the ice dropping portion 21 is moved vertically under an external force.

[0060] In this embodiment, the position limiting mechanism 30b is provided between two sides of the free end of the ice guiding portion 23 and the sidewall of the adjacent box 10. In this way, the pad plate 20 can be unfolded smoothly during the ice storage process, and the friction between the box 10 and the pad plate 20 during the unfolding process can be reduced, such that the ice dropping portion 21 can be moved vertically stably and smoothly. In addition, the position limiting mechanism 30b is provided on two sides of the free end of the ice guiding portion. In this way, the head of the free end of the ice guiding portion 23 may not contact with the inner wall of the box 10, and the water generated by the melting of the ice cubes can be prevented from being frozen twice and from making the ice guiding portion 23 be adhered to the box 10, thereby eliminating the influences on the unfolding of the pad plate 20 or the vertical movement of the ice guiding portion 21.

[0061] Specifically, with reference to FIG. 7, the position limiting mechanism 30b is provided with sliding means 35 provided on two sides of the free end of the ice guiding portion 23 and a slide rail 37 provided inside the box 10 for matching the sliding means 35. In this embodiment, the slide rail 37 may be provided on the inner bottom wall or the inner sidewall of the box 10.

[0062] Specifically, with reference to FIGs. 8 and 9, the sliding means 35 has a connecting portion 35a disposed on the sidewall of the ice guiding portion 23 and a sliding portion 35b connected to the connecting portion 35a. In this embodiment, the sliding portion 35b is preferably of a circular wheel-like structure, which can reduce the friction. Of course, the sliding portion 35b may also be of other structures, as long as it serves a sliding function. As for a connection manner between the sliding portion 35b and the connecting portion 35a, the sliding portion 35b may be fixedly connected to the end of the connecting portion 35a, or the sliding portion 35b may be rotationally provided on the end of the connecting portion 35a using a bearing; or other connection manners are also possible as long as the friction during the sliding can be reduced. Similarly, the connection manner between the sliding portion 35b and the connecting portion 35a can also be applied to the connection between the connecting portion 35a and the ice guiding portion 23.

[0063] Further, the slide rail 37 has a base 37a provided in an inner wall of the box 10 and also a cover plate 37b connected to the base 37a. A sliding space 37c is enclosed between the base 37a and the cover plate 37b for the sliding means 35 to slide, and a position limiting opening 37d is formed in a side of the sliding space 37c to restrict the sliding means 35 from disengaging from the sliding space 37c.

[0064] In this embodiment, the base 37a and the cover plate 37b are provided in a split manner from the box 10, or can be molded integrally with the box 10 to reduce the production cost. In this embodiment, the sliding space 37c enclosed between the base 37a and the cover plate 37b can be configured according to the structure of the sliding means 35. The width between the upper and lower walls of the position limiting opening 37d should be small-

er than the outer diameter of the sliding portion 35b of the sliding means 35, such that the sliding means 35 is limited within the sliding space 37c, thereby enabling smooth sliding and preventing the pad plate 20 from rolling over or disengaging from the box 10.

[0065] Further, with further reference to FIG. 7, the cover plate 37b is provided with a removable clamping assembly 37e for the sliding means 35 to be disengaged from the sliding space 37c. In this embodiment, the provision of the removable clamping assembly 37e enables the removal of the sliding means 35 from the slide rail 37, thereby enabling the cleaning and replacement of the pad plate 20.

[0066] Specifically, with reference to FIGs. 10 and 11, the clamping assembly 37e has an opening 37f in the cover plate 37b and a clamping block 37g inserted into the opening 37f. A locating slot 37h is formed in the bottom of the clamping block 37g, and a locating block 37i matching the locating slot 37h is provided on the base 37a at a position of the opening 37f, thereby restricting the disengagement of the clamping block 37g from the opening 37f after the locating slot 37h is docked with the locating block 37i.

[0067] In this embodiment, the clamping block 37g can be inserted and removed in match with the locating block 37i using the locating slot 37h, thereby filling up the opening 37f without affecting the sliding of the sliding means 35 within the slide rail 37. Moreover, the locating slot 37h is of a prismatic structure, such as an isosceles trapezoidal shape, which can limit the displacement of the clamping block 37g in the horizontal direction and ensure that the clamping block 37g cannot be easily disengaged from the opening 37f by utilizing the friction on the mating surface between the locating slot 37h and the locating block 37i. Similarly, the locating block 37i and the locating slot 37h may also be provided in other polygonal columnar structures or columnar structures.

