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(54) **AIR CHANNEL ASSEMBLY AND REFRIGERATION DEVICE**

(57) The present invention relates to the technical field of refrigeration, and provides an air channel assembly and a refrigeration device. The air channel assembly comprises an air duct component, an air supply line component, and an air return duct component. The air duct component is disposed in a compartment of a box body. An accommodating cavity is formed in the air duct component, and an evaporator component is disposed in the accommodating cavity. A first air return port and a first air supply port in communication with the accommodating cavity are formed in the air duct component. The air supply line component is in communication with the first air supply port, and the air return duct component is in communication with the first air return port. By disposing the evaporator component inside the air duct component, an unused space inside the air duct component is effectively used, and volume utilization of the refrigeration device is improved. The air channel system composed of the air duct component and the air supply line component maximally shortens an air circulation path, improving refrigeration efficiency.

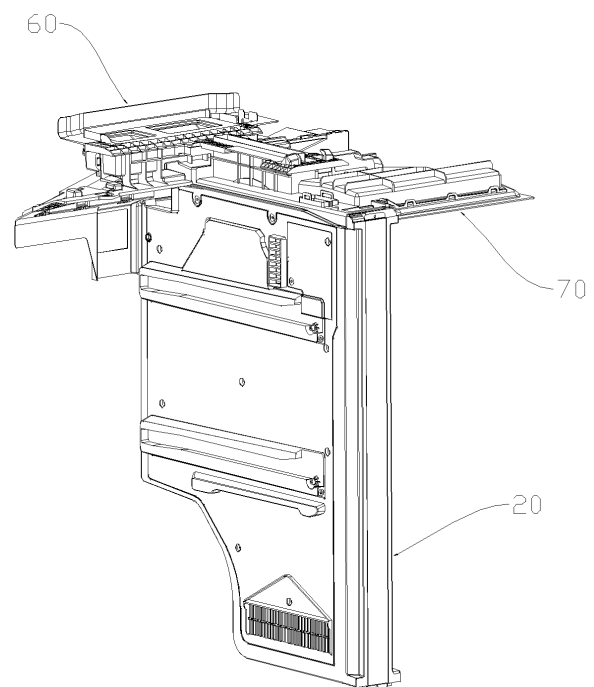


FIG. 1

Description

CROSS-REFERENCES TO RELATED APPLICATIONS

[0001] The present invention claims priority to Chinese Patent Application No. 202210995455.6, filed August 18, 2022, entitled "Air Channel Assembly and Refrigeration Device," which is incorporated herein by reference in its entirety.

FIELD

[0002] The present invention relates to the field of refrigeration, and in particular to an air duct assembly and a refrigeration apparatus.

BACKGROUND

[0003] In the related art, three systems or a single system are usually adopted for wide-range variable temperature of a refrigeration apparatus. Independent evaporators are provided for all the three systems, namely, refrigeration, freezing, and temperature change. A manufacturing process of such refrigeration apparatus is relatively complicated, and a volume ratio of the refrigeration apparatus is low. The single system means that an evaporator is located inside a freezer compartment, and 4 or 5 rows of evaporators are provided, which affects a volume of the freezer compartment.

BRIEF SUMMARY

[0004] The present invention is intended to solve at least one of problems above. The present invention provides an air duct assembly to solve a problem of low volume ratio of traditional refrigeration apparatus.

[0005] The present invention further provides a refrigeration apparatus.

[0006] An air duct assembly according to an embodiment of the present invention includes:

an air duct member provided inside a cabinet liner body, where an interior of the air duct member is provided with an accommodation cavity, an evaporator member is provided inside the accommodation cavity and the air duct member is provided with a first air return port and a first air supply port communicating with the accommodation cavity;

an air supply pipe member communicating with the first air supply port; and

an air return pipe member communicating with the first air return port.

[0007] A refrigeration apparatus according to an embodiment of the present invention includes: a housing, a

cabinet liner body and an air duct assembly as described in any one of the above, where the cabinet liner body is provided inside the housing, and the air supply pipe member and the air return pipe member are provided between the housing and the cabinet liner body.

[0008] One or more solutions in the embodiments of the present invention mentioned above have at least one of the following effects.

[0009] According to the air duct assembly of the embodiment of the present invention, an invalid space inside the air duct member is effectively utilized, and a volume ratio of the refrigeration apparatus is improved by providing the evaporator member inside the air duct member. An air duct system consisting of the air duct member and the air supply pipe member shortens an air circulation path to the maximum extent and improves the refrigeration efficiency.

[0010] Additional aspects and advantages of the present invention will be set forth in part in the description which follows and, in part, will be apparent from the description, or may be learned by practice of the present invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] To more clearly illustrate solutions in the embodiments of the present invention or the related art, the drawings that need to be used in the descriptions of the embodiments or the related art will be briefly described below. The drawings in the following description are only some embodiments of the present invention, and for those skilled in the related art, other drawings may be obtained based on these drawings without any creative work.

FIG. 1 is a schematic structural diagram of an air duct assembly according to an embodiment of the present invention;

FIG. 2 is a schematic structural diagram of an air supply pipe member and an air return pipe member according to an embodiment of the present invention;

FIG. 3 is a schematic structural diagram in bottom view of an air return pipe member according to an embodiment of the present invention;

FIG. 4 is a schematic exploded structural diagram of an air return pipe member according to an embodiment of the present invention;

FIG. 5 is a schematic structural diagram of an air supply pipe member according to an embodiment of the present invention;

FIG. 6 is a schematic exploded structural diagram of an air supply pipe member according to an embodi-

ment of the present invention;

FIG. 7 is a schematic diagram showing an assemble relationship between a cabinet liner body and an air duct member according to an embodiment of the present invention;

FIG. 8 is a three-dimensional schematic structural diagram of a cabinet liner body according to an embodiment of the present invention;

FIG. 9 is a schematic structural diagram of a state in which a cabinet liner body is disengaged from an air duct member according to an embodiment of the present invention;

FIG. 10 is a schematic exploded structural diagram of an air duct member according to an embodiment of the present invention;

FIG. 11 is a schematic cross-sectional structural diagram of an air duct member according to an embodiment of the present invention;

FIG. 12 is a schematic structural diagram of a water receive tray according to the embodiment of the present invention;

FIG. 13 is a schematic front structural diagram of a cabinet liner body according to an embodiment of the present invention;

FIG. 14 is a schematic cross-sectional structural diagram of a section line A-A shown in FIG. 13;

FIG. 15 is a schematic cross-sectional structural diagram of a section line C-C shown in FIG. 13; and

FIG. 16 is a schematic cross-sectional structural diagram of a section line B-B shown in FIG. 13.

Reference numerals:

[0012] 10: cabinet liner body; 11: rear wall; 12: bottom wall; 13: position groove; 14: first compartment; 15: second compartment; 16: through hole; 20: air duct member; 21: first cover plate; 22: second cover plate; 23: vacuum heat-insulation panel; 24: vacuum heat-insulation panel cover plate; 25: accommodation cavity; 26: adhesive accommodation groove; 27: rear side; 28: lower side; 30: freezer air return port; 31: fan; 32: volute; 33: fan mount cover plate; 34: weld window; 35: cover plate; 40: evaporator member; 50: water receive tray; 51: air return port for water receive tray; 52: drainage port; 53, position hole; 54: connection portion; 55: water receive tray body; 56, sandwich air duct; 57, first air return port; 60: air supply pipe member; 61: second air supply port; 62: third air supply port; 64: first air damper; 65: second air dam-

per; 66: first air supply pipe housing; 67: second air supply pipe housing; 68: freezer compartment air supply port; 69: variable temperature compartment air supply port; 70: air return pipe member; 71: first refrigerator air return port; 72: first variable temperature air return port; 73: second variable temperature air return port; 74: second refrigerator air return port; 75: air return pipe upper housing; 76: air return pipe lower housing.

10 DETAILED DESCRIPTION

[0013] Implementations of the present invention are further described in detail below in conjunction with accompanying drawings and embodiments. The following embodiments are intended to illustrate the present invention, but are not intended to limit the scope of the present invention.

[0014] Serial numbers of the members in the embodiments of the present invention, such as "first," "second"; (1), (2), (3); step 1, step 2, etc., are only used to distinguish the objects described and do not have any order or technical meaning. Unless otherwise specified, the meaning of "multiple" refers to two or more. Terms "include", "comprise", "provided with", "contain", etc. used in the embodiments of the present invention are all open terms, which means including but not limited to. The term "and/or" In the embodiments of the present invention only describes a related relationship of associated objects, and indicates that may be three kinds of relationships. For example, A and/or B can represent that A exists alone, A and B exist simultaneously, and B exists alone.

[0015] In the embodiments of the present invention, words "as an example" or "for example" are used to indicate examples, illustrations or explanations. Any embodiment or design schemes described as "as an example" or "for example" in the embodiments of the present invention should not be interpreted as being more preferred or more advantageous than other embodiments or design schemes. Specifically, the use of words such as "as an example" or "for example" is intended to present related concepts in a specific way. Unless otherwise defined, all technical and scientific terms used in the embodiments of the present invention have the same meaning as those generally understood by those skilled in the art of the present invention. In the event of any inconsistency, the meaning described in this specification or the meaning derived from the content recorded in the specification shall prevail.

[0016] In the description of the embodiments of the present invention, it is to be noted that the orientation or positional relationships indicated by terms such as "center," "longitudinal," "lateral," "upper," "lower," "front," "rear," "left," "right," "vertical," "horizontal," "top," "bottom," "inside," "outside," etc. are based on the orientation or positional relationship shown in the drawings, and are merely for the convenience of describing the embodiments of the present invention and simplifying the description, rather than indicating or implying that the de-

vice or component stated must have a particular orientation, is constructed and operated in a particular orientation, and thus is not to be construed as limiting the embodiments of the present invention. Moreover, the terms "first," "second," "third," and the like are used for descriptive purposes only and are not to be construed as indicating or implying relative importance.

