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(54) **REFRIGERATOR**

(57) A refrigerator (100), comprising a refrigerator body (1), a drawer seat (2), a drawer body (3), at least one air-conditioning membrane assembly (7), and an air extractor (8). A low-temperature storage space (14) is formed in the refrigerator body (1), the drawer seat (2) is provided in the low-temperature storage space (14), and the end of the drawer seat (2) distant from a rear side wall (13) of the refrigerator body (1) is open and hollow; the drawer body (3) has a storage cavity (4) mounted in the drawer seat (2); a mounting cavity (5) and a backflow cavity (6) communicated with each other are defined between the drawer body (3) and the drawer seat (2); the mounting cavity (5) and the backflow cavity (6) are respectively provided on the different sides of the drawer body (3), and are respectively communicated with the storage cavity (4); the air-conditioning membrane assembly (7) is provided in the mounting cavity (5), and an oxygen transmission rate thereof is greater than a nitrogen transmission rate; and the air extractor (8) is provided in the low-temperature storage space (14) and configured to suction air in the air-conditioning membrane assembly (7), so that the air in the storage cavity (4) enters the mounting cavity (5), passes through the air-conditioning membrane assembly (7) in the mounting cavity (5) for deoxidization and filtration, and flows back to the storage cavity (4) through the backflow cavity (6), and the air in the drawer seat (2) is deoxidized and filtered by means of cyclic flowing, thereby greatly improving the air conditioning efficiency.

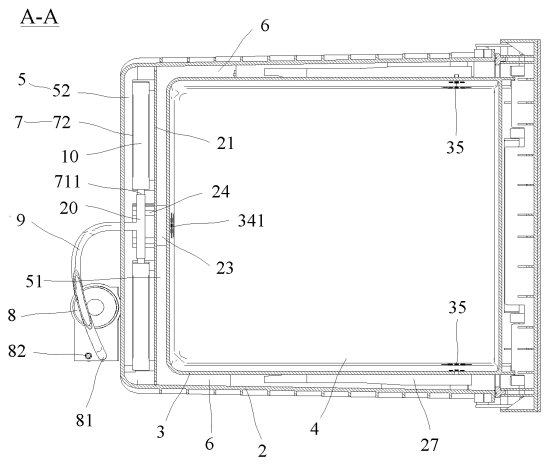

FIG. 2

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Description

[0001] This application claims priority to Chinese Patent Application No. 202010385574.0, filed on May 8, 2020, which is incorporated herein by reference in its entirety.

TECHNICAL FIELD

[0002] The present disclosure relates to the field of refrigeration apparatus technologies, and in particular, to a refrigerator.

BACKGROUND

[0003] The refrigerator is a refrigeration apparatus that maintains a constant low temperature, and it is also a household appliance that keeps food or other items in a constant low temperature and cold state. With the improvement of the quality of life, consumers have higher and higher requirements for the preservation of stored food, especially for the color and taste of food.

[0004] Studies have shown that the respiration of animals and plants, the growth and reproduction of oxygen-consuming microorganisms, and oxidation are closely related to the oxygen concentration. As the oxygen concentration decreases, the respiration and metabolic response of plants weaken, and even enter a dormant state. The life activities of some pests and microorganisms are inhibited, and the growth and reproduction are weakened or even stopped. The weakening of oxidation may effectively reduce the consumption of nutrients in fruits and vegetables, delay the ripening and aging of fruits, reduce the growth and reproduction of pests and microorganisms, inhibit the occurrence of pests and rot, and reduce the oxidative deterioration of some nutrients, fruit oxidative discoloration, which may effectively prolong the preservation period of fruits and vegetables.

[0005] Fruits and vegetables are still undergoing life activities such as respiration and metabolism during storage in the refrigerator after being picked. By controlling the temperature, oxygen concentration and other conditions in the refrigerator, the respiration of fruits and vegetables may be inhibited and the metabolic process of fruits and vegetables may be delayed, so as to well maintain the freshness and commerciality of fruits and vegetables, and to prolong the storage period and preservation period of fruits and vegetables.

SUMMARY

[0006] A refrigerator is provided. The refrigerator includes a refrigerator body, a drawer seat, a drawer body, at least one modified atmosphere film assembly, and a gas suction device. The refrigerator body has a low temperature storage space, the drawer seat is disposed in the low temperature storage space. An end of the drawer seat away from a rear side wall of the refrigerator body is provided with an opening, and the drawer seat is hollow. The drawer body has a storage cavity mounted in the drawer seat. A mounting cavity and a return cavity that communicate with each other are defined between the drawer body and the drawer seat. The mounting cavity and the return cavity are disposed at different sides of the drawer body respectively, and are in communication with the storage cavity respectively. The modified atmosphere film assembly is disposed in the mounting cavity, and a permeability of the modified atmosphere film assembly to oxygen is greater than a permeability to nitrogen. The gas suction device is disposed in the low temperature storage space, and configured to extract and suck air in the modified atmosphere film assembly to make the air in the storage cavity enter the mounting cavity. The air passes through the modified atmosphere film assembly in the mounting cavity is removed with oxygen, and then flows back into the storage cavity through the return cavity.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] In order to illustrate the technical solutions of the present disclosure more clearly, accompanying drawings to be used in the description of some embodiments of the present disclosure will be introduced briefly below. However, the accompanying drawings to be described below are merely accompanying drawings of some embodiments of the present disclosure, and a person having ordinary skill in the art may obtain other drawings according to these drawings. In addition, the accompanying drawings in the following description may be regarded as schematic diagrams, and are not limitations on actual size of products, actual processes of methods and actual timings of signals to which the embodiments of the present disclosure relate.

FIG. 1 is a schematic diagram of a refrigerator, in accordance with some embodiments;

FIG. 2 is a sectional view at A-A in FIG. 1;

FIG. 3 is an exploded view of a drawer assembly and a modified atmosphere film assembly of a refrigerator, in accordance with some embodiments;

FIG. 4 is a schematic diagram of a modified atmosphere film assembly of a refrigerator, in accordance with some embodiments;

FIG. 5 is a schematic diagram of a modified atmosphere film assembly, a fixing plate and a fan of a refrigerator, in accordance with some embodiments;

FIG. 6 is a schematic diagram of a drawer body of a refrigerator, in accordance with some embodiments; and

FIG. 7 is a schematic diagram of a drawer seat and a fixing plate of a refrigerator, in accordance with some embodiments.

DETAILED DESCRIPTION

[0008] The technical solutions in the embodiments of the present disclosure will be clearly and completely described below with reference to the accompanying drawings. However, the described embodiments are merely some but not all embodiments of the present disclosure. All other embodiments obtained by a person having ordinary skill in the art based on embodiments of the present disclosure shall be included in the protection scope of the present disclosure.

[0009] Unless the context requires otherwise, throughout the description and the claims, the term "comprise" and other forms thereof such as the third-person singular form "comprises" and the present participle form "comprising" are construed in an open and inclusive sense, i.e., "including, but not limited to". In the description, the term such as "one embodiment", "some embodiments", "exemplary embodiments", "example", "specific example" or "some examples" are intended to indicate that specific features, structures, materials or characteristics related to the embodiment(s) or example(s) are included in at least one embodiment or example of the present disclosure. Schematic representation of the above term does not necessarily refer to the same embodiment(s) or examples(s). In addition, specific features, structures, materials, or characteristics described herein may be included in any one or more embodiments or examples in any suitable manner.

[0010] The terms "first" and "second" are used for descriptive purposes only, and are not to be construed as indicating or implying a relative importance or implicitly indicating a number of indicated technical features. Therefore, the features defined with "first" and "second" may explicitly or implicitly include one or more of these features. In the description of the embodiments of the present disclosure, terms "a/the plurality of" and "multiple" each mean two or more unless otherwise specified.

[0011] In the description of the present disclosure, it will be noted that term "mounted", "communicated" or "connected" is to be understood broadly. For example, it may be a fixed connection, a detachable connection, or an integral connection. It may be a direct connection, or may be an indirect connection through an intermediate medium, and may be internal communication between two elements. Specific meanings of the above terms in the present disclosure may be understood by those skilled in the art according to specific situations.