[0068] Further, with reference to FIGs. 9 and 10, the top wall of the cover plate 37b is provided with a beveled structure 37j that gradually decreases in height from the sidewall of the box 10 towards the center of the inner bottom surface of the box 10. The beveled structure 37j provided on the upper end surface of the cover plate 37b can reduce the accumulation of dirt on this end surface and facilitate the cleaning.

[0069] Therefore, in Embodiment 3, by providing in the box a pad plate having the ice dropping portion and the ice guiding portion, the ice cubes may slide down to the ice guiding portion after dropping on the ice dropping portion. Thus, the ice cubes can be accumulated firstly at the periphery of the ice dropping portion and then at the ice dropping portion, and the ice cubes can fill up the entire ice storage box along with the continuous downward movement of the ice dropping portion, thereby increasing the utilization rate of the ice storage space and increasing the ice storage capacity of the ice maker of the refrigerator. The position limiting mechanism 30b is provided between two sides of the free end of the ice guiding portion 23 and the sidewall of the adjacent box 10, which can realize the smooth unfolding of the pad plate 20, also reduce the friction between the box 10 and the pad plate 20 during the unfolding, and enable a stable and smooth vertical movement of the ice dropping portion 21. Moreover, the position limiting mechanism 30b is provided on two sides of the free end of the ice guiding portion, such that the head of the free end of the ice guiding portion 23 does not contact with the inner wall of the box 10, which can prevent the water generated by the melting of the ice cubes from being frozen twice and from making the ice guiding portion 23 be adhered to the box 10, thereby eliminating the influences on the unfolding of the pad plate 20 or the vertical movement of the ice guiding portion 21. The pad plate 20 is of a "herringbone" structure and formed with the ice dropping portion 21 and the ice guiding portion 23, which is simple in structure and low in manufacturing cost.

[0070] In addition to the separate implementation of Embodiment 2 and Embodiment 3, Embodiment 2 and Embodiment 3 may also be used together in Embodiment 1. For example, one of the position limiting mechanism 30a and the position limiting mechanism 30b is provided on the first pad plate 25, and the other is provided on the second pad plate 27.

[0071] It should be understood that although the present invention is described in terms of embodiments in this description, not every embodiment includes only one independent technical solution. The statement mode of the description is merely for clarity, and those skilled in the art should regard the description as a whole. The technical solutions in various embodiments may also be combined properly to develop other embodiments that can be understood by those skilled in the art.

[0072] The series of detailed illustration listed above are merely for specifically illustrating the feasible embodiments of the present invention, but not intended to limit the protection scope of the present invention. Any equivalent embodiments or variations made without departing from the technical spirit of the present invention shall fall within the protection scope of the present invention.

Claims

1. An ice storage box, comprising: a box that is provided with a pad plate therein, the pad plate having an ice dropping portion and an ice guiding portion connected to the ice dropping portion, wherein the ice guiding portion is gradually lowered from the ice dropping portion in a direction away from the ice dropping portion, and the ice dropping portion can move downward under an external force.

2. The ice storage box according to claim 1, wherein the ice guiding portion is connected to two sides of the ice dropping portion; the pad plate comprises a first pad plate and a second pad plate connected to

each other; the ice dropping portion is formed at a junction between the first pad plate and the second pad plate; and the ice guiding portion is formed on upper surfaces of the first pad plate and the second pad plate.

3. The ice storage box according to claim 2, wherein the first pad plate is fixedly connected to the second pad plate, and both the first pad plate and the second pad plate are made of a flexible material.

4. The ice storage box according to claim 2, wherein the first pad plate and the second pad plate are hinged to each other, and a resilient mechanism is provided at the junction between the first pad plate and the second pad plate.

5. The ice storage box according to claim 1, wherein a position limiting mechanism is provided between the box and a side of the ice guiding portion away from the ice dropping portion, such that the side of the ice guiding portion away from the ice dropping portion is kept within a certain distance from an inner bottom wall of the box.

6. The ice storage box according to claim 5, wherein the position limiting mechanism has a guiding plate provided at an end of the side of the ice guiding portion away from the ice dropping portion, and a guiding groove provided in the box and matching the guiding plate.

7. The ice storage box according to claim 6, wherein the box has a box body and a position limiting plate connected to an inner wall of the box body, a groove-shaped space formed between the box body and the position limiting plate forms the guiding groove, and the guiding plate penetrates into the guiding groove.