[0017] In the description of embodiments of the present invention, it should be noted that, unless otherwise explicitly specified and defined, the terms "connected to" and "connected" shall be understood broadly. For example, it may be either fixedly connected or detachably connected, or may be integrally connected; it may be either mechanically connected, or electrically connected; it may be either directly connected, or indirectly connected through an intermediate medium. The specific meanings of the terms above in embodiments of the present invention may be understood by those skilled in the art in accordance with specific conditions.

[0018] In the embodiments of the present invention, unless otherwise clearly stated and defined, the first feature being located "on" or "under" the second feature means that the first feature is in direct contact with the second feature or the first feature is in contact with the second feature by an intervening media. In addition, the first feature is "on," "above" and "over" the second feature can refer to that the first feature is directly above or obliquely above the second feature, or simply refer to that the level height of the first feature is higher than that of the second feature. The first feature is "under," "below" and "beneath" the second feature can refer to that the first feature is directly below or obliquely below the second feature, or simply refer to that the level height of the first feature is lower than that of the second feature.

[0019] In the description of this specification, descriptions with reference to the terms "one embodiment," "some embodiments," "examples," "specific examples," or "some examples" etc. mean that specific features, structure, materials or characteristics described in conjunction with the embodiment or example are included in at least one embodiment or example of the embodiments of the present invention. In this specification, the schematic expressions of the above terms do not necessarily refer to the same embodiment or example. Furthermore, the particular features, structures, materials or characteristics described can be combined in any suitable manner in any one or more embodiments or examples. In addition, those skilled in the art may combine the different embodiments or examples described in this specification, as well as the features of the different embodiments or examples, without conflicting each other.

[0020] FIG. 1 illustrates a schematic structural diagram of an air duct assembly according to an embodiment of the present invention and FIG. 10 illustrates a schematic exploded structural diagram of an air duct member according to an embodiment of the present invention. As shown in FIG. 1 and FIG. 10, the air duct assembly includes an air duct member 20, an air supply pipe

member 60 and an air return pipe member 70. The air duct member 20 is provided inside a compartment of a cabinet liner body 10, an interior of the air duct member 20 is provided with an accommodation cavity 25, an evaporator member 40 is provided inside the accommodation cavity 25 and the air duct member 20 is provided with a first air return port 57 and a first air supply port (not shown) communicating with the accommodation cavity 25. The air supply pipe member 60 communicates with the first air supply port; and the air return pipe member 70 communicates with the first air return port 57.

[0021] According to the air duct assembly of the embodiment of the present invention, an invalid space inside the air duct member 20 is effectively utilized, and a volume ratio of the refrigeration apparatus is improved by providing the evaporator member 40 inside the air duct member 20. An air duct system consisting of the air duct member 20 and the air supply pipe member 60 shortens an air circulation path to the maximum extent and improves the refrigeration efficiency. During a final assembly stage, the air duct member 20 only needs to be provided inside the compartment of the cabinet liner body 10, without mounting the evaporator separately, which simplifies the mount steps of the air duct member 20 and improves production efficiency.

[0022] It may be understood that, as shown in FIG. 7, a side of the cabinet liner body 10 is provided with a first opening communicating with the compartment, the first air return port 57 is provided at a side of a top of the air duct member 20 close to the first opening, and the first air supply port is provided at a side of the top of the air duct member 20 away from the first opening. The first opening is an article removal port of the refrigeration apparatus, and the first opening is located at a side of the refrigeration apparatus close to a door body.

[0023] It may be understood that FIG. 2 illustrates a schematic structural diagram of an air supply pipe member and an air return pipe member according to an embodiment of the present invention. As shown in FIG. 1 and FIG. 2, both the air supply pipe member 60 and the air return pipe 70 are located outside a top of the cabinet liner body 10. By providing both the air supply pipe member 60 and the air return pipe 70 outside the top of the cabinet liner body 10, a distance between the air supply pipe member 60, the air return pipe 70 and a refrigerator compartment is decreased to shorten the circulation path of the air duct system, and improve the refrigeration efficiency.

[0024] The top of the cabinet liner body 10 is provided with a plurality of through holes. The air supply pipe member 60 is provided at a side of the top of the air duct member 20 away from the first opening and the air supply pipe member 60 penetrates through a corresponding through hole to communicate with a corresponding compartment and the first air supply port. The air return pipe member 70 is provided at a side of the top of the air duct member 20 close to the first opening and the air return pipe member 70 penetrates through a corresponding

through hole to communicate with a corresponding compartment and the first air return port 57. A foaming material may completely isolate the air supply pipe member 60 from the air return pipe member 70 to avoid the risk of frost caused by alternating hot and cold during the foaming process since the air supply pipe member 60 and air return pipe member 70 are two independently provided members.

[0025] It may be understood that, as shown in FIG. 1 and FIG. 2, a position pin is provided at a side of the air supply pipe member 60 close to the air return pipe member 70, and a position hole 53 is provided at a side of the air return pipe member 70 close to the air supply pipe member 60. The position pin is inserted into the corresponding position hole 53 to achieve the connection between the air supply pipe member 60 and air return pipe member 70. The air supply pipe member 60 and the air return pipe member 70 may be assembled offline and then assembled with the air duct member 20, or they may be assembled separately and independently with the air duct member 20.

[0026] It may be understood that a cabinet liner assembly includes two cabinet liner bodies 10 distributed upward and downward, a compartment is provided inside each cabinet liner body 10, two compartments are distributed upward and downward, and the air duct member 20 is provided inside the compartment of a lower cabinet liner body 10. An upper compartment is a refrigerator compartment, and the refrigerator compartment and a lower compartment are two independent compartments. The air duct member 20 divides the lower compartment into a freezer compartment and a variable temperature compartment. In order to meet the different needs of users, a chill compartment may also be set in the refrigerator compartment.

[0027] It may be understood that FIG. 3 illustrates a schematic structural diagram in bottom view of an air return pipe member according to an embodiment of the present invention and FIG. 4 illustrates a schematic exploded structural diagram of an air return pipe member according to an embodiment of the present invention. As shown in FIG. 3 and FIG. 4, the air return pipe member 70 includes an air return pipe, and an upper part of the air return pipe is provided with a first refrigerator air return port 71, and the first refrigerator air return port 71 is suitable for communicating with an air return port of the upper refrigerator compartment. A lower part of the air return pipe is provided with a first variable temperature air return port 72, a second variable temperature air return port 73 and a second refrigerator air return port 74. The first refrigerator air return port 71 communicates with the second refrigerator air return port 74, and the first variable temperature air return port 72 communicates with the second variable temperature air return port 73; and both the first variable temperature air return port 72 and the second refrigerator air return port 74 communicate with the first air return port 57. The second variable temperature air return port 73 is suitable for communicat-

ing with a variable temperature compartment. The integrated design simplifies the structure of the air return pipe, reduces the production cost, and improves the reliability of the air return pipe since the refrigerator compartment and the variable temperature compartment share an air return pipe. The air return pipe member 70 is located in a foaming layer between the lower compartment and the upper compartment. The distance between the air return pipe member 70 and the refrigerator compartment or a variable temperature compartment is the shortest, which effectively decreases a length of the air return pipe path.

[0028] It may also be understood that a plurality of air guide sheets are provided at intervals at the second variable temperature air return port 73 and inclined toward the first variable temperature air return port 72. Air in the variable temperature compartment directly flows to the first variable temperature air return port 72 under the action of the air guide sheets after entering the second variable temperature air return port 73, which reduces an air flow path and wind resistance to further improve the refrigeration efficiency.

[0029] It may be understood that, as shown in FIG. 3 and FIG. 4, the air return pipe includes an air return pipe upper housing 75 and an air return pipe lower housing 76. The first refrigerator air return port 71 is provided at the upper part of the air return pipe upper housing 75, and is a rectangular air port. The first variable temperature air return port 72 and the second refrigerator air return port 74 are provided at the lower part of the air return pipe upper housing 75, and both the first variable temperature air return port 72 and the second refrigerator air return port 74 are rectangular air ports, and the first variable temperature air return port 72 is suitable for conveying the air in the variable temperature compartment to the first air return port 57. The air inside the refrigerator compartment first enters the first refrigerator air return port 71, and then is conveyed to the first air return port 57 through the second refrigerator air return port 74. The air inside the refrigerator compartment and the air inside the variable temperature compartment finally enter the accommodation cavity 25 through the first air return port 57 to exchange heat with the evaporator member.

[0030] The air return pipe lower housing 76 is provided below the air return pipe upper housing 75, and the second variable temperature air return port 73 is provided at the lower part of the air return pipe lower housing 76, and the second variable temperature air return port 73 is located above the variable temperature compartment. The air return pipe lower housing 76 and the air return pipe upper housing 75 enclose a second flow passage, and the second flow passage communicates with the first variable temperature air return port 72 and the second variable temperature air return port 73 respectively. A communication method of the first variable temperature air return port 72 and the second variable temperature air return port 73 is not limited to this, and the first variable temperature air return port 72 may also communicate

directly with the second variable temperature air return port 73. The air return pipe lower housing 76 is connected to the lower part of the air return pipe upper housing 75 by a buckle to facilitate the mounting and disassemble of the air return pipe. A connection method of the air return pipe lower housing 76 and the air return pipe upper housing 75 is not limited to this, and a bolt or an integrally formed connection method may also be used.