[0012] In the description of the present disclosure, it will be understood that, orientations or positional relationships indicated by the terms such as "upper", "lower", "front", "rear", "left", "right", "vertical", "horizontal", "top", "bottom", "inner", "outer", and the like are based on orientations or positional relationships shown in the drawings, which are merely to facilitate and simplify the description of the present disclosure, and are not to indicate or imply that the devices or elements referred to must have a particular orientation, or must be constructed or operated in a particular orientation. Therefore, these terms should not be construed as limitations on the present disclosure.

[0013] The phrase "at least one of A, B and C" has the same meaning as the phrase "at least one of A, B or C", both including following combinations of A, B and C: only A, only B, only C, a combination of A and B, a combination of A and C, a combination of B and C, and a combination of A, B and C.

[0014] The phrase "A and/or B" includes following three combinations: only A, only B, and a combination of A and B.

[0015] The use of the phrase "configured to" herein means an open and inclusive expression, which does not exclude devices that are configured to perform additional tasks or steps.

[0016] In addition, the use of the phrase "based on" is meant to be open and inclusive, since a process, step, calculation or other action that is "based on" one or more of the stated conditions or values may, in practice, be based on additional conditions or values exceeding those stated.

[0017] The term such as "about," "substantially," or "approximately" as used herein includes a stated value and an average value within an acceptable range of deviation of a particular value determined by a person of ordinary skill in the art, considering measurement in question and errors associated with measurement of a particular quantity (i.e., limitations of a measurement system).

[0018] In some related technologies, a modified atmosphere film assembly for controlling the oxygen concentration in the refrigerator is disposed at a top of a drawer seat, so as to perform gas exchange in an inner space of a drawer body to implement deoxygenation and nitrogen return. However, the modified atmosphere film assembly only acts on the top range of the inner space of the drawer body, the air in the inner space of the drawer body may not flow effectively, and the efficiency of gas regulation is low.

[0019] As shown in FIGS. 1 and 2, some embodiments of the present disclosure provide a refrigerator 100. The refrigerator 100 includes a refrigerator body 1, a drawer seat 2, a drawer body 3, at least one modified atmosphere film assembly 7, and a gas suction device 8.

[0020] Referring to FIG. 1, the refrigerator body 1 includes a left side wall 11, a right side wall 12, and a rear side wall 13. The refrigerator 100 may further include a door body, and the door body is mounted on a side of the refrigerator body 1 opposite to the rear side wall 13. The refrigerator body 1 has a low temperature storage space 14, and the low temperature storage space 14 may be a refrigerating compartment 110 or a freezing compartment 120.

[0021] Referring to FIG. 1, the drawer seat 2 is disposed in the low temperature storage space 14. An end of the drawer seat 2 away from the rear side wall 13 of the refrigerator body 1 is provided with an opening, and

the drawer seat 2 is hollow.

[0022] Referring to FIG. 1, the drawer body 3 has a front side, a rear side, a left side, and a right side. Here, the front side refers to a side of the drawer body 3 away from the rear side wall 13 of the refrigerator body 1, the rear side is a side of the drawer body 3 corresponding to the rear side wall 13 of the refrigerator body 1, the left side is a side of the drawer body 3 corresponding to the left side wall 11 of the refrigerator body 1, and the right side is a side of the drawer body 3 corresponding to the right side wall 11 of the refrigerator body 1. Referring to FIG. 2, the drawer body 3 has a storage cavity 4 and is mounted in the drawer seat 2. A mounting cavity 5 and a return cavity 6 that communicate with each other are defined between the drawer body 3 and the drawer seat 2, and the mounting cavity 5 and the return cavity 6 are provided on different sides of the drawer body 3 respectively. Exemplarily, the mounting cavity 5 and the return cavity 6 are disposed at different sides of the rear side, the left side and the right side of the drawer body 3 respectively, and are in communication with the storage cavity 4, respectively.

[0023] Referring to FIG. 2, the modified atmosphere film assembly 7 is disposed in the mounting cavity 5, and the permeability of the modified atmosphere film assembly 7 to oxygen is greater than a permeability to nitrogen. That is, the modified atmosphere film assembly 7 allows the oxygen in the air to pass more than the nitrogen, and may block at least a part of the nitrogen in the air. For example, the modified atmosphere film assembly 7 allows more than 80% of the oxygen in the air to pass through the modified atmosphere film assembly 7, and blocks more than 80% of the nitrogen in the air. For another example, the modified atmosphere film assembly 7 allows 100% of the oxygen in the air to pass through the modified atmosphere film assembly 7, and blocks 100% of the nitrogen in the air.

[0024] Referring to FIGS. 1 and 2, the gas suction device 8 is disposed in the low temperature storage space 14 and is configured to extract and suck the air in the modified atmosphere film assembly 7, so as to make the air in the storage cavity 4 enter the mounting cavity 5, the air passes through the modified atmosphere film assembly 7 in the mounting cavity 5 is removed with oxygen, and then flows back into the storage cavity 4 through the return cavity 6. Optionally, the gas suction device 8 includes an air suction pump.

[0025] Based on the refrigerator 100 with the above technical features, the storage cavity 4 of the drawer body 3 is used for storing food, and the air in the storage cavity 4 enters the mounting cavity 5 due to the suction of the gas suction device 8. The modified atmosphere film assembly 7 allows the oxygen in the air to pass more than nitrogen, and may block at least a part of the nitrogen in the air. Therefore, the gas suction device 8 may suck the gas rich in oxygen and poor in nitrogen, so that the gas blocked in the mounting cavity 5 is a nitrogen-enriched gas. Then, the nitrogen-enriched gas flows back to the storage cavity 4 through the return cavity 6, so that the air in the drawer seat 2 is deoxygenated and filtered by means of circulation flow. In this case, since the mounting cavity 5 and the return cavity 6 are disposed at different sides of the rear side, the left side and the right side of the drawer body 3 respectively, the circulation flow of air covers many regions of the storage cavity 4, which greatly improves the efficiency of gas regulation and reduces the intensity of aerobic respiration of fruits and vegetables, thereby achieving the purpose of preservation of fruits and vegetables for a long time.

[0026] In some embodiments, as shown in FIGS. 1 and 2, the mounting cavity 5 is disposed at a side of the drawer body 3 proximate to the rear side wall 13 of the refrigerator body 1, and the return cavity 6 is disposed at the left and/or right side of the drawer body 3. FIG. 2 exemplifies that the return cavities 6 are disposed at the left side and the right side of the drawer body 3. In this case, the modified atmosphere film assembly 7 in the mounting cavity 5 is disposed at the rear side of the drawer body 3, which may effectively reduce the space occupied by the drawer seat 2 in the vertical direction, so as to make the overall structure of the refrigerator 100 more compact and reliable, and facilitate the rapid maintenance and replacement of the modified atmosphere film assembly 7.

[0027] In addition, the gas suction device 8 may be directly mounted on a back of an outer side of the mounting cavity 5, that is, the gas suction device 8 is mounted in the low temperature storage space 14 between the mounting cavity 5 and the rear side wall 13 of the refrigerator body 1, and does not need to be mounted in the compressor chamber, the foamed layer, and the top of the refrigerator body 1, so that problems such as difficulty in heat dissipation, resonance with the compressor, excessively long pipelines, and affecting refrigeration may be avoided, and the compact mounting between the gas suction device 8 and the modified atmosphere film assembly 7 may be implemented, which has advantages of reducing the length of the pipeline, effectively isolating the noise after closing the door, and being prone to install and replace.

[0028] In some embodiments, as shown in FIG. 2, the return cavities 6 are disposed at the left side and the right side of the drawer body 3, so as to form two gas circulation flow loops, so that the efficiency of gas regulation is high. In some other embodiments, the return cavity 6 may further be disposed at the left side or the right side of the drawer body 3 separately, and only one gas circulation flow loop is used to implement gas regulation, thereby saving internal space.

[0029] In some embodiments, as shown in FIG. 6, the drawer body 3 includes: a front panel 31, a rear side plate 34, a left side plate 32, and a right side plate 32. Referring to FIGS. 2, 3 and 6, a first vent 35 is provided at an end of side plate of the left side plate 32 or the right side plate 32 of the drawer body 3 provided with the return cavity 6 on a side away from the mounting cavity 5. That is, if a side of the left side plate 32 is provided with the return

cavity 6, the end of the left side plate 32 away from the mounting cavity 5 is provided with the first vent 35; if a side of the right side plate 32 is provided with the return cavity 6, the end of the right side plate 32 away from the mounting cavity 5 is provided with the first vent 35; if a side of the left side plate 32 and a side of the right side plate 32 are provided with the return cavity 6 respectively, the ends of the left side plate 32 and the right side plate 32 away from the mounting cavity 5 are provided with the first vent 35.