8. The ice storage box according to claim 7, wherein the box body has a sidewall surface on a side of the guiding plate away from the ice dropping portion, the position limiting plate is connected to the sidewall surface and is disposed parallel to the sidewall surface, the guiding groove opens downward, and a total unfolding length of the pad plate is not less than a corresponding length of a bottom wall of the box body.

9. The ice storage box according to claim 8, wherein the position limiting plates connected to the same sidewall surface are provided at intervals in pair and are provided along two side edges of the sidewall surface respectively, so as to provide a position-limiting guide to positions at two sides of the guiding plate approximating the edges, respectively.

10. The ice storage box according to claim 6, wherein an inclined guiding surface is formed at an open end of the guiding groove towards the guiding plate, a guiding portion is formed at an end of the guiding plate away from the ice dropping portion, and a thickness of the guiding portion is gradually decreasing from an end approximating the ice dropping portion towards the interior of the guiding groove.

11. The ice storage box according to claim 5, wherein the position limiting mechanism has sliding means provided on two sides of a free end of the ice guiding portion, and a slide rail provided inside the box for matching the sliding means.

12. The ice storage box according to claim 11, wherein the slide rail has a base provided in an inner wall of the box and a cover plate connected to the base, wherein a sliding space is enclosed between the base and the cover plate for the sliding means to slide, and a position limiting opening is formed in a side of the sliding space to restrict the sliding means from disengaging from the sliding space.

13. The ice storage box according to claim 12, wherein the cover plate is provided with a removable clamping assembly for the sliding means to be disengaged from the sliding space.

14. The ice storage box according to claim 13, wherein the clamping assembly has an opening provided in the cover plate, and a clamping block inserted into the opening; a locating slot is formed in the bottom of the clamping block, and a locating block matching the locating slot is provided on the base at a position of the opening for restricting the disengagement of the clamping block from the opening after the locating slot is docked with the locating block.

15. The ice storage box according to claim 12, wherein a top wall of the cover plate is provided with a beveled structure that gradually decreases in height from a sidewall of the box towards a center of an inner bottom surface of the box.

