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(54) **Title:** REFRIGERATOR WITH ICE-MAKING FUNCTION

(54) **发明名称**: 带有制冰功能的冰箱

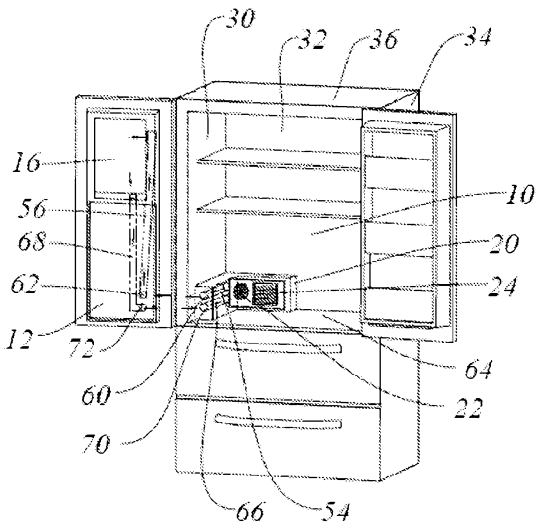

图 1

(57) Abstract: Disclosed is a refrigerator with an ice-making function, wherein the refrigerator comprises a refrigerating chamber (10), a refrigerating chamber door (12), a freezing chamber (14) and an ice-making compartment (16) arranged on the refrigerating chamber door (12). The refrigerator further comprises an ice-making evaporator compartment (20), and an ice-making fan (22) and an ice-making evaporator (24) which are arranged in the ice-making evaporator compartment (20), wherein the ice-making evaporator (24) is in communication with the ice-making compartment (16) through an air inlet duct and an air return duct, with part of one of the air inlet duct and the air return duct being arranged in the refrigerating chamber (10). The refrigerator loses less cold and the ice-making efficiency thereof is high.

(57) 摘要: 提供了一种带有制冰功能的冰箱，冰箱包括冷藏室（10）、冷藏室箱门（12）、冷冻室（14）及设于冷藏室箱门（12）的制冰间室（16）。冰箱还包括制冰蒸发器间室（20），设于制冰蒸发器间室（20内的制冰风机（22）和制冰蒸发器（24），制冰蒸发器（24）通过进风风道和回风风道与制冰间室（16）相连通，进风风道和回风风道其中之一的部分进风风道或部分回风风道设于冷藏室（10）中。该冰箱冷量损失较小，制冰效率较高。

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[见续页]

SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW。

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— 包括国际检索报告(条约第21条(3))。

REFRIGERATOR WITH ICE MAKING FUNCTION

[0001] The present application claims priority to Chinese Patent Application No. 201720197501.2, entitled "refrigerator with ice making function", filed on March 1, 2017, and Chinese Patent Application No. 201710197550.0, entitled "refrigerator with ice making function", filed on March 29, 2017, the disclosures of which are incorporated herein by reference in its entirety.

TECHNICAL FIELD

[0002] The present invention relates to the field of home appliances, and in particular, to a refrigerator with an ice making function.

BACKGROUND

[0003] In a related art, an air duct is embedded in a side wall of a refrigerating compartment. Since the refrigerating compartment is relatively thin and the relatively long air duct is communicated to an ice making compartment on a door body from a rear side of a freezing compartment, a loss of refrigeration capacity in the air duct is relatively great, thereby greatly influencing an ice making efficiency. In addition, usually, one evaporator is shared among the ice making compartment, the refrigerating compartment and the freezing compartment of the refrigerator, and the refrigeration capacity flows back and forth among the above-mentioned three compartments, which causes flavors of food, especially in the refrigerating compartment, to transfer to the ice making compartment and to taint ice cubes therein, and affects qualities and tastes of the ice cubes. Additionally, a plurality of compartments sharing one evaporator also complicates the structure of the air duct. Also, the freezing compartment and the ice making compartment are designed to share one evaporator. Similarly, the flavors of food in the freezing compartment will also taint ice cubes in the ice making compartment, thereby affecting the qualities and tastes thereof.

SUMMARY

[0004] An object of the present invention is to provide a refrigerator with an ice

making function, which has a relatively low loss of refrigeration capacity and a relatively high ice making efficiency.