[0030] The first vent 35 is configured to communicate with the storage cavity 4 and the return cavity 6. In this case, the air filtered and regulated by the modified atmosphere film assembly 7 flows to the return cavity 6 disposed at the left and/or right side of the drawer seat 2 from the mounting cavity 5, and finally return to the storage cavity 4 from the return cavity 6, so as to form a gas circulation flow loop. In this case, the gas flows from the front side to the rear side of the storage cavity 4, covering the entire storage cavity 4, serving to transfer heat, improving the uniformity of the temperature in the storage cavity 4, and improving the cooling effect. Moreover, the efficiency of gas regulation may be improved, and the fruits and vegetables stored in the storage cavity 4 are all in a nitrogen-rich and oxygen-poor gas environment, thereby effectively inhibiting the aerobic respiration and metabolic reactions of the fruits and vegetables.

[0031] Here, the first vent 35 may be provided in any shape. For example, the shape of the first vent 35 may be a circle, an ellipse, a rectangle or a polygon, and the present disclosure is not limited thereto. For another example, the first vent 35 is formed by a plurality of small holes distributed in an array. FIGS. 3 and 6 show an example in which the first vent 35 is formed by the plurality of small holes distributed in an array, so as to reduce the risk of contamination caused by the items in the storage cavity 4 entering the return cavity 6 while ensuring the ventilation volume.

[0032] In some embodiments, as shown in FIG. 4, the modified atmosphere film assembly 7 includes a mounting frame 71 and two modified atmosphere films 72. Referring to FIGS. 2 and 4, the mounting frame 71 is connected to the drawer seat 2. The two modified atmosphere films 72 are disposed at two sides of the mounting frame 71 in a direction L1 perpendicular to a plane defined by the mounting frame respectively. That is, the two modified atmosphere films 72 are disposed at the front side and the rear side of the mounting frame 71 respectively, and the two modified atmosphere films 72 and the mounting frame 71 define the oxygen-enriched gas accommodating cavity 10. Referring to FIGS. 2 and 3, a suction port 81 of the gas suction device 8 communicates with the oxygen-enriched gas accommodating cavity 10.

[0033] Exemplarily, as shown in FIG. 4, the mounting frame 71 is provided with a gas outlet 711 leading to the oxygen-enriched gas accommodating cavity 10. Referring to FIG. 2 and FIG. 3, the suction port 81 of the gas suction device 8 is connected to the gas outlet 711 through the pipe 9. The air in the mounting cavity 5 passes through the modified atmosphere films 72 on two sides of the mounting frame 71, so as to form an oxygen-enriched gas due to the guidance of the suction port 81. The oxygen-enriched gas enters the oxygen-enriched gas accommodating cavity 10, and is discharged to the outside of the refrigerator body 1 through an exhaust port 82 of the gas suction device 8, so that the effect of oxygen removal filtration is implemented, and the nitrogen-enriched gas is blocked and made to flow back into the storage cavity 4 from the return cavity 6.

[0034] Optionally, an orthogonal projection of an outer contour of the mounting frame 71 on the rear side wall 13 of the refrigerator body 1 is approximately in a geometric shape of such as a rectangle, a circle, or a triangle, and the present disclosure is not limited thereto.

[0035] In some embodiments, as shown in FIG. 4, the mounting frame 71 is provided with a plurality of reinforcing ribs 73 therein. Each reinforcing rib 73 supports the mounting frame 71, and strengthens the structural strength of the mounting frame 71, so as to improve the stability of the oxygen-enriched gas accommodating cavity 10.

[0036] Based on this, referring to FIG. 4, the plurality of reinforcing ribs 73 includes a plurality of first reinforcing ribs 731 and a plurality of second reinforcing ribs 732. The plurality of first reinforcing ribs 731 and the plurality of second reinforcing ribs 732 intersect each other, and divide the oxygen-enriched gas accommodating cavity 10 into a plurality of cavities 101. A through hole 733 is provided in the first reinforcing rib 731 or the second reinforcing rib 732 between any two adjacent cavities 101. In this way, each reinforcing rib 73 supports the mounting frame 71 and the modified atmosphere films 72 on the front and rear sides of the mounting frame 71, which further improves the stability of the oxygen-enriched gas accommodating cavity 10.

[0037] In some embodiments, as shown in FIG. 4, the modified atmosphere film assembly 7 further includes a first support plate 74 and a second support plate 75. The first support plate 74 is disposed at a side of one modified atmosphere film 72 of the two modified atmosphere films 72 away from the mounting frame 71, and the second support plate 75 is disposed at a side of another modified atmosphere film 72 of the two modified atmosphere films 72 away from the mounting frame 71. The first support plate 74 and the second support plate 75 are provided with a plurality of hollow regions 76. In this case, the gas may enter the oxygen-enriched gas accommodating cavity 10 from the plurality of hollow regions 76. Due to the action of the first support plate 74 and the second support plate 75, the amount of deformation caused to the modified atmosphere film 72 by the force generated by the gas flow may be reduced, and the service life of the modified atmosphere film 72 may be prolonged.

[0038] It can be understood that, the fixing manner of the first support plate 74 and the second support plate 75 are fixed in a non-exclusive manner. In some embod-

iments, referring to FIG. 4, the first support plate 74 and the second support plate 75 are clamped with each together. With such arrangement, the first support plate 74 and the second support plate 75 are easily assembled and disassembled to facilitate maintenance.

[0039] In addition, the first support plate 74 and the second support plate 75 are clamped with each together, so that the modified atmosphere film 72 may be simultaneously fixed on the mounting frame 71. Exemplarily, as shown in FIG. 4, the first support plate 74 is provided with a plurality of first elastic claws 741 and a plurality of first clamping grooves 742, and the plurality of first elastic claws 741 and the plurality of first clamping grooves 742 are alternately distributed in a circumferential direction of the first support plate 74. The second support plate 75 is provided with a plurality of second elastic claws 751 and a plurality of second clamping grooves 752, and the plurality of second elastic claws 751 and the plurality of second clamping grooves 752 are alternately distributed in a circumferential direction of the second support plate 75. The plurality of first elastic claws 741 are clamped with the plurality of second clamping grooves 752 in one-to-one correspondence, and the plurality of second elastic claws 751 are clamped with the plurality of first clamping grooves 742 in one-to-one correspondence. With such arrangement, the connection reliability of the first support plate 74 and the second support plate 75 is high, and the disassembly and assembly of the first support plate 74 and the second support plate 75 is convenient.

[0040] In some embodiments, as shown in FIGS. 2 and 3, the refrigerator 100 includes a plurality of modified atmosphere film assemblies 7, and orthogonal projections of the plurality of modified atmosphere film assemblies 7 on the rear side wall 13 of the refrigerator body 1 are not overlapped with each other. In this way, the plurality of modified atmosphere film assemblies 7 in the mounting cavity 5 may perform oxygen removal filtration simultaneously, thereby improving the efficiency of gas regulation.

[0041] On this basis, the refrigerator 100 further includes a connecting pipe 20, the connecting pipe 20 communicates with each modified atmosphere film assembly 7, and the suction port 81 of the gas suction device 8 communicates with the connecting pipe 20. In this way, the gas suction device 8 may simultaneously discharge the oxygen-enriched gas in the plurality of oxygen-enriched gas accommodating cavities 10, and a number of gas suction devices 8 may be reduced. The gas suction device 8 may include a vacuum pump, and may be mounted on an outer back of the air extraction cavity, and does not need to be mounted in the compressor chamber, the foamed layer, and the top of the refrigerator body 1. In this way, the problems such as difficulty in heat dissipation, resonance with the compressor, excessively long pipelines, and affecting refrigeration may be avoided, and the compact mounting between the gas suction device 8 and the modified atmosphere film assembly 7 may be implemented, which has the advantages of reducing the length of the pipeline, effectively isolating the noise after closing the door, and being prone to install and replace.