[0031] It may be understood that FIG. 13 illustrates a schematic structural diagram in front view of a cabinet liner body according to an embodiment of the present invention; FIG. 14 is a schematic cross-sectional structural diagram of a section line A-A in FIG. 13; FIG. 15 is a schematic cross-sectional structural diagram of a section line C-C in FIG. 13; and FIG. 16 is a schematic cross-sectional structural diagram of a section line B-B in FIG. 13. As shown in FIG. 13 to FIG. 16, the air supply pipe member 60 communicates with a freezer compartment air supply port 68, a refrigerator compartment air supply port, a chill compartment air supply port, and a variable temperature compartment air supply port 69 respectively. Such an integrated design simplifies the structure of an air supply pipeline and reduces the production cost since pipelines for conveying cold air to each compartment are integrated into the air supply duct.

[0032] It may be understood that FIG. 5 illustrates a schematic structural diagram of an air supply pipe member according to an embodiment of the present invention and FIG. 6 illustrates a schematic exploded structural diagram of an air supply pipe member according to an embodiment of the present invention. As shown in FIG. 5 and FIG. 6, the air supply pipe member 60 includes an air supply pipe, a first air damper 64 and a second air damper 65. An interior of the air supply pipe is provided with a first flow passage, and the air supply pipe is provided with an air inlet, a second air supply port 61, a third air supply port 62 and a fourth air supply port communicating with the first flow passage, where the air inlet communicates with the first air supply port, and temperature-reduced cold air enters the first flow passage through the first air supply port and the air inlet in turn, and then the cold air is conveyed into a corresponding compartment through the second air supply port 61, the third air supply port 62 and the fourth air supply port. The first air damper 64 is provided at the second air supply port 61, and an air inlet port of the first air damper 64 communicates with the second air supply port 61. The second air damper 65 is provided at the third air supply port 62, and an air inlet port of the second air damper 65 communicates with the third air supply port 62.

[0033] The first air damper 64 is a double air damper, a first air outlet port of the first air damper 64 communicates with an air outlet of the refrigerator compartment, the second air outlet port of the first air damper 64 communicates with an air supply port of the chill compartment, and the first air damper 64 is suitable for controlling cooling capacity entering the refrigerator compartment and the chill compartment respectively. The second air

damper 65 is a single air damper, and an air outlet of the second air damper 65 communicates with the variable temperature compartment air supply port 69. The second air damper 65 is suitable for controlling cooling capability entering the variable temperature compartment. The fourth air supply port communicates with the freezer compartment air supply port 68. The type of the first air damper 64 is not limited thereto, and it may also be a single air damper or a triple air damper, which is specifically determined according to the temperature zone setting requirements of the refrigerator compartment.

[0034] It may be understood that the air supply pipe includes a first air supply pipe housing 66 and a second air supply pipe housing 67. The first air supply pipe housing 66 and the second air supply pipe housing 67 enclose the first flow passage, and the first air supply pipe housing 66 is connected to the second air supply pipe housing 67 by a buckle to facilitate the mounting and disassemble of the air supply pipe. The second air supply port 61 is formed by splicing an opening of the first air supply pipe housing 66 and an opening of the second air supply pipe housing 67. The second air supply port 61 may also be separately provided at the first air supply pipe housing 66 or the second air supply pipe housing 67. Similarly, the air inlet, the third air supply port 62 and the fourth air supply port may be spliced by an opening of the first air supply pipe housing 66 and an opening of the second air supply pipe housing 67, or the first air supply pipe housing 66 or the second air supply pipe housing 67 may be separately provided.

[0035] A working principle of the air duct assembly is as follows.

[0036] As shown in FIG. 1 to FIG. 6, during the air circulation process, air inside the refrigerator compartment first enters the first refrigerator air return port 71, and then enters the first air return port 57 through the second refrigerator air return port 74. Air inside the variable temperature compartment enters the first air return port 57 through the second variable temperature air return port 73 and the first variable temperature air return port 72 in turn. The air inside the refrigerator compartment and the air in the variable temperature compartment finally enter the accommodation cavity 25 through the first air return port 57 to exchange heat with the evaporator member. After the heat exchange, the temperature of the air is further reduced and the air becomes cold air. As shown in FIG. 5, the cold air (shown in filled wide arrow) enters the first flow passage through the first air supply port under the action of the fan 31. At this time, the cold air is divided into four paths in which a first path of cold air (shown in hollow wide arrow in a dashed line) enters the freezer compartment through the fourth air supply port for cooling; the second path of cold air (shown in narrow arrow in a dotted line) enters the first air damper 64, and finally enters the refrigerator compartment through the first air outlet port of the first air damper 64 for cooling; a third path of cold air (shown in narrow arrow in a solid line) enters the first air damper 64, and finally

enters the chill compartment through the second air outlet port of the first air damper 64 for cooling; and a fourth path of cold air (shown in hollow wide arrow in a solid line) enters the second air damper 65 and finally enters the variable temperature compartment for cooling.

[0037] FIG. 7 illustrates a schematic diagram showing an assemble relationship between a cabinet liner body and an air duct member according to an embodiment of the present invention. As shown in FIG. 7 and FIG. 10, in the air duct member 20 according to the embodiment of the present invention, by providing the evaporator member 40 inside the air duct member 20, in the final assembly stage, it is only necessary to provide the air duct member 20 inside the compartment of the cabinet liner body 10, and then weld a pipeline of the evaporator member 40 with a pipeline of the refrigeration system, without providing a position for the evaporator mounting step separately, which reduces the labor cost, simplifies the mounting step of the air duct member, and improves the production efficiency.

[0038] It may be understood that the air duct member 20 is provided inside the compartment inside the cabinet liner body 10, and the air duct member 20 divides the compartment into a first compartment 14 and a second compartment 15. The air duct member 20 includes at least two detachably connected cover plates, an accommodation cavity 25 is formed inside the air duct member 20 and the evaporator member 40 is provided inside the accommodation cavity 25.

[0039] According to the air duct member 20 of the embodiment of the present invention, only the cover plate needs to be removed to disassemble the evaporator member 40 when the evaporator member 40 is disassembled by providing the evaporator member 40 inside the accommodation cavity 25, which simplifies the disassembly steps of the evaporator member 40 and facilitates the maintenance of the evaporator member 40.

[0040] It may be understood that the air duct member 20 is provided inside the compartment of the cabinet liner body 10, an adhesive accommodation groove 26 is provided at a side of the air duct member 20 facing an inner wall of the cabinet liner body 10, and the inner wall of the cabinet liner body 10 is provided with a through hole 16 communicating with the adhesive accommodation groove 26, and the adhesive accommodation groove 26 is filled with a foaming material connected to the inner wall and the side of the air duct member 20 respectively.

[0041] It may be understood that, as shown in FIG. 10, the air duct member 20 includes a first cover plate 21, a second cover plate 22, a vacuum heat-insulation panel 23 and a vacuum heat-insulation panel cover plate 24. The second cover plate 22 is provided opposite to the first cover plate 21, and the vacuum heat-insulation panel 23 is provided between the second cover plate 22 and the first cover plate 21. The vacuum heat-insulation panel cover plate 24 is provided at a side of the vacuum heat-insulation panel 23 away from the second cover 22. The vacuum heat-insulation panel cover plate 24 has a shape

matching the shape of the first cover plate 21 and the shape of the second cover plate 22. Both an area of the vacuum heat-insulation panel cover plate 24 and an area of the second cover plate 22 are larger than an area of the vacuum heat-insulation panel 23 to ensure that the vacuum heat-insulation panel 23 may be completely wrapped when the vacuum heat-insulation panel 23 is sandwiched between the vacuum heat-insulation panel cover plate 24 and the second cover plate 22. The accommodation cavity 25 is formed between the vacuum heat-insulation panel cover plate 24 and the first cover plate 21, that is, the accommodation cavity 25 is enclosed by the vacuum heat-insulation panel cover plate 24 and the first cover plate 21, and the accommodation cavity 25 is used to mount a fan member, the evaporator member 40 and the fan mount cover plate 33. The vacuum heat-insulation panel cover plate 24 is connected to the first cover plate 21 and the second cover plate 22 respectively by screws, and may also be connected by buckles, or by other detachable connection methods. The adhesive accommodation groove 26 is formed on a rear side 27 and a lower side 28 of the vacuum heat-insulation panel cover plate 24, and the position of the adhesive accommodation groove 26 corresponds to the position of the position groove 13. The first air return port 57 and the first air supply port are provided at the top of the vacuum heat-insulation panel cover plate 24.

[0042] In the related art, the evaporator member 40 is located at a rear side of the freezer air duct assembly. When the evaporator member 40 is disassembled, it is necessary to first remove the freezer drawers on both sides, then remove screws of a middle partition plate in a freezer cabinet liner, then remove the middle partition plate, then remove the screws of the freezer air duct assembly, then remove the freezer air duct assembly, and finally remove the evaporator member. It is largely difficult to maintain the evaporator since disassembly steps of the evaporator are cumbersome.

[0043] Not only the mounting steps of the refrigeration apparatus are simplified, but also the disassembly steps of the evaporator member 40 are simplified by providing the evaporator member 40 inside the accommodation cavity 25. When the evaporator member 40 is disassembled, the freezer drawer at a side of the freezer air duct is first removed, the screws of the first cover plate 21 or the second cover plate 22 are then removed, the first cover plate 21 or the second cover plate 22 is then removed, and the evaporator member 40 is finally removed. Compared with the disassembly method of the evaporator in the above-mentioned related art, the evaporator member 40 is provided inside the accommodation cavity 25, which not only increases the capacity of the refrigeration apparatus, simplifies the mount steps of the refrigeration apparatus, but also simplifies the mount steps of the evaporator member 40.