[0005] In order to achieve one of the above-mentioned objects of the present invention, an embodiment of the present invention provides a refrigerator with an ice making function, including a refrigerating compartment; a door of the refrigerating compartment for opening and closing the refrigerating compartment; a freezing compartment; and an ice making compartment provided at the door of the refrigerating compartment, wherein the refrigerator further includes a compartment for an ice making evaporator; an ice making blower and the ice making evaporator provided in the compartment for the ice making evaporator, the ice making evaporator is communicated with the ice making compartment through an air intake duct and an air return duct, cold air at the ice making evaporator is transferred to the ice making compartment through the air intake duct by means of the ice making blower, heat of the ice making compartment is returned back to the compartment for the ice making evaporator through the air return duct, and a part of one of the air intake duct and the air return duct is provided in the refrigerating compartment.

[0006] As a further improvement of the embodiments of the present invention, the air intake duct includes a first section of the air intake duct provided in the refrigerating compartment and a second section of the air intake duct provided on the door of the refrigerating compartment, one end of the first section of the air intake duct is communicated with the ice making evaporator, the other end of the first section of the air intake duct is provided with a first air vent, one end of the second section of the air intake duct is communicated with the ice making compartment, the other end of the second section of the air intake duct is provided with a second air vent; when the door of the refrigerating compartment is open, the first air vent is separated from the second air vent; when the door of the refrigerating compartment is closed, the first air vent is butt-jointed with the second air vent to communicate the first and second sections of the air intake duct.

[0007] As a further improvement of the embodiments of the present invention, the first section of the air intake duct is provided horizontally substantially.

[0008] As a further improvement of the embodiments of the present invention, the air return duct includes a first section of the air return duct provided in the refrigerating

compartment and a second section of the air return duct provided on the door of the refrigerating compartment, one end of the first section of the air return duct is communicated with the ice making evaporator, the other end of the first section of the air return duct is provided with a third air vent, one end of the second section of the air return duct is communicated with the ice making compartment, the other end of the second section of the air return duct is provided with a fourth air vent; when the door of the refrigerating compartment is open, the third air vent is separated from the fourth air vent; when the door of the refrigerating compartment is closed, the third air vent is butt-jointed with the fourth air vent to communicate the first and second sections of the air return duct.

[0009] As a further improvement of the embodiments of the present invention, the second section of the air return duct includes a first portion of the air return duct, which is operatively separated from or communicated with the first section of the air return duct; and a second portion of the air return duct, which is communicated with the ice making compartment and is angularly provided from the first portion of the air return duct.

[0010] As a further improvement of the embodiments of the present invention, one end of the air intake duct is communicated with the ice making evaporator, the other end of the air intake duct is provided with a fifth air vent, the ice making compartment is provided with a sixth air vent; when the door of the refrigerating compartment is open, the fifth air vent is separated from the sixth air vent; when the door of the refrigerating compartment is closed, the fifth air vent is butt-jointed with the sixth air vent to communicate the air intake duct with the ice making compartment.

[0011] As a further improvement of the embodiments of the present invention, a position where the air intake duct is connected with the ice making compartment is located above a position where the air return duct is connected with the ice making compartment.

[0012] As a further improvement of the embodiments of the present invention, the compartment for the ice making evaporator is provided in the refrigerating compartment.

[0013] As a further improvement of the embodiments of the present invention, the refrigerator further includes an ice maker and an ice storage box provided in the ice making compartment; a passage and a dispenser are provided on the door of the refrigerating compartment, wherein the passage is configured to communicate the ice storage box and the

exterior of the door of the refrigerating compartment, and the dispenser is communicated with the passage.

[0014] As a further improvement of the embodiments of the present invention, the refrigerator further includes a freezing evaporator, a freezing blower and an air quantity adjusting device, wherein the freezing evaporator is configured to supply cold air to the refrigerating compartment and the freezing compartment, and the air quantity adjusting device is configured for adjusting an air quantity blown into the refrigerating compartment and the freezing compartment by the freezing blower.

[0015] As a further improvement of the embodiments of the present invention, the refrigerator further includes a freezing evaporator, a freezing blower, a refrigerating evaporator and a refrigerating blower, wherein the freezing evaporator blows the cold air to the freezing compartment by means of the freezing blower, and the refrigerating evaporator blows the cold air to the refrigerating compartment by means of the refrigerating blower.