[0042] In addition, the suction port 81 of the gas suction device 8 is communicated with the plurality of oxygen-enriched gas accommodating cavities 10 through the connecting pipe 20. In this way, in a case where one of the modified atmosphere film assemblies 7 has the oxygen-enriched gas accommodating cavity 10 that fails, for example, in a case where one of the oxygen-enriched gas accommodating cavities 10 is leaked or the channel is blocked, the remaining modified atmosphere film assemblies 7 may continue to regulate the gas, and has better stability.

[0043] Exemplarily, as shown in FIGS. 2 and 5, there are two modified atmosphere film assemblies 7, which are distributed left and right in the horizontal direction in the mounting cavity 5. The two oxygen-enriched gas accommodating cavities 10 are connected to each other through the connecting pipe 20. That is, the gas outlets 711 on the two mounting frames 71 are connected to each other through the connecting pipe 20, and the suction port 81 of the gas suction device 8 is communicated with the connecting pipe 20, so as to form two gas circulation flow loops. Each gas circulation flow loop may be operated separately. In a case where the failure of components, leakage or blockage of channel occurs in one of the gas circulation flow loops, another gas circulation flow loop may continue to regulate the gas with better stability.

[0044] In some embodiments, as shown in FIGS. 2 and 3, the refrigerator 100 further includes a fixing plate 21. The fixing plate 21 is connected to the drawer seat 2 and is disposed in the mounting cavity 5. Here, the mounting cavity 5 is divided into a front cavity 51 and a rear cavity 52 by the fixing plate 21. Referring to FIGS. 2 and 6, the fixing plate 21 and the rear side plate 34 of the drawer body 3 define the front cavity 51, and the fixing plate 21 and the rear side plate of the drawer seat 2 define the rear cavity 52. Here, the rear side plate of the drawer seat 2 refers to a plate of the drawer seat 2 proximate to the rear side wall 13 of the refrigerator body 1. Here, referring to FIGS. 2 and 5, the rear cavity 52 is communicated with the return cavity 6, the modified atmosphere film assembly 7 is disposed in the rear cavity 52, and the fixing plate 21 is provided with a second vent 211 that communicates the front cavity 51 with the rear cavity 52. In this case, the modified atmosphere film assembly 7 is disposed in the rear cavity 52, so as to avoid contamination caused by contact with the items in the storage cavity 4. For example, the contact between the modified atmosphere film assembly 7 and the vegetable leaves, soil, water droplets or plastic films in the storage cavity 4 may be avoided, and the service life of the modified atmosphere film 72 may be prolonged.

[0045] In some embodiments, as shown in FIG. 5, the orthogonal projection of the outer contour of the mounting frame 71 on the rear side wall 13 of the refrigerator body

1 is approximately a rectangle. The rear side of the fixing plate 21 is provided with a fixing member 22 corresponding to the four corners of each mounting frame 71. The fixing member 22 includes a base 221, a first clamping board 222 and a second clamping board 223. The edges of the four corners of the mounting frame 71 abut against the corresponding first clamping boards and second clamping boards 223 of the fixing member 22, so that the mounting frame 71 is clamped between the four fixing members 22. The base 221 is located between the mounting frame 71 and the fixing plate 21, and is configured to define a distance between the mounting frame 71 and the fixing plate 21. With such arrangement, the mounting frame 71 and the fixing plate 21 are easily assembled and disassembled, and is easily replaced.

[0046] In some embodiments, as shown in FIG. 2 and FIG. 5, the return cavities 6 are disposed at the left side and right side of the drawer body 3. The second vent 211 is disposed in the middle of the fixing plate 21. The left side and the right side of the fixing plate 21 are provided with at least one third vent 212 respectively. The third vent 212 disposed at the left side of the fixing plate 21 is configured to communicate with the rear cavity 52 and the return cavity 6 disposed at the left side of the drawer body 3. The third vent 212 disposed at the right side of the fixing plate 21 is configured to communicate with the rear cavity 52 and the return cavity 6 disposed at the right side of the drawer body 3. With such arrangement, the gas circulation flow may be accelerated, and the efficiency of gas regulation is higher.

[0047] In some embodiments, as shown in FIGS. 3 and 7, the refrigerator 100 further includes an air guide loop 23, and the air guide loop 23 is disposed between the fixing plate 21 and the rear side plate 34 of the drawer body 3. Here, the air guide loop 23 may be disposed on the fixing plate 21 or the rear side plate 34 of the drawer body 3, and FIG. 3 and FIG. 7 illustrate that the air guide loop 23 is disposed on the fixing plate. Referring to FIGS. 3 and 6, a fourth vent 341 is provided on the rear side plate 34 of the drawer body 3. An end of the air guide loop 23 is communicated with the second vent 211, and another end of the air guide loop 23 is communicated with the fourth vent 341. In this way, referring to FIGS. 2 and 6, the air guide loop 23 abuts against the rear side plate 34 of the drawer body 3, so as to form an air flow channel, facilitating the air in the storage cavity 4 to directly enter the rear cavity 52 through the air guide loop 23, accelerating the gas circulation flow, and improving the efficiency of gas regulation.

[0048] Based on this, the refrigerator 100 further includes an elastic pad. In a case where the air guide loop is disposed on the fixing plate, the elastic pad is disposed between the air guide loop and the rear side plate of the drawer body 3, so as to play a role of shock absorption, noise reduction and protection. In a case where the air guide loop is disposed at the rear side plate of the drawer body 3, the elastic pad is disposed between the air guide loop and the fixing plate, so as to play the role of shock absorption, noise reduction and protection. Optionally, the elastic pad includes a silicone pad.

[0049] Here, the second vent 211, the third vent 212 and the fourth vent 341 may be provided in any shape. For example, the shapes of the second vent 211, the third vent 212 and the fourth vent 341 are circles, ovals, rectangles or polygons, and the present disclosure is not limited thereto. For another example, the second vent 211, the third vent 212 and the fourth vent 341 are all formed by a plurality of small holes distributed in an array. FIGS. 5 and 6 are illustrated by taking an example in which the second vent 211 and the fourth vent 341 are formed by the plurality of small holes distributed in an array. FIG. 7 is illustrated by taking an example in which the third vents 212 are rectangular notches formed on the left and right sides of the fixing plate 21.

[0050] In some embodiments, as shown in FIGS. 2 and 5, the refrigerator 100 further includes at least one fan 24 disposed in the rear cavity 52. Each fan 24 includes an air inlet and an air outlet, the air inlet is located on the axis of the fan 24, and the air inlet communicates with the second vent 211. The air outlet is located on a peripheral side of the fan 24, and the air outlet faces one or more modified atmosphere film assemblies 7. In this case, the fan 29 guides the air to flow to the modified atmosphere film assembly 7, so as to accelerate the air flow and improve the efficiency of gas regulation.

[0051] Optionally, referring to FIGS. 2 and 5, in a case where the modified atmosphere film assemblies 7 are distributed in the horizontal direction in the mounting cavity 5, there may be two fans 24. The rear side of the fixing plate 21 is provided with a connecting column 30, and the fan 24 is mounted on the rear side of the fixing plate 21 through the connecting column 30. Here, the two fans 24 are distributed up and down in the vertical direction. In this case, one fan 24 guides the air flow to the modified atmosphere film assembly 7 located on the left side, and another fan 24 guides the air flow to the modified atmosphere film assembly 7 located on the right side, so that the gas flow speed may be accelerated, and the air may be guided to flow to the two gas circulation flow loops respectively, thereby accelerating the gas circulation flow and improving the efficiency of gas regulation.

[0052] Based on this, the flow path of each gas circulation flow loop includes: storage cavity 4 → fourth vent 341 → air guide loop 23 → second vent 211 → fan 24 → modified atmosphere film assembly 7 → return cavity 6 → first vent 35 → storage cavity 4. The operating principle includes: the fan 24 blows the air inside the storage cavity 4 to the modified atmosphere film assembly 7, and the gas suction device 8 performs suction to make the air pass through the modified atmosphere film 72. In this case, the oxygen permeates through the modified atmosphere film 72 more than the nitrogen, so as to gradually reduce the oxygen concentration in the mounting cavity 5. Finally, the nitrogen-enriched gas in the mounting cavity 5 returns to the storage cavity 4 through the return cavity 6 to form a low-oxygen preservation space, so as

to inhibit the respiration and metabolic reaction of the fruits and vegetables stored in the drawer body 3, thereby implementing the purpose of prolonging the fresh-keeping time.