[0044] It may be understood that the air duct member 20 is vertically provided inside the compartment, the first cover plate 21 is located at a side of the air duct member

20 facing the first compartment 14, and the second cover plate 22 is located at a side of the air duct member 20 away from the first compartment 14.

[0045] FIG. 8 is a three-dimensional schematic structural diagram of a cabinet liner body according to an embodiment of the present invention and FIG. 9 is a schematic structural diagram of a state in which a cabinet liner body is disengaged from an air duct member according to an embodiment of the present invention. As shown in FIG. 7 to FIG. 10, the present invention further provides a cabinet liner assembly including a cabinet liner body 10, where an interior of the cabinet liner body 10 is provided with a compartment, a side of the cabinet liner body 10 is provided with a first opening communicating with the compartment, and an inner wall of the cabinet liner body 10 is provided with a through hole 16. The air duct member 20 is provided inside the compartment, and a side of the air duct member 20 facing the inner wall and the inner wall of the cabinet liner body 10 encloses a hollow cavity, the hollow cavity communicates with the through hole 16, and the hollow cavity is filled with a foaming material connected to the inner wall and the side of the air duct member 20 respectively.

[0046] According to the cabinet liner assembly of the embodiment of the present invention, the air duct member 20 is mounted inside the compartment of the cabinet liner body 10 before foaming, and the hollow cavity is enclosed between the side of the air duct member 20 facing the inner wall of the cabinet liner body 10 and the inner wall of the cabinet liner body 10. During foaming, the foaming material will flow into the hollow cavity through the through hole 16. Even if the cabinet liner body 10 or the air duct member 20 is deformed, since the foaming material is a flowing liquid during foaming, the foaming material may effectively seal a gap between the cabinet liner body 10 and the air duct member 20, thereby avoiding cold leakage of the freezer air duct, enhancing the refrigeration effect, and effectively preventing the air duct from icing.

[0047] It may be understood that, as shown in FIG. 9, the hollow cavity includes an adhesive accommodation groove 26 and the adhesive accommodation groove 26 is provided at a side of the air duct member 20 facing the inner wall. The adhesive accommodation groove 26 is the entire hollow cavity when the side wall of the cabinet liner body 10 is a plane. After the air duct member 20 is mounted in place, the side of the air duct member 20 facing the inner wall abuts against the inner wall of the cabinet liner body 10, and the through hole 16 in the inner wall communicates with the adhesive accommodation groove 26. The foaming material may enter the adhesive accommodation groove 26 through the through hole 16 and fill the entire adhesive accommodation groove 26 to seal between the air duct member 20 and the cabinet liner body 10.

[0048] When the side wall of the cabinet liner body 10 is provided with a position mechanism (i.e., position groove 13), the adhesive accommodation groove 26 communi-

cates with the position mechanism, and the hollow cavity is formed by the adhesive accommodation groove 26 and the position mechanism. After the air duct member 20 is mounted in place, the side of the air duct member 20 facing the inner wall is in snap fit with the position mechanism, and the through hole 16 in the inner wall communicates with the adhesive accommodation groove 26 and the position mechanism. The foaming material enters the adhesive accommodation groove 26 through the through hole 16, and it will also fill the position mechanism in addition to filling the entire adhesive accommodation groove 26. The position mechanism may be a groove, or a position convex rib or other position mechanisms.

[0049] It may be understood that, as shown in FIG. 7, the air duct member 20 is vertically provided inside the compartment, and the air duct member 20 divides the compartment into a first compartment 14 and a second compartment 15, where the first compartment 14 is a compartment at the left side of FIG. 1, the first compartment 14 is a freezer compartment, the second compartment 15 is the compartment at the right side of FIG. 1, and the second compartment 15 is a variable temperature compartment. A capacity of the first compartment 14 may be the same as or different from a capacity of the second compartment 15, and the capacities of the first compartment 14 and the second compartment 15 are determined according to actual needs. The arrangement of the air duct member 20 is not limited to be vertical arrangement, and may also be horizontally provided, in which case the two compartments are distributed in the vertical direction.

[0050] In the related art, the evaporator and the freezer air duct are provided at the rear wall 11 of the cabinet liner. Such an arrangement occupies the space in the freezer compartment and reduces the depth of the freezer compartment in the front and rear direction. In the cabinet liner assembly of the embodiment of the present invention, the space in the front and rear direction of the freezer compartment is increased to improve a space utilization rate of the refrigeration apparatus by vertically providing the air duct member 20 in the compartment. It is also convenient for the mounting and disassemble of the evaporator member.

[0051] The adhesive accommodation groove 26 is provided at the rear side 27 and the lower side 28 of the air duct member 20. The adhesive accommodation groove 26 at the rear side 27 communicates with the adhesive accommodation groove 26 at the lower side 28. In an embodiment, the adhesive accommodation groove 26 at the rear side 27 and the adhesive accommodation groove 26 at the lower side 28 may also be independent of each other, that is, the adhesive accommodation groove 26 at the rear side 27 does not communicate with the adhesive accommodation groove 26 at the lower side 28. The arrangement position of the adhesive accommodation groove 26 is not limited to the rear side 27 and the lower side 28 of the air duct member 20. The adhesive accommodation groove 26 may also be provided at an upper side of the air duct member 20, and the foaming

material in the adhesive accommodation groove 26 at the upper side is connected to the top wall of the cabinet liner body 10.

[0052] It should be noted here that the front and rear directions in the embodiment of the present invention means that a direction facing a user is the rear, a direction away from the user is the front, a left hand side of the user is the left side, and a right hand side is the right side when the user opens or closes the door of the refrigeration apparatus.

[0053] It may be understood that, as shown in FIG. 8, the hollow cavity further includes a position groove 13 provided at the inner wall of the cabinet liner body 10. A position groove 13 at the rear wall 11 of the cabinet liner body 10 extends along the height direction of the cabinet liner body 10, and a position groove 13 at the bottom wall 12 of the cabinet liner body 10 extends along the front-back direction. The side of the air duct member 20 facing the inner wall is clamped inside the position groove 13, and the position groove 13 communicates with the adhesive accommodation groove 26. The foaming material enters the adhesive accommodation groove 26 through the through hole 16 to fill the entire adhesive accommodation groove 26 and the position groove 13. After being cured, the foaming material may fill and seal the hollow cavity, thereby achieving the sealing between the air duct member 20 and the cabinet liner body 10, and the foaming material may also play a certain fixing role on the air duct member 20.

[0054] It may be understood that, as shown in FIG. 9, the position groove 13 is provided at the rear wall 11 and the bottom wall 12 of the cabinet liner body 10 respectively, and the position groove 13 at the rear wall 11 communicates with the position groove 13 at the bottom wall 12. In an embodiment, the position groove 13 at the rear wall 11 and the position groove 13 at the bottom wall 12 may also be relatively independently provided, that is, the position groove 13 at the rear wall 11 does not communicate with the position groove 13 at the bottom wall 12. The rear side 27 is clamped inside the position groove 13 at the rear wall 11, and the lower side 28 is clamped inside the position groove 13 at the bottom wall 12. In an embodiment, the position groove 13 may also be provided at the top wall of the cabinet liner body 10, in which case the upper side of the air duct member 20 is clamped inside the position groove 13 at the top wall. A width of the position groove 13 is greater than or equal to a width of the air duct member 20.

[0055] It may be understood that the through holes 16 are provided at intervals along the length direction of the position groove 13 so that the foaming material may enter each area of the adhesive accommodation groove 26 during the foaming process to improve the sealing between the air duct member 20 and the cabinet liner body 10, avoid the cold leakage of the freezer air duct, and reduce the energy consumption of the refrigeration apparatus. The through hole 16 may be a circular hole or a rectangular hole. In this case, multiple through holes 16

are provided at intervals along the length direction of the position groove 13. In an embodiment, the through hole may also be a strip through hole. In this case, the through hole 16 extends along the length direction of the position groove 13.

[0056] In the related art, during a final assembly stage after the cabinet liner body is foamed, it is necessary to mount first the water receive tray 50 and then mount the evaporator assembly. The air duct assembly is finally mounted after the evaporator is welded completely. The final assembly stage has many and complicated processes. The more processes, the more the production efficiency is affected.

[0057] It may be understood that, as shown in FIG. 10, an interior of the air duct member 20 is provided with an accommodation cavity 25, and the evaporator member 40 is provided inside the accommodation cavity 25. Since the evaporator member 40 is provided inside the air duct member 20 in advance, the air duct member 20 only needs to be mounted in the compartment of the cabinet liner body 10 before foaming, and the pipeline of the evaporator member 40 only needs to be welded with the pipeline of the refrigeration system during the final assembly stage, which simplifies the mount steps of the refrigeration apparatus and improves production efficiency. The labor cost is decreased since the number of workers who assemble the evaporator and the water receive tray 50 is reduced.

[0058] It may be understood that the air duct member 20 is provided with a weld window 34 corresponding to a weld position of the evaporator member 40. The arrangement of the weld window 34 may facilitate the operator to weld the pipeline of the evaporator member 40, which reduces the welding time, and improves production efficiency.

[0059] It may be understood that, as shown in FIG. 10, a cover body covers the weld window 34, and the cover body is detachably connected to the air duct member 20. The cover body and the air duct member 20 may be connected by buckles or screws. The cover body is opened when the evaporator is welded, and the cover body covers the weld window 34 after welding is completed.