[0016] Compared with the prior art, the prevent invention has the beneficial effects as follows. With the technical solution according to the present invention, the ice making evaporator is communicated with the ice making compartment through the air intake duct and the air return duct, and a part of one of the air intake duct and the air return duct is provided in the refrigerating compartment, thereby reducing the loss of refrigeration capacity of the refrigerator and further greatly improving the ice making efficiency.

BRIEF DESCRIPTION OF THE DRAWINGS

[0017] FIG.1 is a schematic perspective view of a refrigerator with an ice making function according to a first embodiment of the present invention;

[0018] FIG.2 is a sectional view of the refrigerator with an ice making function according to the first embodiment of the present invention;

[0019] FIG.3 is a schematic perspective view of a refrigerator with an ice making function according to a second embodiment of the present invention;

[0020] FIG.4 is a sectional view of the refrigerator with an ice making function according to the second embodiment of the present invention; and

[0021] FIG. 5 is a schematic perspective view of a refrigerator with an ice making

function according to a third embodiment of the present invention.

DETAILED DESCRIPTION

[0022] The present invention is below described in detail in combination with specific embodiments illustrated in drawings. However, these embodiments have no limitations on the present invention, and any transformations of structure, method, or function made by persons skilled in the art according to these embodiments fall within the protection scope of the present invention.

[0023] In the description about the embodiments of the present invention, the orientation or positional relation indicated by terms such as “upper,” “lower,” “front,” “rear,” “left,” “right,” “vertical,” “horizontal,” “bottom,” “inner,” and “outer” should be construed to refer to the orientation or positional relation as shown in the drawings. Usually, these terms are used by taking the refrigerator in a normal state as a reference, and are not intended to indicate that the position or element in question must have a specific orientation.

[0024] As shown in FIGs. 1 and 2, according to a first preferable embodiment of the present invention, there is disclosed a refrigerator with an ice making function, including a refrigerating compartment 10; a door 12 of the refrigerating compartment for opening and closing the refrigerating compartment 10; a freezing compartment 14; and an ice making compartment 16 provided at the door 12 of the refrigerating compartment. The refrigerator further includes a door 18 of the freezing compartment, for opening and closing the freezing compartment 14.

[0025] The refrigerator further includes an compartment 20 for the ice making evaporator; an ice making blower 22 and an ice making evaporator 24 provided in the compartment 20 for the ice making evaporator. The ice making evaporator 24 is communicated with the ice making compartment 16 through the air intake duct and the air return duct, cold air at the ice making evaporator 24 is transferred to the ice making compartment 16 through the air intake duct by means of the ice making blower 22, thereby supplying refrigeration capacity to the ice making compartment 16 for making ice. Heat of the ice making compartment 16 is returned back to the compartment 20 for the ice making evaporator through the air return duct, thereby taking away the heat of the ice making

compartment 16 by means of air circulation. In the preferable embodiment, a part of one of the air intake duct and the air return duct is provided in the refrigerating compartment 10. Specifically, part of the air intake duct or the air return duct is provided in the refrigerating compartment 10. The refrigerating compartment 10 is enclosed by a left side wall 30, a rear side wall 32, a right side wall 34 and an upper side wall 36. part of the air intake duct or the air return duct is provided in the refrigerating compartment 10, instead of in a side wall of the refrigerating compartment 10, which prevents the refrigeration capacity entering the ice making compartment 16 from dissipating through the side wall of the refrigerating compartment 10, thereby greatly reducing the loss of refrigeration capacity of the refrigerator and further greatly improving the ice making efficiency.

[0026] In the preferable embodiment, a position where the air intake duct is connected with the ice making compartment 16 is located above a position where the air return duct is connected with the ice making compartment 16.

[0027] In addition, the refrigerator further includes an ice maker 38 and an ice storage box 40 provided in the ice making compartment 16. A passage 42 and a dispenser 44 are provided on the door 12 of the refrigerating compartment, wherein the passage 42 is configured to communicate the ice storage box 40 and the exterior of the door 12 of the refrigerating compartment, and the dispenser 44 is communicated with the passage 42. Ice made by the ice maker 38 may fall in the ice storage box 40 located below the ice maker 38, then passes through the passage 42, and finally is dispersed to a user container by means of the dispenser 44.