[0053] In some embodiments, as shown in FIG. 6, the refrigerator 100 further includes a sealing loop 25. The sealing loop 25 is disposed at the end of the drawer body 3 away from the rear side plate of the drawer seat 2, that is, the front panel 31 of the drawer body 3. The sealing loop 25 cooperates with the opening located at the end of the drawer seat 2 away from the rear side wall 13 of the refrigerator body 1, so as to implement the sealing of the drawer seat 2.

[0054] In addition, in a case where the oxygen-enriched gas is continuously extracted by the gas suction device 8, a negative pressure phenomenon may be generated in the drawer seat 2. In a case where the negative pressure value is greater than or equal to a preset value, the sealing loop 25 allows outside air to enter the drawer seat 2. That is, in a case where the negative pressure value in the drawer seat 2 is less than the preset value, the interior of the drawer seat 2 is isolated from the outside air, and the negative pressure value in the drawer seat 2 increases continuously due to the action of the gas suction device 8. In a case where the negative pressure in the drawer seat 2 is greater than or equal to the preset value, the interior of the drawer seat 2 is communicated with the outside air, so that the user may conveniently open the drawer body 3 and the fruits and vegetables may be prevented from anaerobic respiration.

[0055] The preset value may be a negative pressure value corresponding to a first gas atmosphere, and the first gas atmosphere includes a gas atmosphere that is conducive to the preservation of the fruits and vegetables. For example, the first gas atmosphere includes a gas environment corresponding to only guaranteeing the basic respiration of fruits and vegetables, so as to reduce the intensity of aerobic respiration of fruits and vegetables, and simultaneously prevent the anaerobic respiration of fruits and vegetables.

[0056] In some embodiments, as shown in FIGS. 3 and 7, the refrigerator 100 further includes a cooling air duct 26, and the cooling air duct 26 is disposed at a top of the drawer seat 2, so as to cool the storage cavity 4 indirectly. Here, the top of the drawer seat 2 is an end of the drawer seat 2 that is proximate to the top of the refrigerator body 1. In addition, the low temperature environment formed by the cooling air duct may reduce the risk of overheating of the gas suction device 8, and protect the gas suction device 8, thereby facilitating the efficient operation of the gas suction device 8 and prolonging the service life of the gas suction device 8.

[0057] Exemplarily, as shown in FIG. 3 and FIG. 7, a surface of a top plate (i.e., a plate located on top of the drawer seat 2 in the drawer seat 2) of the drawer seat 2 away from the drawer body 3 is provided with an air groove 261. The refrigerator 100 further includes an air duct cover plate 262. The air duct cover plate 262 is embedded in the surface of the top plate of the drawer seat 2 away from the drawer body 3, and defines the cooling air duct 26 with the air groove 261. In this case, since the air duct cover plate 262 is embedded in the surface of the top plate of the drawer seat 2 away from the drawer body 3, the mounting space in the vertical direction of the refrigerator 100 may not be affected.

[0058] Based on this, the modified atmosphere film assembly 7 is disposed at the rear side of the drawer body 2, which does not affect the provision of the cooling air duct 26 on the top plate of the drawer seat 2. For example, referring to FIGS. 1 and 7, the drawer seat 2 and the drawer body 3 may be disposed in the refrigerating compartment 110 of the refrigerator 100, and a cooling vent 111 provided at a back of the refrigerating compartment 110 is communicated to the cooling air duct 26 correspondingly. In this case, since the tightness between the drawer seat 2 and the drawer body 3 is high, the cooling air duct 26 is used to cool the drawer seat 2 indirectly, which can effectively prevent the fruits and vegetables from withering and drying due to the direct blowing of cold air, retain the crisp and tender taste and texture of the fruits and vegetables. The oxygen concentration in the drawer body 3 is lower than the oxygen concentration in the refrigerating compartment 110, which may inhibit the respiration and metabolism of fruits and vegetables, reduce the occurrence of oxidative browning, and prevent the loss of nutrients and food deterioration. Therefore, the preservation period of stored food may be prolonged.

[0059] Optionally, referring to FIGS. 3 and 7, the air groove 261 may be a U-shaped groove disposed on the top plate of the drawer seat 2. The air duct cover plate 262 is disposed on the U-shaped groove by means of hooks and fixing screws, so as to form the cooling air duct 26. In this case, the cooling air may enter the U-shaped groove from an end of the U-shaped groove and exit the U-shaped groove from another end of the U-shaped groove. It can be understood that, the U-shaped cooling air duct may increase the cooling area, so as to ensure the cooling efficiency.

[0060] In some embodiments, as shown in FIGS. 2, 3 and 6, guide structures 27 for matching and guiding is provided between the drawer body 3 and the drawer seat 2. The guide structures 27 are located on the left and right sides of the drawer body 3, so as to implement the pulling function of the drawer body 3. The guide structures 27 may be disposed in the return cavity 6.

[0061] In some embodiments, the drawer body 3 is provided with a locking structure 28, and the locking structure 28 is configured to be able to be clamped with the drawer seat 2. Exemplarily, after the drawer body 3 is closed, the locking structure 28 is clamped on the drawer seat 2, so as to maintain a relatively sealed state.

[0062] The foregoing descriptions are merely specific implementations of the present disclosure, but the protection scope of the present disclosure is not limited thereto. Changes or replacements that any person skilled

in the art could conceive of within the technical scope of the present disclosure shall be included in the protection scope of the present disclosure. Therefore, the protection scope of the present disclosure shall be subject to the protection scope of the claims.

Claims

1. A refrigerator, comprising:

a refrigerator body having a low temperature storage space;
a drawer seat disposed in the low temperature storage space; an end of the drawer seat away from a rear side wall of the refrigerator body being provided with an opening, and the drawer seat being hollow;
a drawer body having a storage cavity and mounted in the drawer seat; a mounting cavity and a return cavity that communicate with each other being defined between the drawer body and the drawer seat; the mounting cavity and the return cavity being disposed at different sides of the drawer body respectively, and being in communication with the storage cavity respectively;
at least one modified atmosphere film assembly disposed in the mounting cavity, and a permeability of the modified atmosphere film assembly to oxygen being greater than a permeability to nitrogen; and
a gas suction device disposed in the low temperature storage space, and configured to extract and suck air in the modified atmosphere film assembly to make the air in the storage cavity enter the mounting cavity; the air passing through the modified atmosphere film assembly in the mounting cavity is removed with oxygen, and then flowing back into the storage cavity through the return cavity.

2. The refrigerator according to claim 1, wherein the mounting cavity is disposed at a side of the drawer body proximate to the rear side wall of the refrigerator body, and the return cavity is disposed at a left side and/or right side of the drawer body.

3. The refrigerator according to claim 2, wherein a first vent is provided at an end of a side plate of the left side plate or the right side plate of the drawer body provided with the return cavity on a side away from the mounting cavity, and the first vent is configured to communicate with the storage cavity and the return cavity.

4. The refrigerator according to any one of claims 1 to 3, wherein the modified atmosphere film assembly includes:

a mounting frame connected to the drawer seat; and
two modified atmosphere films disposed at two sides of the mounting frame in a direction perpendicular to a plane defined by the mounting frame respectively; an oxygen-enriched gas accommodating cavity being defined between the two modified atmosphere films and the mounting frame; a suction port of the gas suction device being communicated with the oxygen-enriched gas accommodating cavity.

5. The refrigerator according to claim 4, wherein the mounting frame is provided with a plurality of reinforcing ribs.

6. The refrigerator according to claim 5, wherein the plurality of reinforcing ribs include a plurality of first reinforcing ribs and a plurality of second reinforcing ribs;
the plurality of first reinforcing ribs and the plurality of second reinforcing ribs intersect with each other and divide the oxygen-enriched gas accommodating cavity into a plurality of cavities; a through hole is provided in a first reinforcing rib or a second reinforcing rib between any two adjacent cavities.

7. The refrigerator according to any one of claims 4 to 6, wherein the modified atmosphere film assembly further includes:

a first support plate disposed at a side of one modified atmosphere film of the two modified atmosphere films away from the mounting frame; and
a second support plate disposed at a side of another modified atmosphere film of the two modified atmosphere films away from the mounting frame;
wherein the first support plate and the second support plate are provided with a plurality of hollow regions.

8. The refrigerator according to claim 7, wherein the first support plate and the second support plate are clamped with each other.