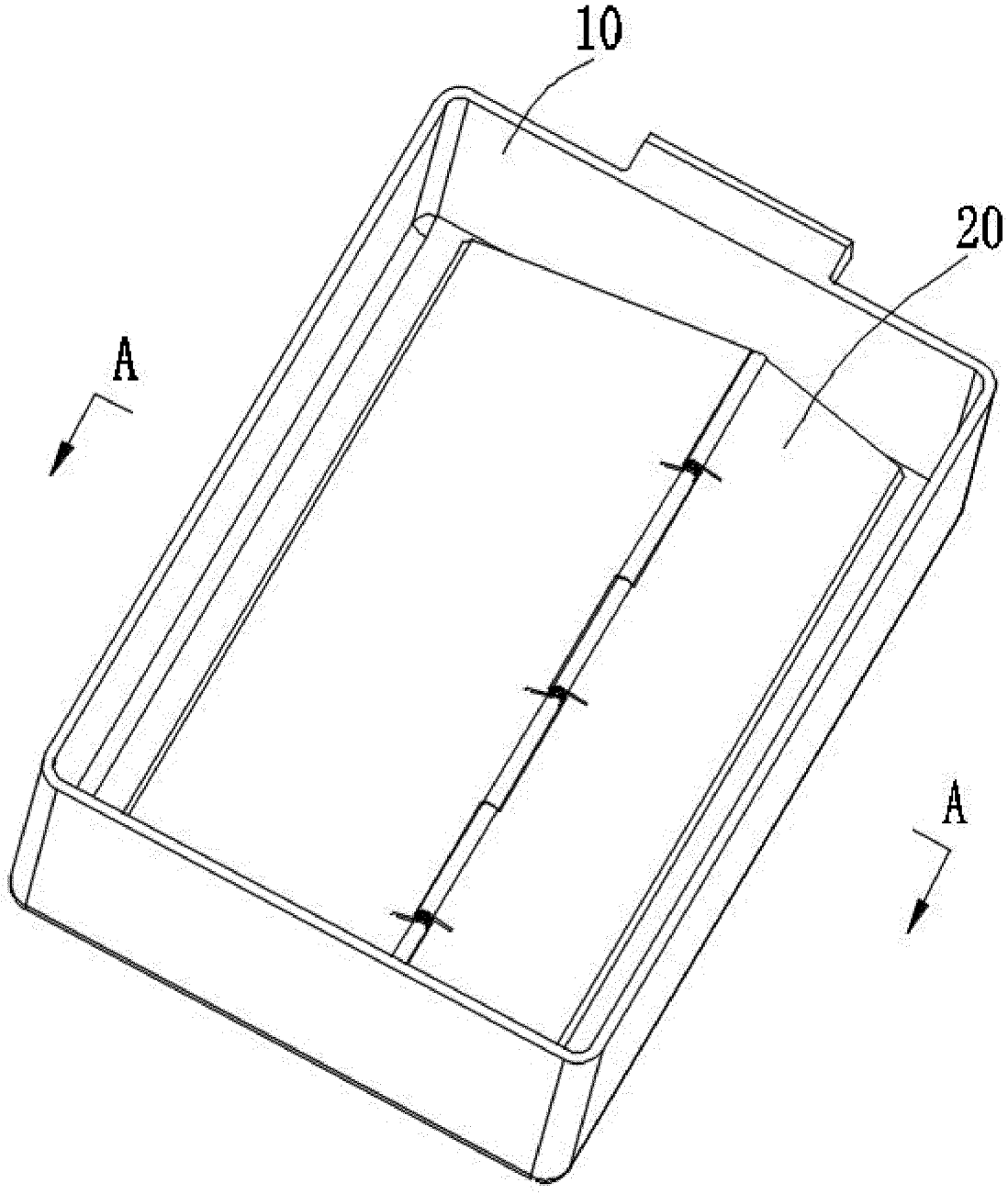
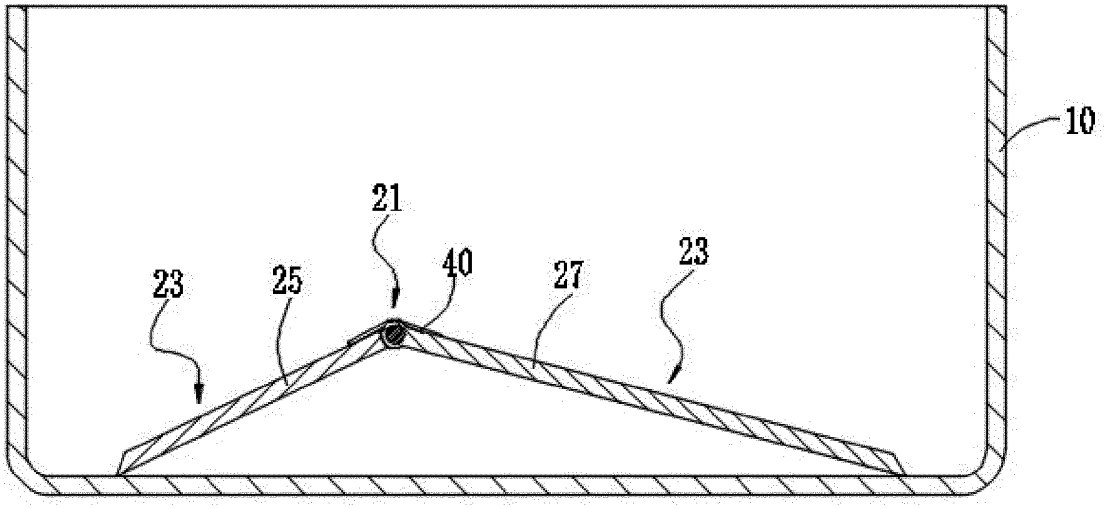