[0028] In the present preferable embodiment, the refrigerator further includes a freezing evaporator 46, a freezing blower 48, a refrigerating evaporator 50 and a refrigerating blower 52, wherein the freezing evaporator 46 blows the cold air to the freezing compartment 14 by means of the freezing blower 48, and the refrigerating evaporator 50 blows the cold air to the refrigerating compartment 10 by means of the refrigerating blower 52.

[0029] The air intake duct includes a first section 54 of the air intake duct provided in the refrigerating compartment 10 and a second section 56 of the air intake duct provided on the door 12 of the refrigerating compartment, one end of the first section 54 of the air intake duct is communicated with the ice making evaporator 24, the other end of the first section 54

of the air intake duct is provided with a first air vent 60, one end of the second section 56 of the air intake duct is communicated with the ice making compartment 16, and the other end of the second section 56 of the air intake duct is provided with a second air vent 62. When the door 12 of the refrigerating compartment is open, the first air vent 60 is separated from the second air vent 62, thereby disconnecting the first section 54 of the air intake duct from the second section 56 of the air intake duct; when the door 12 of the refrigerating compartment is closed, the first air vent 60 is butt-jointed with the second air vent 62 to communicate the first and second sections 54 and 56 of the air intake duct, thereby transferring the cold air at the ice making evaporator 24 to the ice making compartment 16 by means of the ice making blower 22 through the first and second sections 54 and 56 of the air intake duct for making ice.

[0030] Specifically, the compartment 20 for the ice making evaporator is provided in the refrigerating compartment 10. Further, the compartment 20 for the ice making evaporator is provided adjacent to the bottom 64 and the rear side wall 32 of the refrigerating compartment 10, and the first section 54 of the air intake duct is provided horizontally substantially. Certainly, the first section 54 of the air intake duct may also be provided at other angles. In the present preferable embodiment, the door 12 of the refrigerating compartment provided with the ice making compartment 16 is provided at a left side wall 30 of the refrigerating compartment 10, and the first section 54 of the air intake duct is provided adjacent to the left side wall 30, which may reduce a length of the air intake duct and further reduce the loss of refrigeration capacity.

[0031] In addition, the air return duct includes a first section 66 of the air return duct provided in the refrigerating compartment 10 and a second section 68 of the air return duct provided on the door 12 of the refrigerating compartment. One end of the first section 66 of the air return duct is communicated with the ice making evaporator 24, the other end of the first section 66 of the air return duct is provided with a third air vent 70, one end of the second section 68 of the air return duct is communicated with the ice making compartment 16, and the other end of the second section 68 of the air return duct is provided with a fourth air vent 72. When the door 12 of the refrigerating compartment is open, the third air vent 70 is separated from the fourth air vent 72, thereby disconnecting the first section 66 of the air

return duct from the second section 68 of the air return duct. When the door 12 of the refrigerating compartment is closed, the third air vent 70 is butt-jointed with the fourth air vent 72 to communicate the first and second sections 66 and 68 of the air return duct, thereby transferring the heat of the ice making compartment 16 to the compartment 20 for the ice making evaporator through the first and second sections 66 and 68 of the air return duct.

[0032] As shown in FIGs. 3 and 4, the second preferable embodiment according to the present invention is different from the first preferable embodiment in the arrangement of the air intake duct, and in that the refrigerating compartment and the freezing compartment in the present embodiment share one evaporator. The difference therebetween will be introduced in detail below, without explaining the similarities herein.

[0033] In the present embodiment, only one section of the air intake duct 74 is provided in the refrigerating compartment 10, wherein one end of the air intake duct 74 is communicated with the ice making evaporator 24, the other end of the air intake duct 74 is provided with the fifth air vent 76, and the ice making compartment 16 is provided with a sixth air vent 78. When the door 12 of the refrigerating compartment is open, the fifth air vent 76 is separated from the sixth air vent 78, thereby separating the air intake duct 74 from the ice making compartment 16; when the door 12 of the refrigerating compartment is closed, the fifth air vent 76 is butt-jointed to the sixth air vent 78 to communicate the air intake duct 74 with the ice making compartment 16, thereby transferring the cold air at the ice making evaporator 24 to the ice making compartment 16 by means of the ice making blower 22 through the air intake duct 74 for making ice.