9. The refrigerator according to claim 8, wherein the first support plate is provided with a plurality of first elastic claws and a plurality of first clamping grooves, and the plurality of first elastic claws and the plurality of first clamping grooves are alternately distributed in a circumferential direction of the first support plate;

the second support plate is provided with a plurality of second elastic claws and a plurality of

second clamping grooves, and the plurality of second elastic claws and the plurality of second clamping grooves are alternately distributed in a circumferential direction of the second support plate;
wherein the plurality of first elastic claws are clamped in one-to-one correspondence with the plurality of second clamping grooves, and the plurality of second elastic claws are clamped in one-to-one correspondence with the plurality of first clamping grooves.

10. The refrigerator according to any one of claims 1 to 9, wherein the refrigerator comprises a plurality of the modified atmosphere film assemblies, and orthogonal projections of the plurality of modified atmosphere film assemblies on the rear side wall of the refrigerator body are not overlapped with each other.

11. The refrigerator according to claim 10, further comprising a connecting pipe communicated with each of the modified atmosphere film assemblies, and a suction port of the gas suction device being communicated with the connecting pipe.

12. The refrigerator according to any one of claims 1 to 11, further comprising:

a fixing plate connected to the drawer seat and disposed in the mounting cavity;
the mounting cavity being divided into a front cavity and a rear cavity by the fixing plate; wherein the fixing plate and a rear side plate of the drawer body define the front cavity, and the fixing plate and a rear side plate of the drawer seat define the rear cavity;
the rear cavity is communicated with the return cavity, and the modified atmosphere film assembly is disposed in the rear cavity; the fixing plate is provided with a second vent that communicates the front cavity with the rear cavity.

13. The refrigerator according to claim 12, wherein the return cavities are disposed at a left and a right side of the drawer body, and the second vent is disposed at a middle of the fixing plate;

a left and a right side of the fixing plate are provided with at least one third vent respectively;
wherein the third vent disposed at the left side of the fixing plate is configured to communicate with the rear cavity and the return cavity disposed at a left side of the drawer body;
the third vent disposed at the right side of the fixing plate is configured to communicate with the rear cavity and the return cavity disposed at a right side of the drawer body.

14. The refrigerator according to claim 12 or 13, wherein a fourth vent is provided on the rear side plate of the drawer body;
the refrigerator further comprises an air guide loop disposed between the fixing plate and the rear side plate of the drawer body; an end of the air guide loop is communicated with the second vent, and another end of the air guide loop is communicated with the fourth vent.

15. The refrigerator according to claim 14, further comprising an elastic pad,

in a case where the air guide loop is disposed on the fixing plate, the elastic pad is disposed between the air guide loop and the rear side plate of the drawer body;
in a case where the air guide loop is disposed on the rear side plate of the drawer body, the elastic pad is disposed between the air guide loop and the fixing plate.

16. The refrigerator according to claim 14 or 15, further comprising:

at least one fan disposed in the rear cavity;
each fan including an air inlet and an air outlet; the air inlet being located on an axis of the fan, and the air inlet being communicated with the second vent; the air outlet being located on a peripheral side of the fan, and the air outlet facing one or more of the modified atmosphere film assemblies.

17. The refrigerator according to any one of claims 1 to 16, further comprising a sealing loop disposed at an end of the drawer body away from a rear side plate of the drawer seat; the sealing loop being cooperated with the opening of the end of the drawer seat away from the rear side wall of the refrigerator body.

18. The refrigerator according to any one of claims 1 to 17, further comprising a cooling air duct disposed at a top of the drawer seat.

19. The refrigerator according to claim 18, wherein a surface of a top plate of the drawer seat away from the drawer body is provided with an air groove;
the refrigerator further comprises an air duct cover plate embedded in the surface of the top plate of the drawer seat away from the drawer body, and defining the cooling air duct with the air groove.