FIG. 1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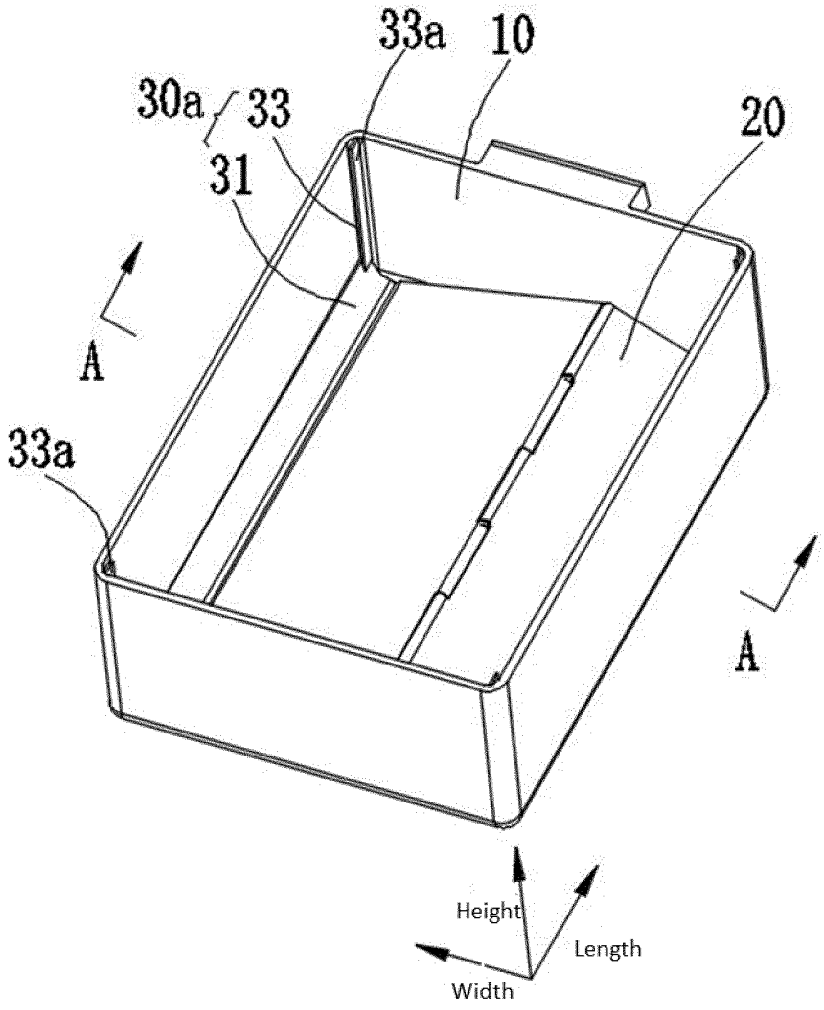
23
25

FIG. 2


33a
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30a
33
20
31
A
33a
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Height
Length
Width