[0034] The air intake duct 74 is provided adjacent to the left side wall 30 of the refrigerating compartment 10, and is angularly provided from the horizontal direction. In this way, the length of the air intake duct 74 is reduced, the loss of refrigeration capacity is reduced, and the refrigeration efficiency is further improved. In the present preferable embodiment, the arrangement of the air return duct is the same as in the first embodiment, and is not repeated herein.

[0035] In the present preferable embodiment, the refrigerating compartment 10 and the freezing compartment 14 share one evaporator. Specifically, the refrigerator includes a freezing evaporator 80, a freezing blower 82 and an air quantity adjusting device (not shown),

wherein the freezing evaporator 80 supplies the cold air to the refrigerating compartment 10 and the freezing compartment 14, and the air quantity adjusting device is configured for adjusting the air quantity blown to the refrigerating compartment 10 and the freezing compartment 14 by the freezing blower 82.

[0036] As shown in FIG. 5, the arrangement of the air intake duct in the third preferable embodiment is similar to that in the first embodiment. In addition, the arrangement of the evaporator in the third embodiment is the same as in the first embodiment. The third embodiment is different from the first embodiment in the arrangement of the air return duct. The above-mentioned difference will be introduced below, without repeating the similarities herein.

[0037] In the present preferable embodiment, the air return duct also includes a first section 84 of the air return duct provided in the refrigerating compartment 10 and a second section 86 of the air return duct provided on the door 12 of the refrigerating compartment. The present preferable embodiment differs from the first embodiment in that the first section 84 of the air return duct is angularly provided from the horizontal direction. The second section 86 of the air return duct includes a first portion 88 of the air return duct, which is operatively separated from or communicated with the first section 84 of the air return duct; and a second portion 90 of the air return duct, which is communicated with the ice making compartment 16 and is angularly provided from the first portion 88 of the air return duct.

[0038] Specifically, one end of the first portion 88 of the air return duct is communicated with the second portion 90 of the air return duct, the other end of the first portion 88 of the air return duct is provided with a seventh air vent 92, one end of the first section 84 of the air return duct is communicated with the ice making evaporator 24, and the other end of the first section 84 of the air return duct is provided with an eighth air vent 94. When the door 12 of the refrigerating compartment is open, the seventh air vent 92 is separated from the eighth air vent 94, thereby disconnecting the first section 84 of the air return duct from the first portion 88 of the air return duct; when the door 12 of the refrigerating compartment is closed, the seventh air vent 92 is butt-jointed with the eighth air vent 94 to communicate the first section 84 of the air return duct with the first portion 88 of the air return duct.

[0039] It should be understood that although the present specification is described based on embodiments, not every embodiment contains only one independent technical solution. Such a narration way of the present specification is only for the sake of clarity. Those skilled in the art should take the present specification as an entirety. The technical solutions in the respective embodiments may be combined properly to form other embodiments which may be understood by those skilled in the art.

[0040] A series of the detailed descriptions set forth above is merely specific description of feasible embodiments of the present invention, and is not intended to limit the protection scope of the present invention. Equivalent embodiments or modifications made within the spirit of the present invention shall fall within the protection scope of the present invention.

CLAIMS

What is claimed is:

1. A refrigerator with an ice making function, comprising a refrigerating compartment; a door of the refrigerating compartment for opening and closing the refrigerating compartment; a freezing compartment; and an ice making compartment provided at the door of the refrigerating compartment, wherein the refrigerator further comprises a compartment for an ice making evaporator; an ice making blower and the ice making evaporator provided in the compartment for the ice making evaporator, the ice making evaporator is communicated with the ice making compartment through an air intake duct and an air return duct, cold air at the ice making evaporator is transferred to the ice making compartment through the air intake duct by means of the ice making blower, heat of the ice making compartment is returned back to the compartment for the ice making evaporator through the air return duct, and a part of one of the air intake duct and the air return duct is provided in the refrigerating compartment.