[0060] It may be understood that the air duct member 20 is vertically provided inside the compartment, and the weld window 34 is located at an edge of the air duct member 20 close to the first opening. An operator may operate more conveniently through the weld window 34 since the weld window 34 is close to the first opening, so that the operator is in a comfortable state during welding to reduce the fatigue of the operator and improve the work efficiency.

[0061] It may be understood that in the related art, the vertically provided refrigeration system is often prone to high temperature at the bottom drawer of the freezer compartment due to the position of the air return port being higher than the bottom drawer, and the temperature does not meet the standard, which affects the freeze

effect. In the cabinet liner assembly of the present invention, by providing the freezer air return port 30 communicating with the accommodation cavity 25 at the bottom of the air duct member 20, the cold air surrounds the bottom drawer and returns to the evaporator member 40 through the freezer air return port 30 after coming out of the air outlet, which effectively solves the problem that the temperature of the bottom drawer of the vertically provided refrigeration system does not meet the standard.

[0062] It may be understood that a fan member is provided inside the accommodation cavity 25, and the fan member further includes a fan 31 and a volute 32. The volute 32 is located above the evaporator member 40. The interior of the volute 32 is hollow, and the volute 32 is provided with an air inlet and an air outlet. The fan 31 is provided inside the volute 32, and the fan 31 is used to drive an air flow to enter the accommodation cavity 25 through the freezer air return port 30 and contact the evaporator member. After the air flow contacts the evaporator, the temperature of the air flow is further reduced and the air flow is finally discharged through the air outlet.

[0063] It may be understood that in order to conveniently mount the fan 31, a fan mount cover plate 33 is further provided in the accommodation cavity 25. The fan mount cover plate 33 is located between the evaporator and the vacuum heat-insulation panel cover plate 24. The fan mount cover plate 33 is connected to the vacuum heat-insulation panel cover plate 24 by screws, and the volute 32 is fixed to an upper part of the fan mount cover plate 33 by the screws.

[0064] It may be understood that FIG. 11 illustrates a schematic cross-sectional structural diagram of an air duct member according to an embodiment of the present invention and FIG. 12 illustrates a schematic structural diagram of a water receive tray according to the embodiment of the present invention. As shown in FIG. 11 and FIG. 12, the cabinet liner assembly further includes a water receive tray 50 provided inside the accommodation cavity 25 and located below the evaporator member 40. The water receive tray 50 is used to accommodate condensed water generated by the evaporator member 40, and the condensed water automatically flows into the water receive tray 50 under the action of gravity after being generated.

[0065] It may be understood that a lower part of the water receive tray 50 is provided with an air return port for water receive tray 51 communicating with the freezer air return port 30.

[0066] It may be understood that, as shown in FIG. 12, the water receive tray 50 includes a connection portion 54 and a water receive tray body 55, the top of the connection portion 54 is open, and the connection portion 54 is sleeved at the bottom of the evaporator member 40. The water receive tray body 55 is provided below the connection portion 54, and the water receive tray body 55 is connected to the connection portion 54, and the water receive tray body 55 and the connection portion 54 are integrally formed. In an embodiment, the water receive

tray body 55 and the connection portion 54 may also be two independent members, and the water receive tray body 55 and the connection portion 54 are connected by screws or buckles. An interior of the water receive tray body 55 is provided with a water accommodation groove communicating with the inside of the connection portion 54, and the air return port for water receive tray 51 is provided at a side wall of the water receive tray body 55. The connection portion 54 may guide the water generated by the evaporator member 40 to the water accommodation groove, and may also guide the air flow entering through the air return port for water receive tray 51 to the evaporator member 40.

[0067] The cold air at the bottom of the compartment enters the accommodation cavity 25 through the freezer air return port 30, then enters the water receive tray 50 through the air return port for water receive tray 51, and finally enters the evaporator member 40 through the top of the connection portion 54 for exchanging heat. The structure of the cabinet liner assembly is effectively simplified and the production cost is reduced since no separate air duct needs to be provided.

[0068] It may be understood that, as shown in FIG. 12, the bottom of the water receive tray body 55 is provided with a drainage port 52 communicating with the water receive tank and the drainage port 52 is used to discharge the condensed water in the water accommodation groove. The bottom surface of the water receive tray body 55 is tilted downward toward the drainage port 52. The bottom surface of the water receive tray body 55 is tilted downward to drain the water in the water accommodation groove as soon as possible to avoid condensed water freezing. The water receive tray body 55 is V-shaped, and it may also be C-shaped in an embodiment.

[0069] It may be understood that a support is provided at the lower part of a side of the vacuum heat-insulation panel cover plate 24 facing the first cover plate 21 and the bottom of the water receive tray body 55 abuts against the top of the support. A width of the connection portion 54 is greater than a width of the water receive tray body 55. A sandwich air duct 56 is formed between the water receive tray body 55 and the first cover plate 21 since the width of the water receive tray body 55 is narrow, and the sandwich air duct 56 communicates with the freezer air return port 30 and the air return port for water receive tray 51 respectively.

[0070] It may be understood that a rear side 27 of the air duct member 20 is provided with a position hole 53, and the drainage port 52 penetrates through the position hole 53, and the drainage port 52 is connected with the drainage pipe in an inserted manner. In an embodiment, the connection method between the drainage port 52 and the drainage pipe is not limited to this, and the drainage pipe may also be introduced into the accommodation cavity 25 after penetrating through the position hole 53 and then connected to the drainage port 52.

[0071] It may be understood that the weld window 34 is

located at an edge of the first cover plate 21 close to the first opening, and the freezer air return port 30 is located at the lower part of the second cover plate 22. At this time, the first compartment 14 is a freezer compartment, and the second compartment 15 is a variable temperature compartment. In an embodiment, the position of the freezer air return port 30 is not limited thereto, and the freezer air return port 30 may also be provided at the second cover plate 22. In this case, the first compartment 14 is a variable temperature compartment, and the second compartment 15 is a freezer compartment.

[0072] It may be understood that the side of the air duct member 20 is detachably connected to the inner wall of the cabinet liner body 10 through multiple connectors.

[0073] It may be understood that in order to effectively fix the air duct member 20, the side of the vacuum heat-insulation panel cover plate 24 is connected to the inner wall of the cabinet liner body 10 through multiple knobs, and the knobs may be used to quickly connect the side of the vacuum heat-insulation cover plate 35 to the inner wall of the cabinet liner body 10. The side of the vacuum heat-insulation cover plate 35 is also connected to the inner wall of the cabinet liner body 10 through knobs in addition to being connected by the foaming material, and the two methods are used to cooperate to fix the air duct member 20, which effectively improves the stability of the air duct member 20. In an embodiment, screws or buckles may also be used to connect the side of the vacuum heat-insulation cover plate 35 to the inner wall of the cabinet liner body 10.

[0074] The present invention further provides a refrigeration apparatus, including: a housing, a cabinet liner body and an air duct assembly as described in any one of the above embodiments, where the cabinet liner body is provided inside the housing, and the air supply pipe member and the air return pipe member are provided between the housing and the cabinet liner body.

[0075] The implementations above are only used to illustrate the application, but not to limit the application. Although the application has been described in detail with reference to the embodiments, those skilled in the art should understand that various combinations, modifications, or equivalent replacements of the technical solutions of the application do not depart from the scope of the solutions of the application, and should all be covered in the scope of the claims of the present invention.

Claims

1. An air duct assembly, comprising:

an air duct member provided inside a cabinet liner body, wherein an interior of the air duct member is provided with an accommodation cavity, an evaporator member being provided inside the accommodation cavity, the air duct member being provided with a first air return port

and a first air supply port communicating with the accommodation cavity;
an air supply pipe member communicating with the first air supply port; and
an air return pipe member communicating with the first air return port.

2. The air duct assembly of claim 1, wherein a side of the cabinet liner body is provided with a first opening communicating with an interior of the cabinet liner body, the first air return port provided at a side of a top of the air duct member close to the first opening, the first air supply port provided at a side of the top of the air duct member away from the first opening.

3. The air duct assembly of claim 2, wherein the air supply pipe member is provided at the side of the top of the air duct member away from the first opening, the air return pipe member provided at the side of the top of the air duct member close to the first opening.

4. The air duct assembly of any one of claims 1 to 3, wherein the air return pipe member comprises: an air return pipe, wherein an upper part of the air return pipe is provided with a first refrigerator air return port, a lower part of the air return pipe being provided with a first variable temperature air return port, a second variable temperature air return port and a second refrigerator air return port; the first refrigerator air return port communicating with the second refrigerator air return port, the first variable temperature air return port communicating with the second variable temperature air return port; both the first variable temperature air return port and the second refrigerator air return port communicating with the first air return port.

5. The air duct assembly of claim 4, wherein the air return pipe comprises:

an air return pipe upper housing, wherein the first refrigerator air return port is provided at an upper part of the air return pipe upper housing, the first variable temperature air return port and the second refrigerator air return port being provided at a lower part of the air return pipe upper housing; and

an air return pipe lower housing provided below the air return pipe upper housing and detachably connected to the lower part of the air return pipe upper housing, the second variable temperature air return port being provided at a lower part of the air return pipe lower housing.