FIG. 3

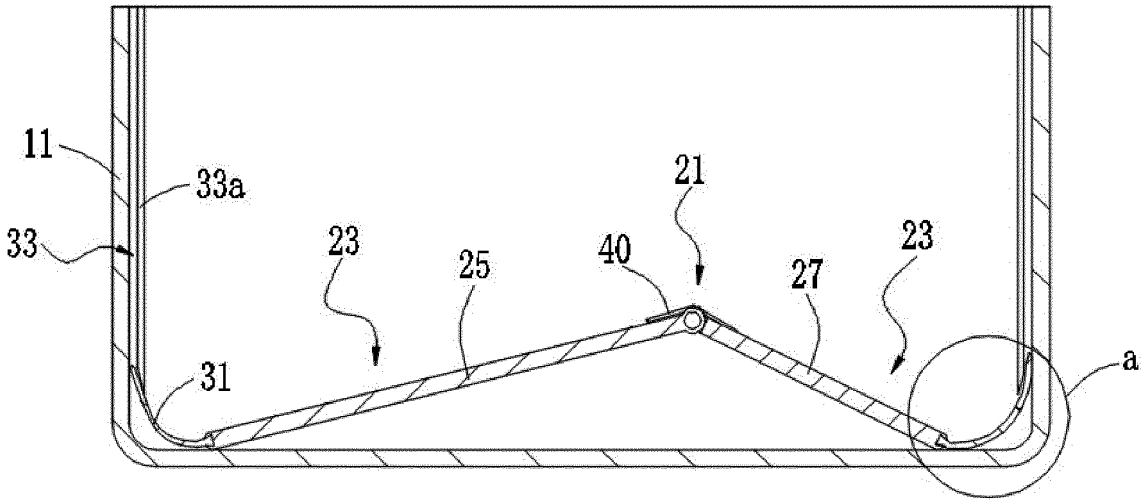

FIG. 4

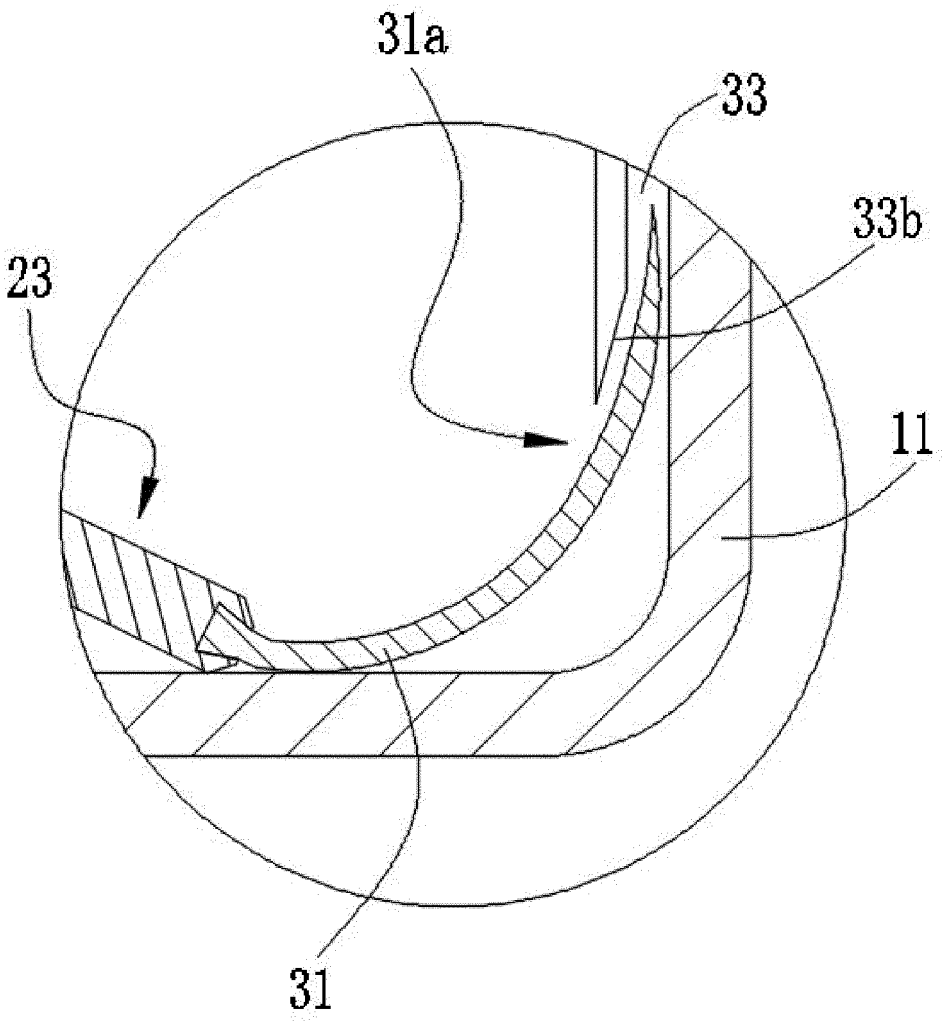

FIG. 5

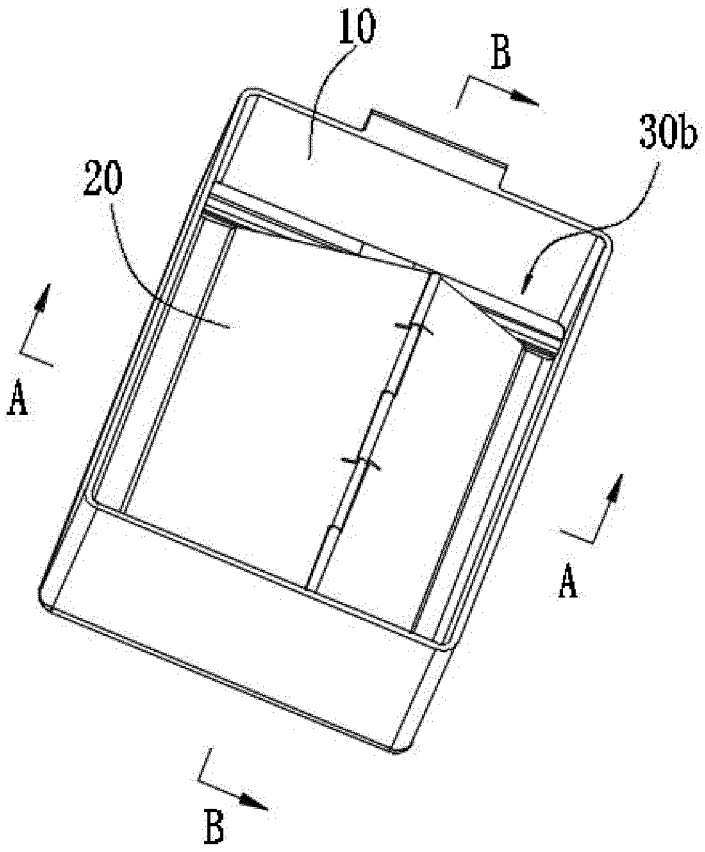

FIG. 6

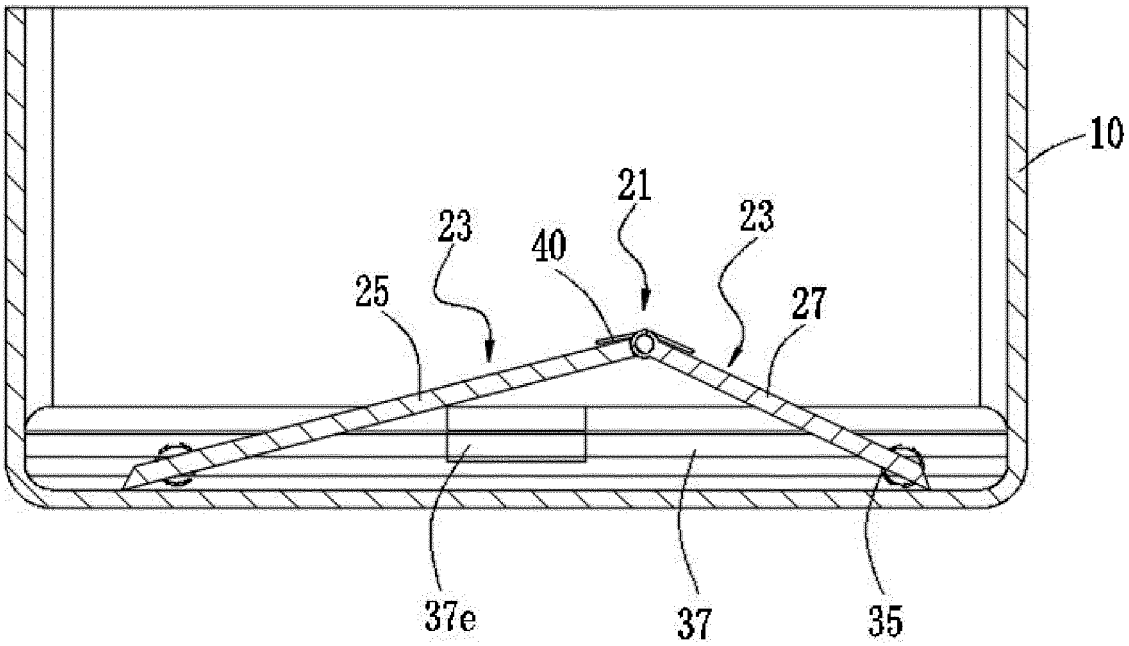

FIG. 7

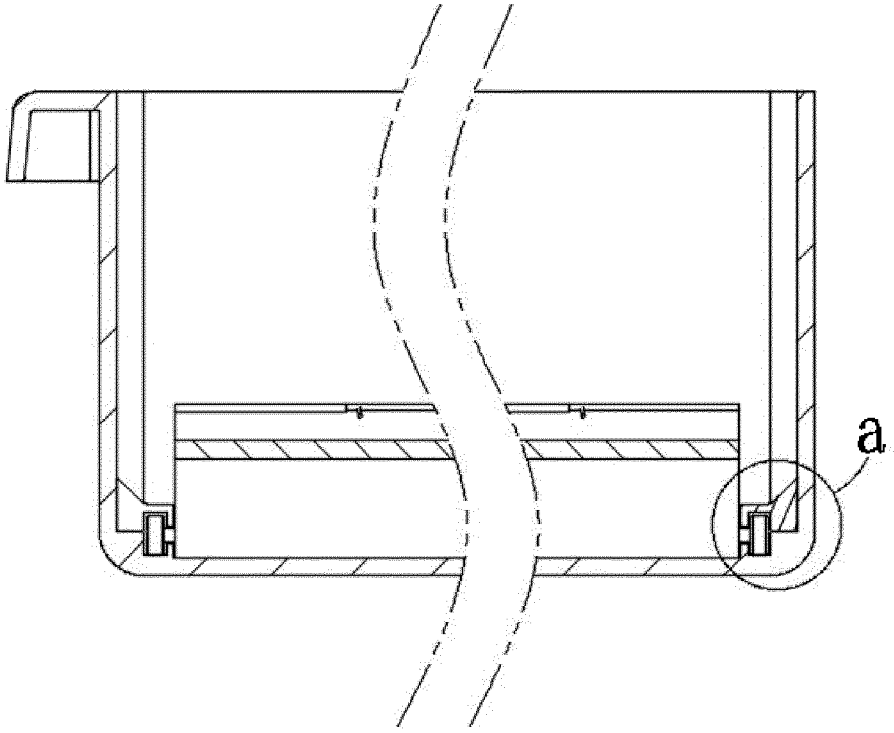

FIG. 8

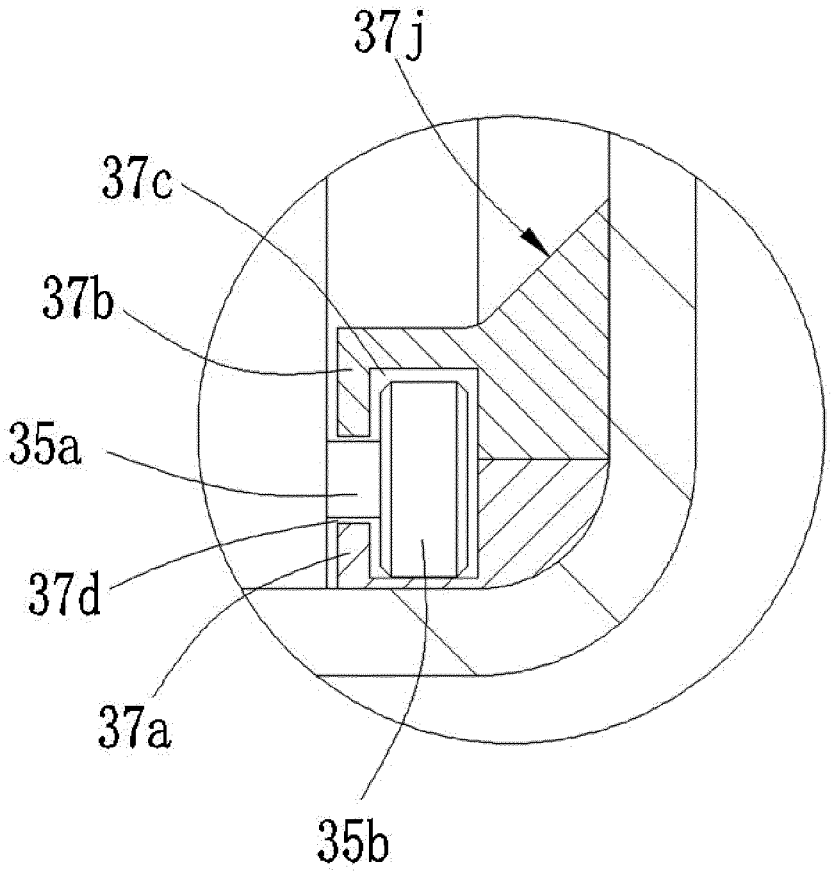

FIG. 9

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2022/082456

A. CLASSIFICATION OF SUBJECT MATTER

F25C 5/182(2018.01)i; F25D 23/12(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

F25C1 F25C5 F25D11 F25D23

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

CNABS, CNTXT, CNKI, DWPI: 冰, 盒, 容器, 箱, 导, 板, 槽, ice box, container, tank, case guid+, board, plate, panel, groove, slot

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
PX	CN 215638180 U (QINDAO HAIER REFRIGERATOR CO., LTD. et al.) 25 January 2022 (2022-01-25) description, paragraphs [0028]-[0050] and figures 1-8	1-10