2. The refrigerator with an ice making function according to claim 1, wherein the air intake duct comprises a first section of the air intake duct provided in the refrigerating compartment and a second section of the air intake duct provided on the door of the refrigerating compartment, one end of the first section of the air intake duct is communicated with the ice making evaporator, the other end of the first section of the air intake duct is provided with a first air vent, one end of the second section of the air intake duct is communicated with the ice making compartment, the other end of the second section of the air intake duct is provided with a second air vent; when the door of the refrigerating compartment is open, the first air vent is separated from the second air vent; when the door of the refrigerating compartment is closed, the first air vent is butt-jointed with the second air vent to communicate the first and second sections of the air intake duct.

3. The refrigerator with an ice making function according to claim 2, wherein the first section of the air intake duct is provided horizontally substantially.

4. The refrigerator with an ice making function according to claim 1, wherein the air return duct comprises a first section of the air return duct provided in the refrigerating compartment and a second section of the air return duct provided on the door of the refrigerating compartment, one end of the first section of the air return duct is communicated with the ice making evaporator, the other end of the first section of the air return duct is provided with a third air vent, one end of the second section of the air return duct is communicated with the ice making compartment, the other end of the second section of the air return duct is provided with a fourth air vent; when the door of the refrigerating compartment is open, the third air vent is separated from the fourth air vent; when the door of the refrigerating compartment is closed, the third air vent is butt-jointed with the fourth air vent to communicate the first and second sections of the air return duct.

5. The refrigerator with an ice making function according to claim 4, wherein the second section of the air return duct comprises a first portion of the air return duct, which is operatively separated from or communicated with the first section of the air return duct; and a second portion of the air return duct, which is communicated with the ice making compartment and is angularly provided from the first portion of the air return duct.

6. The refrigerator with an ice making function according to claim 1, wherein one end of the air intake duct is communicated with the ice making evaporator, the other end of the air intake duct is provided with a fifth air vent, the ice making compartment is provided with a sixth air vent; when the door of the refrigerating compartment is open, the fifth air vent is separated from the sixth air vent; when the door of the refrigerating compartment is closed, the fifth air vent is butt-jointed with the sixth air vent to communicate the air intake duct with the ice making compartment.

7. The refrigerator with an ice making function according to claim 1, wherein a position where the air intake duct is connected with the ice making compartment is located above a position where the air return duct is connected with the ice making compartment.

8. The refrigerator with an ice making function according to claim 1, wherein the compartment for the ice making evaporator is provided in the refrigerating compartment.

9. The refrigerator with an ice making function according to claim 1, wherein the refrigerator further comprises an ice maker and an ice storage box provided in the ice making compartment; a passage and a dispenser are provided on the door of the refrigerating compartment, wherein the passage is configured to communicate the ice storage box and the exterior of the door of the refrigerating compartment, and the dispenser is communicated with the passage.

10. The refrigerator with an ice making function according to claim 1, wherein the refrigerator further comprises a freezing evaporator, a freezing blower and an air quantity adjusting device, wherein the freezing evaporator is configured to supply cold air to the refrigerating compartment and the freezing compartment, and the air quantity adjusting device is configured for adjusting an air quantity blown into the refrigerating compartment and the freezing compartment by the freezing blower.

11. The refrigerator with an ice making function according to claim 1, wherein the refrigerator further comprises a freezing evaporator, a freezing blower, a refrigerating evaporator and a refrigerating blower, wherein the freezing evaporator blows the cold air to the freezing compartment by means of the freezing blower, and the refrigerating evaporator blows the cold air to the refrigerating compartment by means of the refrigerating blower.