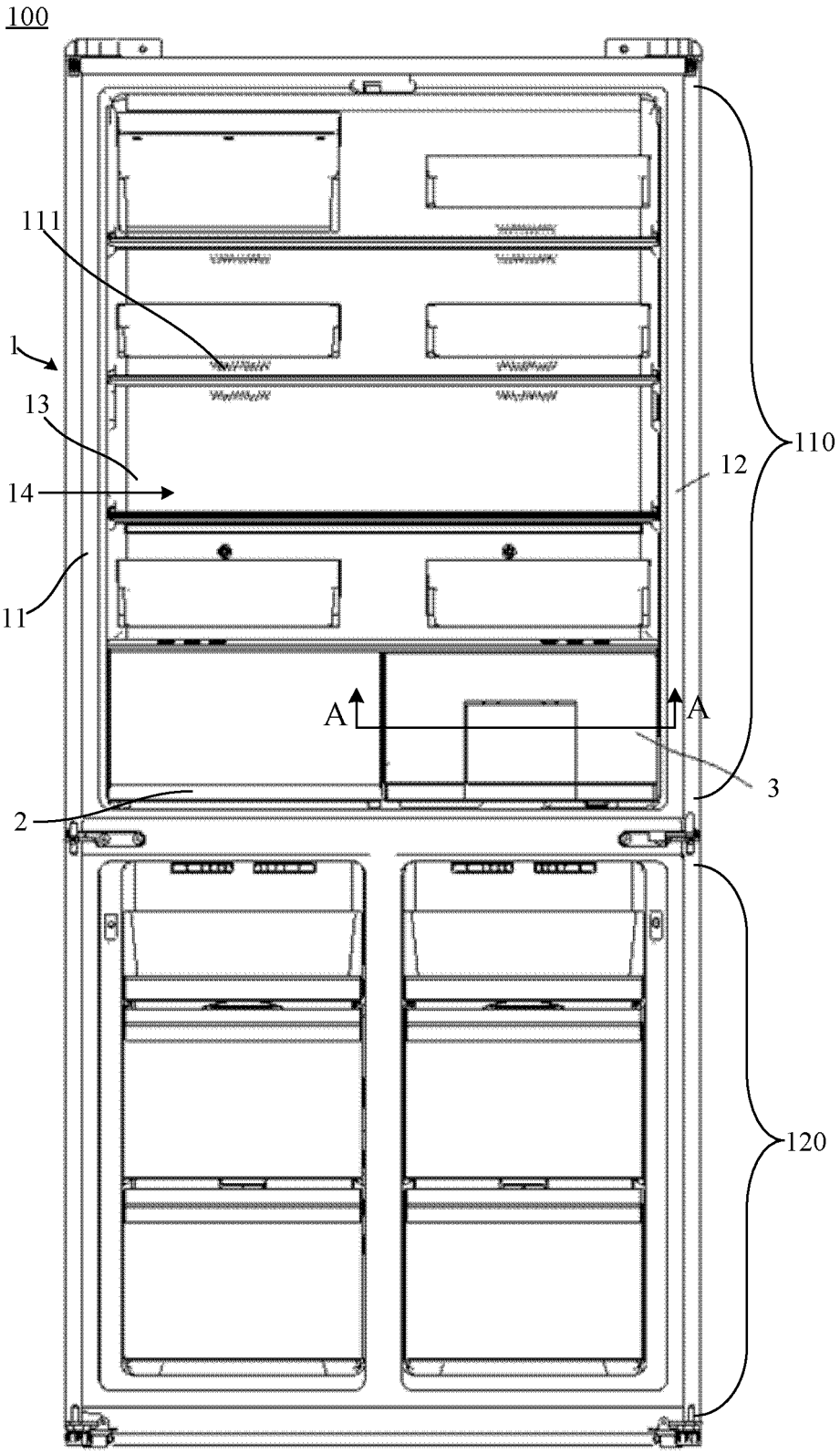

FIG. 1

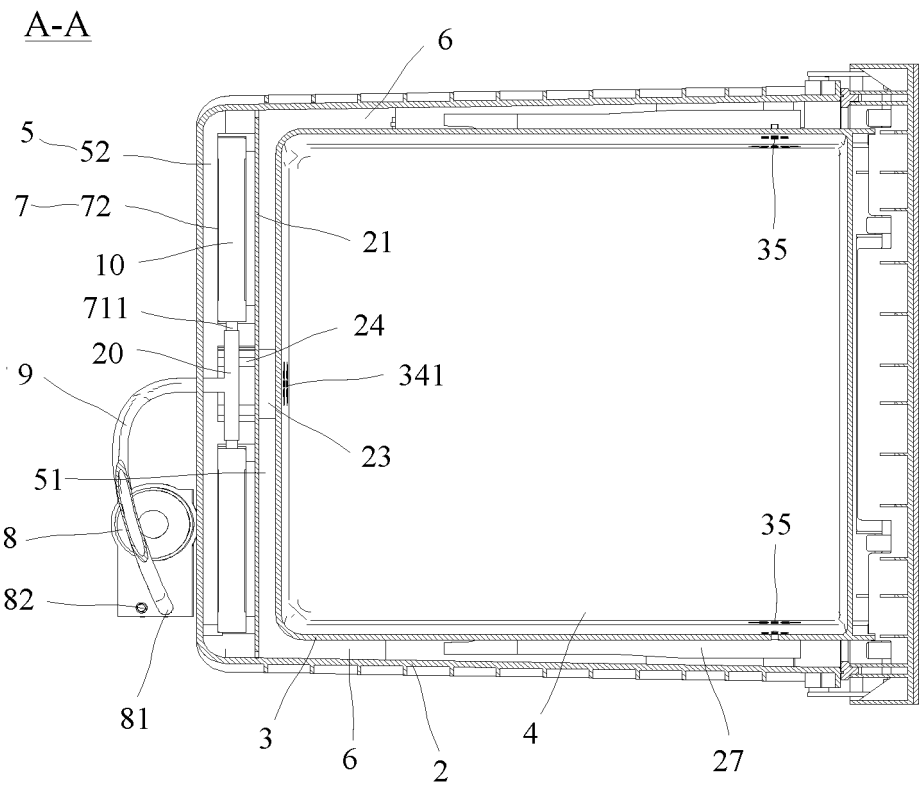
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FIG. 2

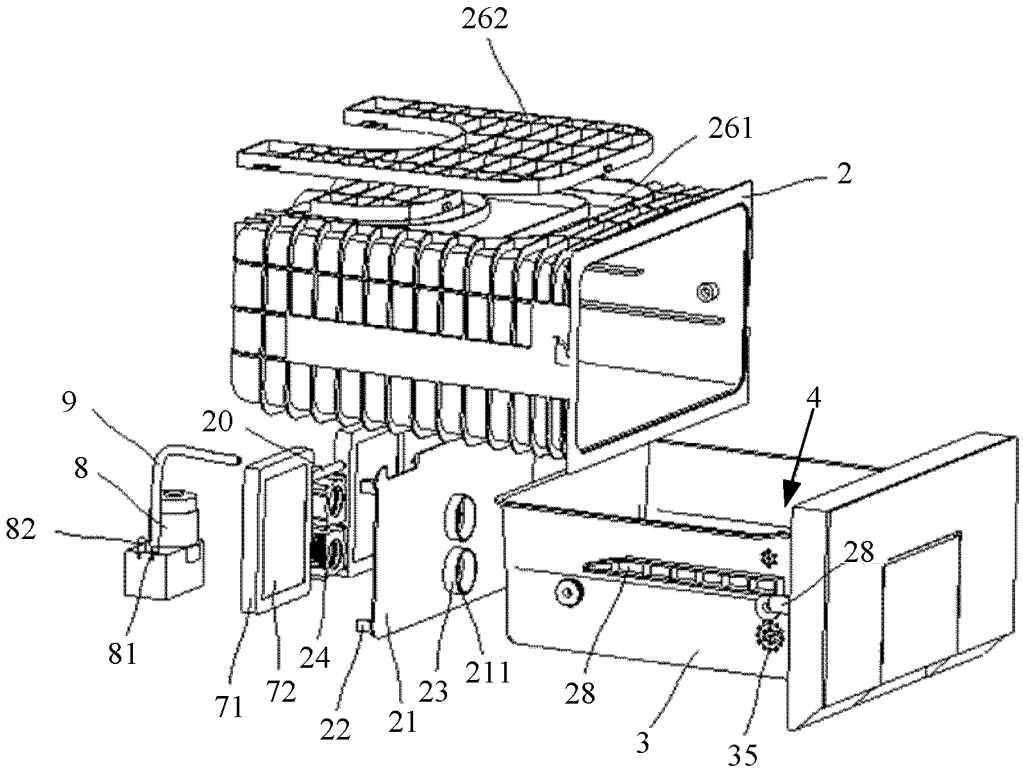
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FIG. 3

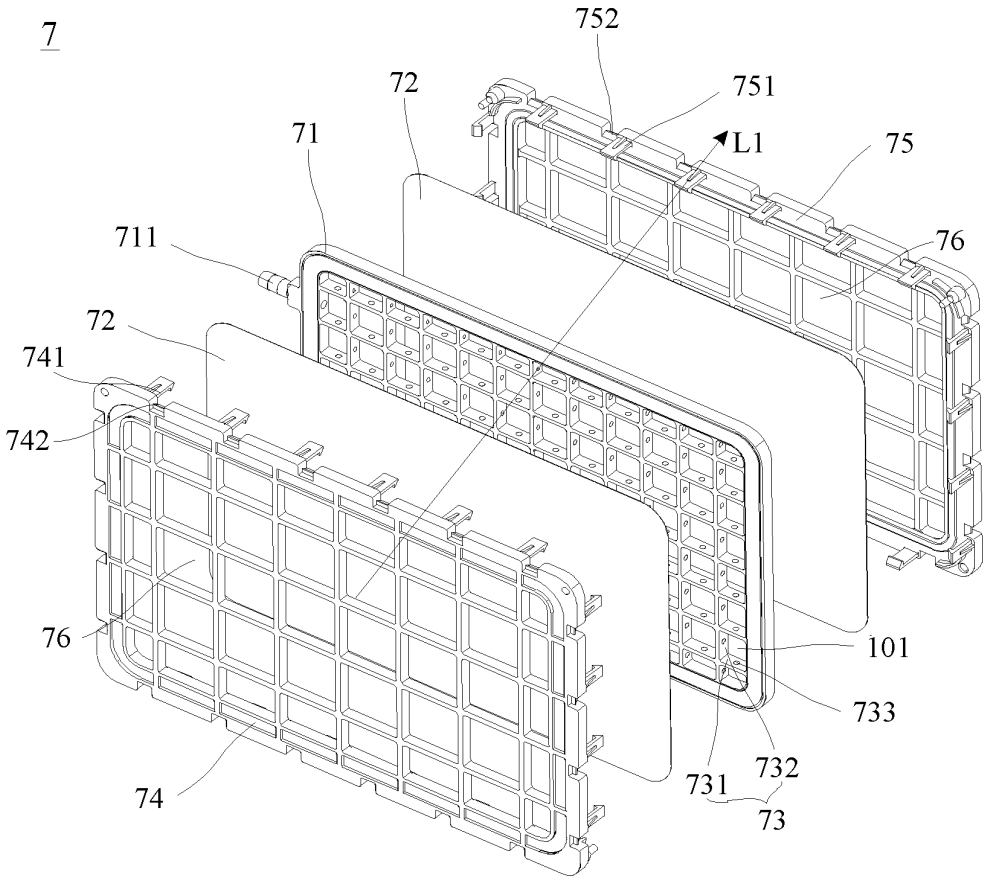
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FIG. 4

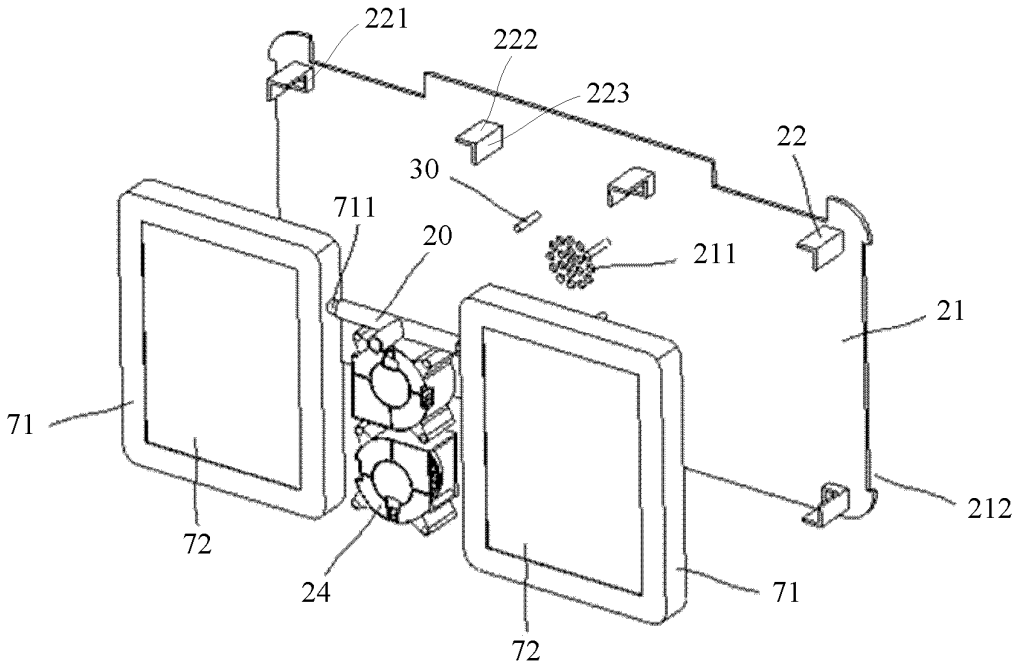
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FIG. 5