6. The air duct assembly of any one of claims 1 to 3, wherein the air supply pipe member comprises:

an air supply pipe, an interior of the air supply

- pipe being provided with a first flow passage and the air supply pipe being provided with an air inlet, a second air supply port, a third air supply port and a fourth air supply port communicating with the first flow passage, the air inlet communicating with the first air supply port; a first air damper provided at the second air supply port; and a second air damper provided at the third air supply port. 5 10
7. The air duct assembly of claim 6, wherein the first air damper is a single air damper, a double air damper or a triple air damper. 15
8. The air duct assembly of claim 2 or 3, wherein a weld window corresponding to a weld position of the evaporator member is provided at the air duct member. 20
9. The air duct assembly of claim 8, wherein a cover body covers the weld window, and the cover body is detachably connected to the air duct member. 25
10. The air duct assembly of claim 8, wherein the air duct member is vertically provided at the interior of the cabinet liner body, the weld window being located at an edge of the air duct member close to the first opening. 30
11. The air duct assembly of claim 8, wherein a water receive tray is provided inside the accommodation cavity, the water receive tray being located below the evaporator member. 35
12. The air duct assembly of claim 11, wherein a freezer air return port communicating with the accommodation cavity is provided at a bottom of the air duct member, an air return port for water receive tray communicating with the freezer air return port being provided at a lower part of the water receive tray. 40
13. The air duct assembly of claim 12, wherein the water receive tray comprises:
- a connection portion, wherein a top of the connection portion is open, the connection portion being sleeved at a bottom of the evaporator member; and 45
- a water receive tray body, provided below the connection portion and connected to the connection portion, wherein a water accommodation groove communicating with an interior of the connection portion is formed at an interior of the water receive tray body, and the air return port for water receive tray is provided at a side wall of the water receive tray body. 50 55
14. The air duct assembly of claim 8, wherein the air duct member comprises:
- a first cover plate; 5
- a second cover plate provided opposite to the first cover plate; 10
- a vacuum heat-insulation panel provided between the second cover plate and the first cover plate; and 15
- a vacuum heat-insulation panel cover plate provided at a side of the vacuum heat-insulation panel away from the second cover plate, wherein the vacuum heat-insulation panel cover plate is detachably connected to the first cover plate and the second cover plate respectively, the accommodation cavity being formed between the vacuum heat-insulation panel cover plate and the first cover plate, the first air return port and the first air supply port being provided at a top of the vacuum heat-insulation panel cover plate. 20
15. A refrigeration apparatus, comprising: a housing, a cabinet liner body and an air duct assembly of any one of claims 1 to 14, wherein the cabinet liner body is provided inside the housing, the air supply pipe member and the air return pipe member being provided between the housing and the cabinet liner body. 25