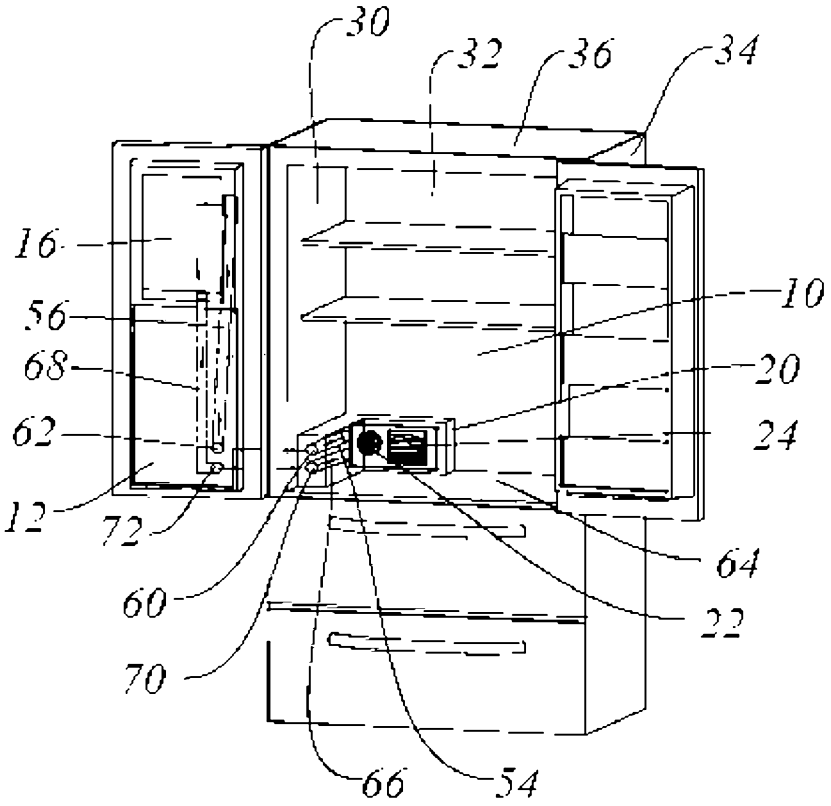

FIG. 1

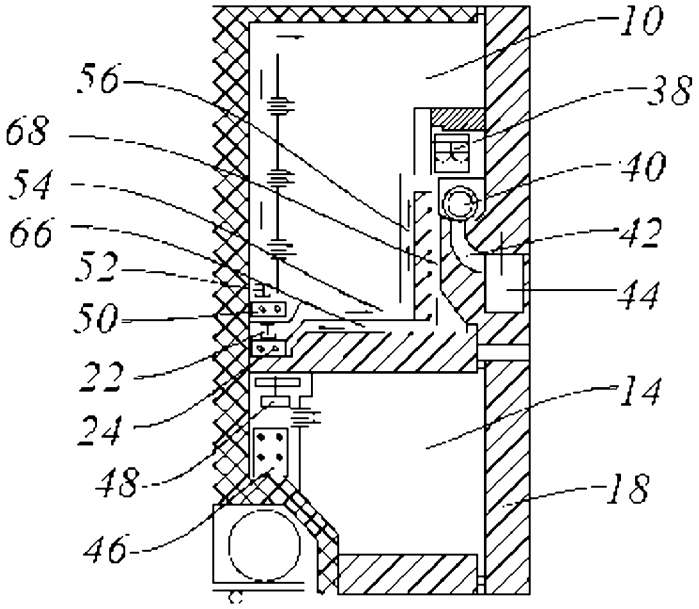

FIG. 2

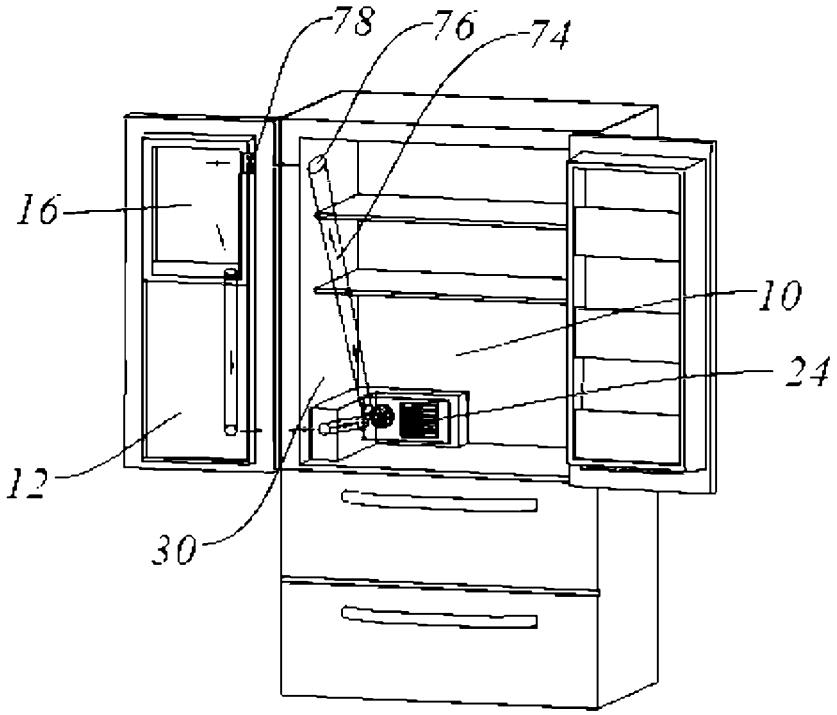