X	JP 09178316 A (TOSHIBA CORP. et al.) 11 July 1997 (1997-07-11) description, paragraphs [0027]-[0033] and figures 6-7	1-5
A	CN 209655641 U (NINGBO HICON INTERNATIONAL INDUSTRY CO., LTD.) 19 November 2019 (2019-11-19) entire document	1-15
A	CN 202002416 U (HAIER GROUP CORP. et al.) 05 October 2011 (2011-10-05) entire document	1-15
A	US 2010199701 A1 (SAMSUNG ELECTRONICS CO., LTD.) 12 August 2010 (2010-08-12) entire document	1-15

☐ Further documents are listed in the continuation of Box C. ☑ See patent family annex.

* Special categories of cited documents:
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"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
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"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
07 June 2022	**17 June 2022**
Name and mailing address of the ISA/CN **China National Intellectual Property Administration (ISA/CN)** **No. 6, Xitucheng Road, Jimenqiao, Haidian District, Beijing 100088, China** Facsimile No. **(86-10)62019451**	Authorized officer Telephone No.

Form PCT/ISA/210 (second sheet) (January 2015)

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2022/082456

Patent document cited in search report	Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
CN 215638180 U	25 January 2022	None	
JP 09178316 A	11 July 1997	JP H09178316 A	11 July 1997
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CN 202002416 U	05 October 2011	None	
US 2010199701 A1	12 August 2010	US 2011023520 A1	03 February 2011
		KR 20100092168 A	20 August 2010

Form PCT/ISA/210 (patent family annex) (January 2015)