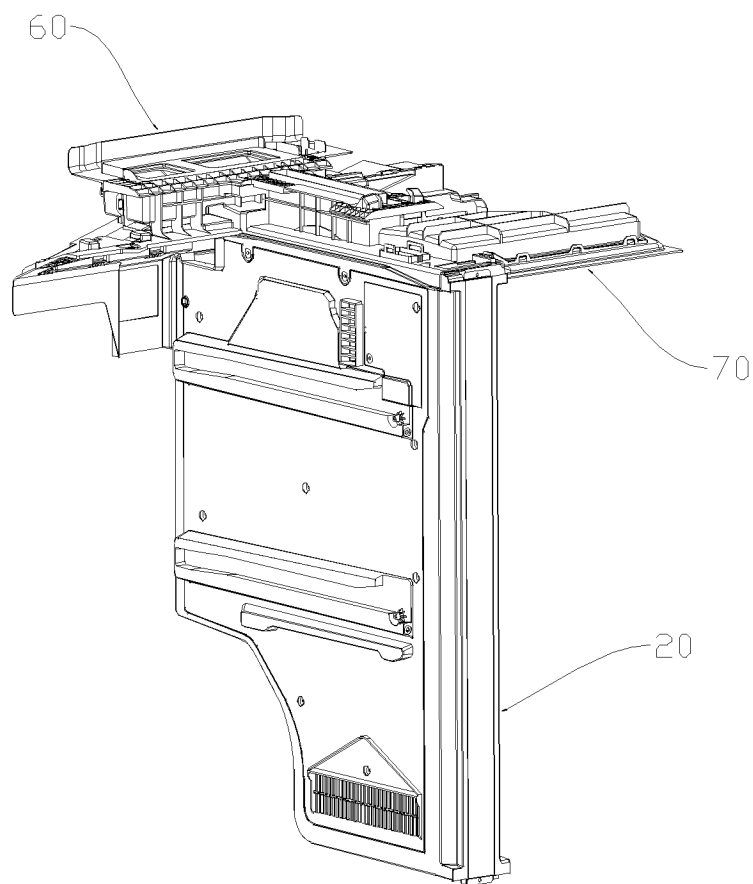


FIG. 1

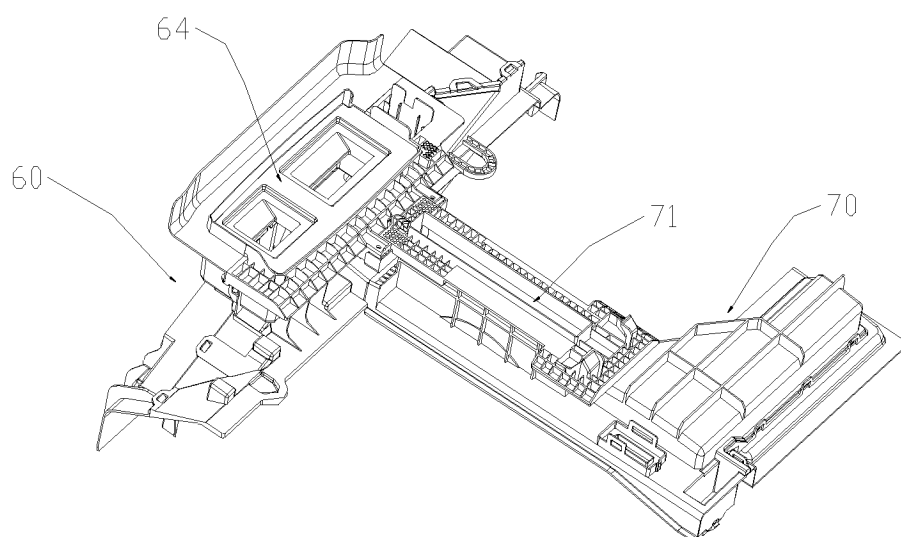


FIG. 2

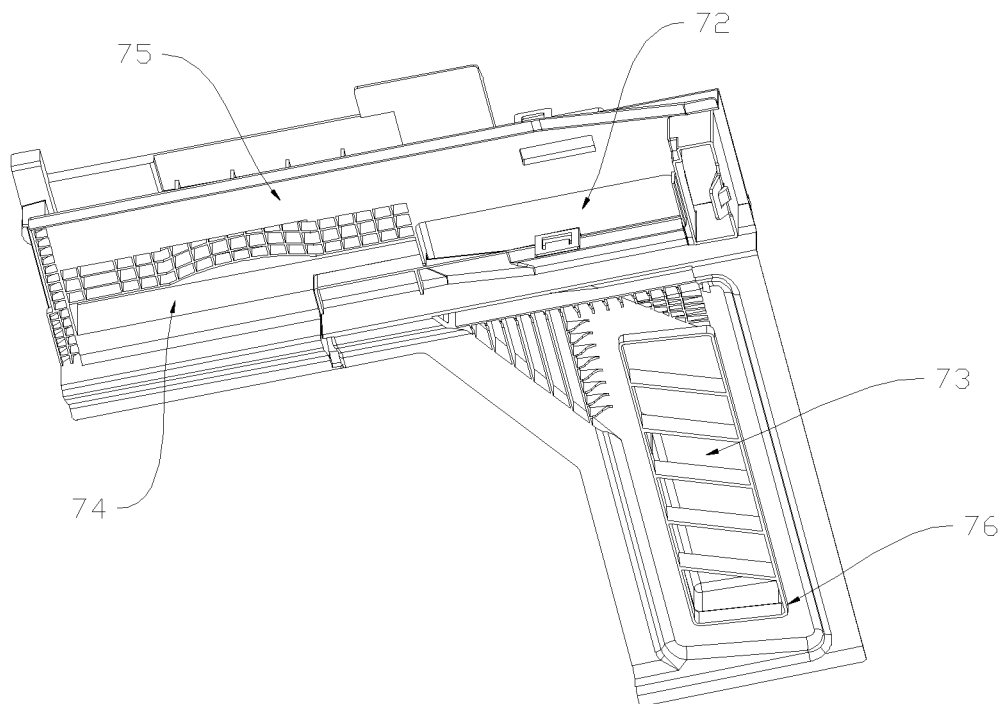


FIG. 3

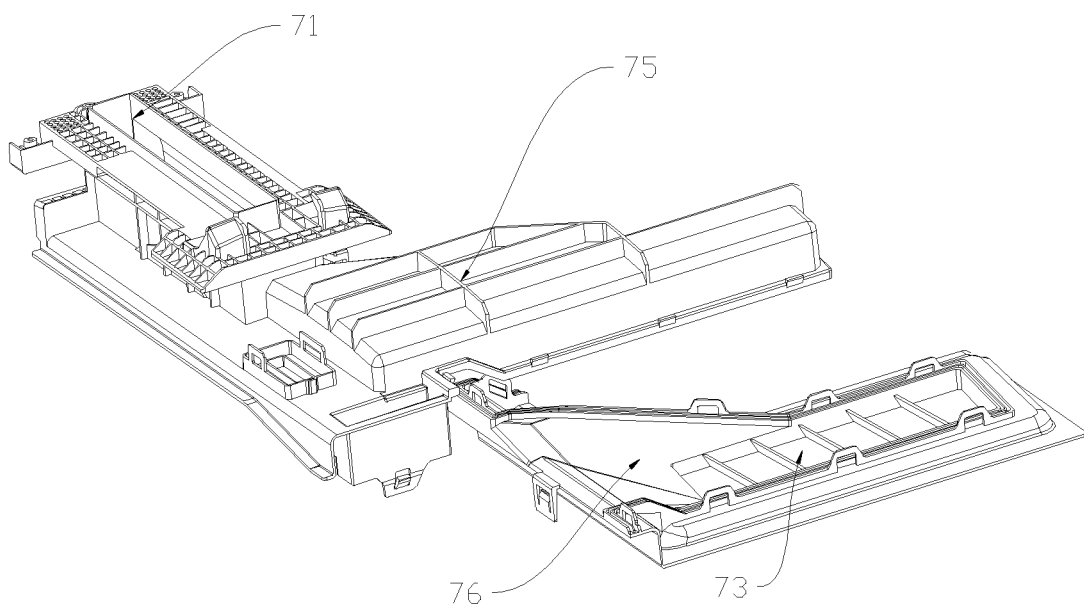


FIG. 4

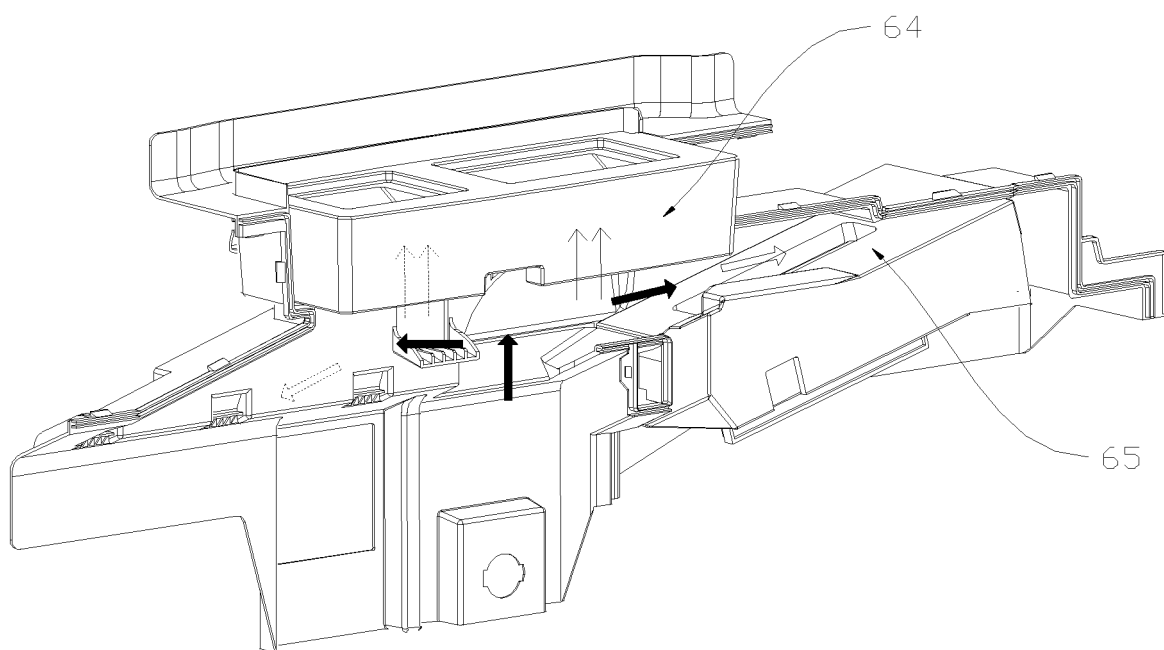


FIG. 5

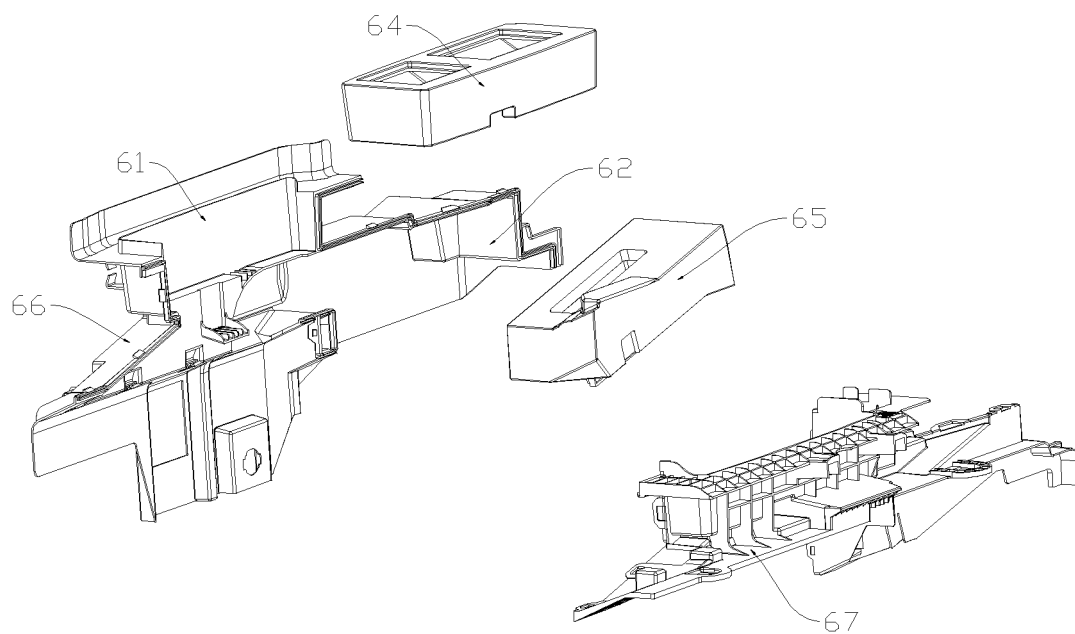