FIG. 3

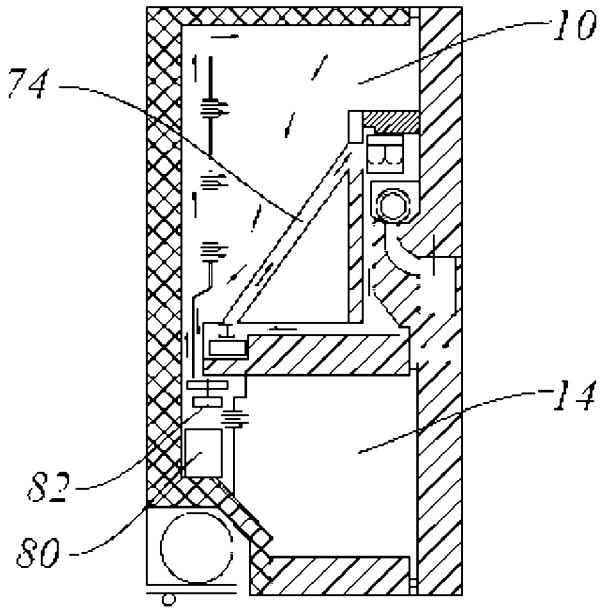

FIG. 4

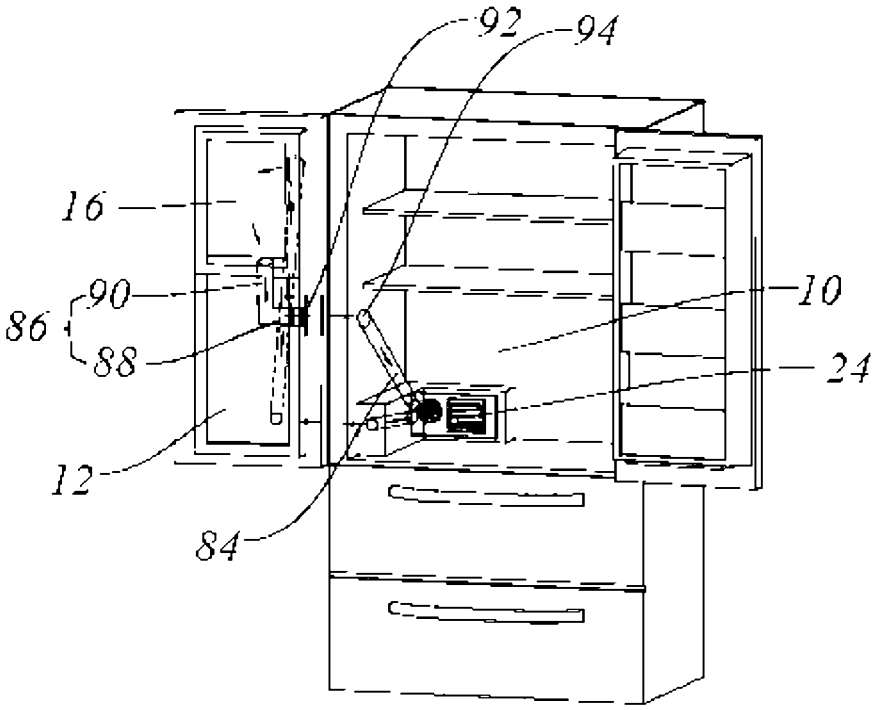

FIG. 5