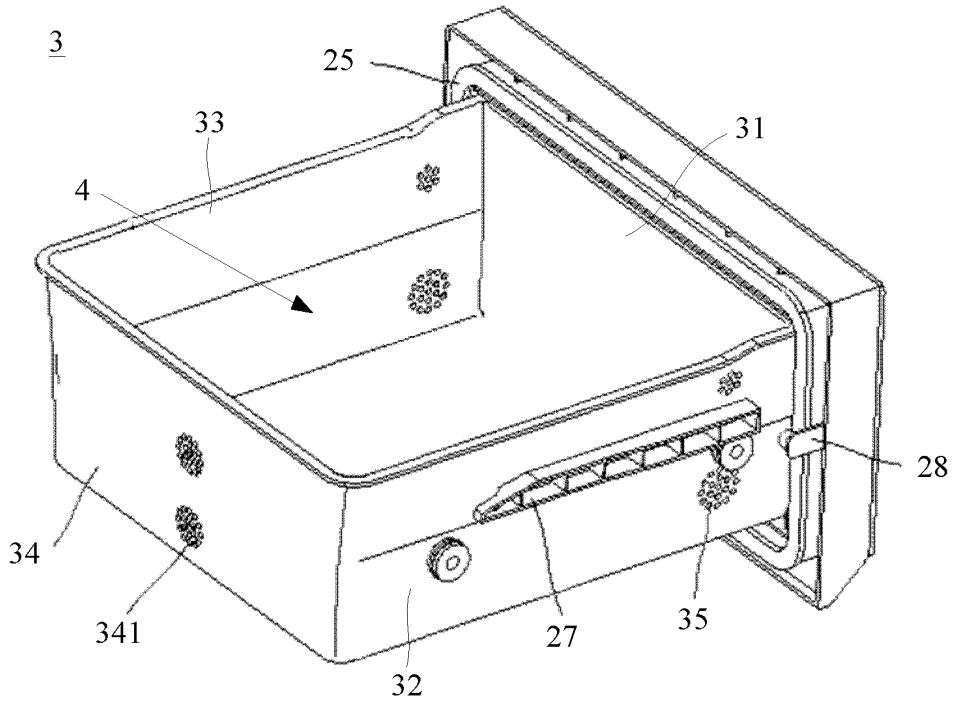

FIG. 6

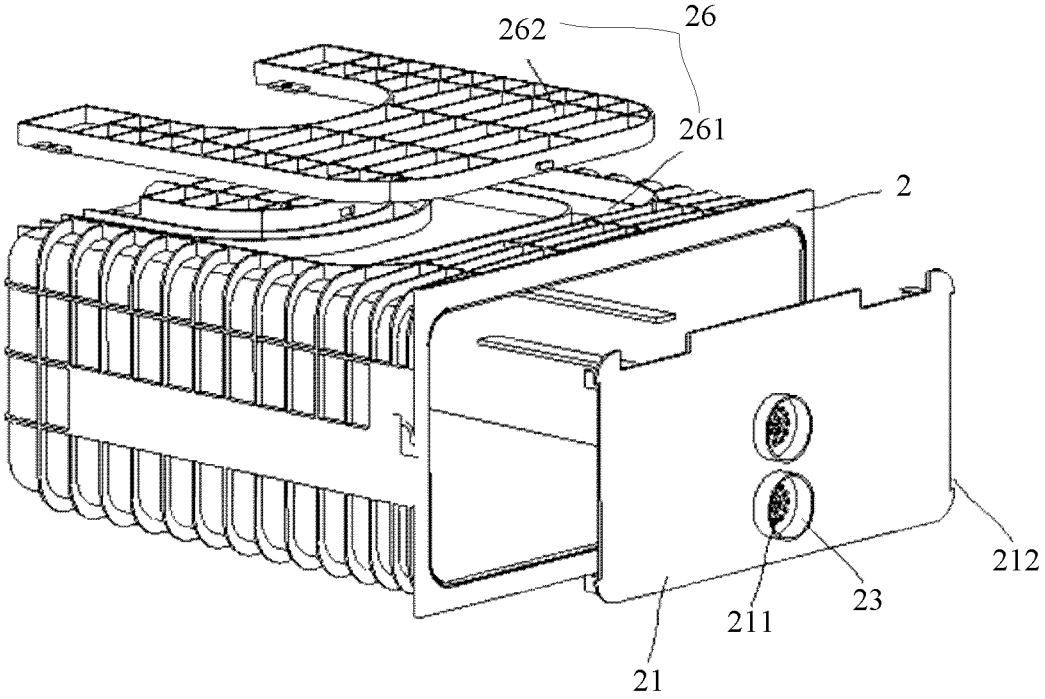

FIG. 7

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2020/141732

A. CLASSIFICATION OF SUBJECT MATTER

F25D 11/00(2006.01)i; F25D 17/04(2006.01)i; F25D 17/06(2006.01)i; F25D 25/02(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)

F25D11/-,F25D17/-,F25D25/-

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, SIPOABS, EPTXT, USTXT, WOTXT, 冰箱, 储物盒, 储物容器, 果蔬盒, 保鲜盒, 抽屉, 筒, 座, 本体, 回流, 循环, 分离, 气调膜, 过滤, 富氧, 除氧, 降氧, 气氛, 氧气, 氮气, 抽气, 泵, 气道, 风道, refrigerat+, stor+, box+, container+, fresh+, case+, drawer?, seat+, back+, circulat+, separat+, filt+, film+, deoxidize+, atmosphere+, oxygen+, nitrogen+, pump?, fan+, duct?, passage

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
PX	CN 111637672 A (HISENSE RONSHEN (GUANGDONG) REFRIGERATORS CO., LTD.) 08 September 2020 (2020-09-08) description paragraphs 0041-0057, 1-7	1-19
Y	JP H055585 A (SHARP K. K.) 14 January 1993 (1993-01-14) description, paragraphs 0010-0020, and figures 1-5	1-19
Y	CN 209744805 U (QINGDAO HAIER CO., LTD.) 06 December 2019 (2019-12-06) description, paragraphs 0036-0046, and figures 1-5	1-19
Y	CN 206362061 U (QINGDAO HAIER CO., LTD.) 28 July 2017 (2017-07-28) description, paragraphs 0055-0072, and figures 1-8	4-9
A	CN 103575050 A (HISENSE RONSHEN (GUANGDONG) REFRIGERATORS CO., LTD.) 12 February 2014 (2014-02-12) entire document	1-19
A	CN 201199115 Y (HENAN XINFEI ELECTRIC CO., LTD.) 25 February 2009 (2009-02-25) entire document	1-19

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

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"A" document defining the general state of the art which is not considered to be of particular relevance
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"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"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
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"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
10 March 2021	**25 March 2021**

Name and mailing address of the ISA/CN	Authorized officer
China National Intellectual Property Administration (ISA/CN) **No. 6, Xitucheng Road, Jimenqiao, Haidian District, Beijing 100088** **China**	
Facsimile No. **(86-10)62019451**	Telephone No.

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

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2020/141732

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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A	JP 2009174725 A (HITACHI APPLIANCES INC.) 06 August 2009 (2009-08-06) entire document	1-19

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

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2020/141732

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CN 206131588 U	26 April 2017	None	
JP H0759511 A	07 March 1995	None	
JP 2009174725 A	06 August 2009	None	

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

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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