FIG. 6

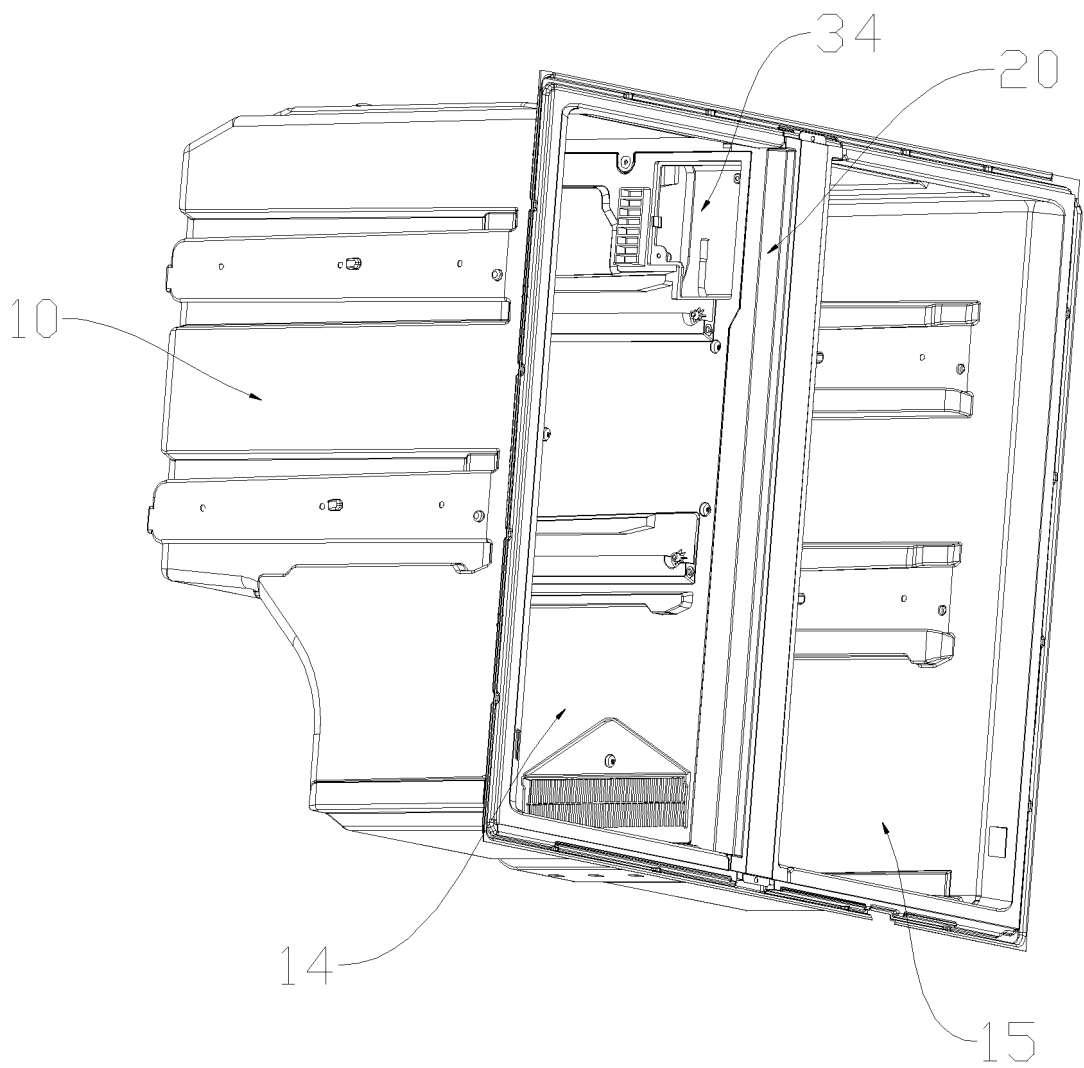


FIG. 7

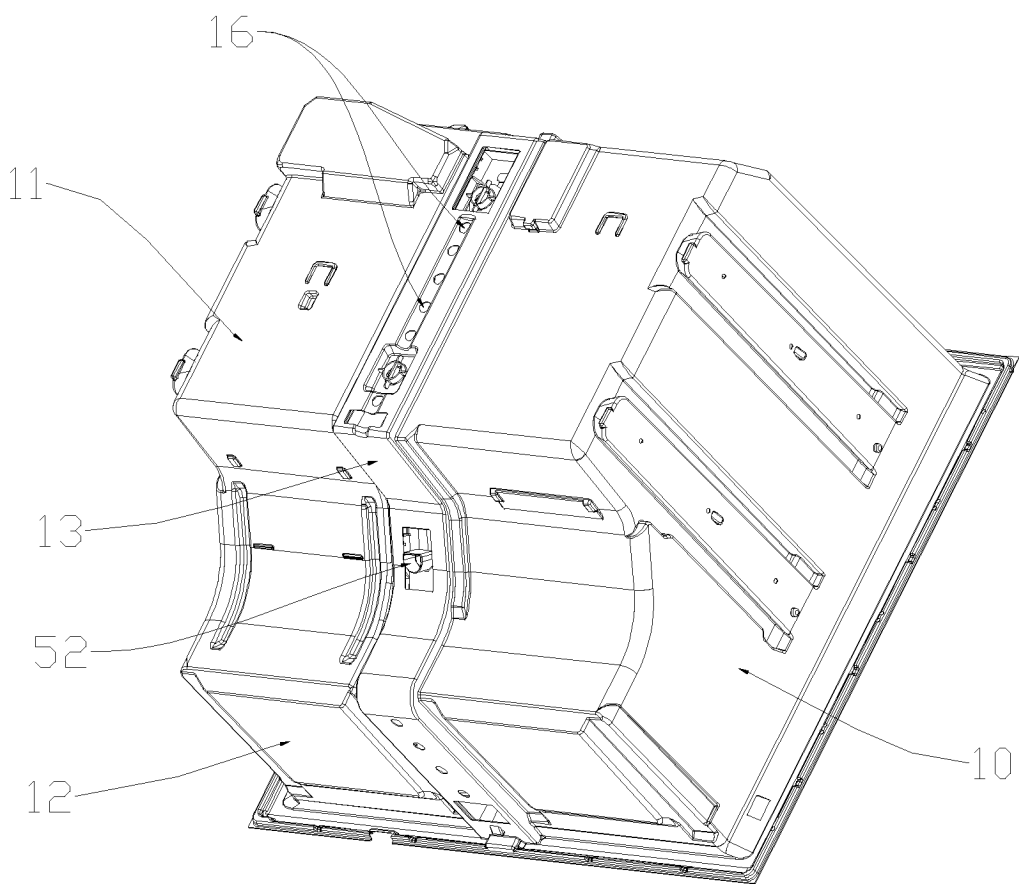


FIG. 8

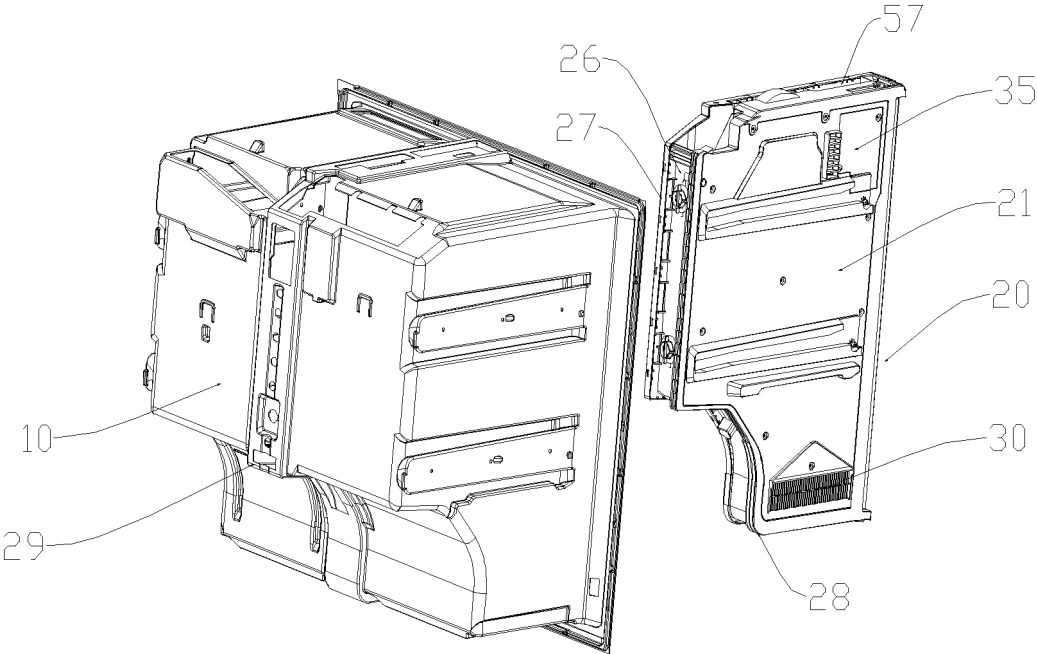


FIG. 9

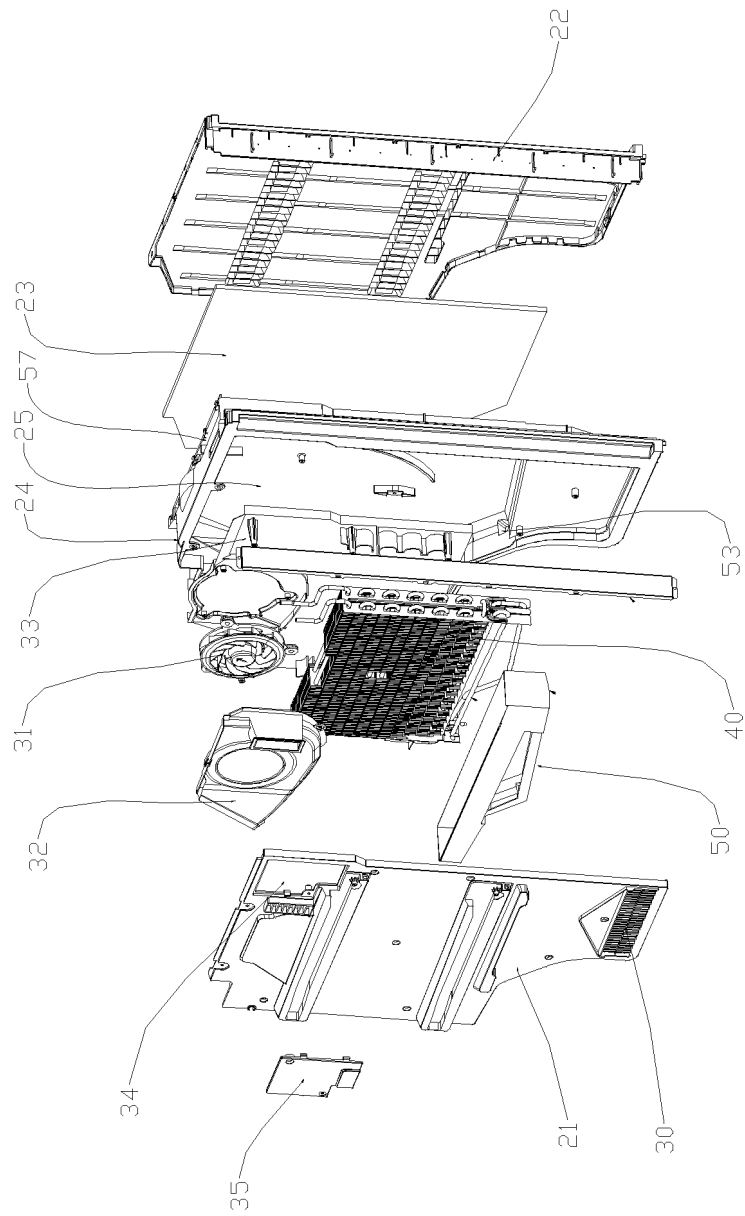


FIG. 10

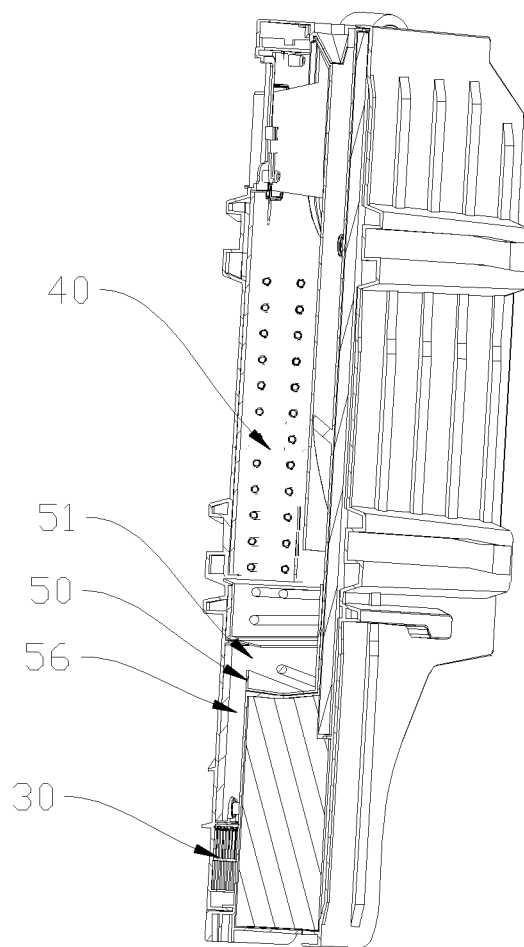


FIG. 11

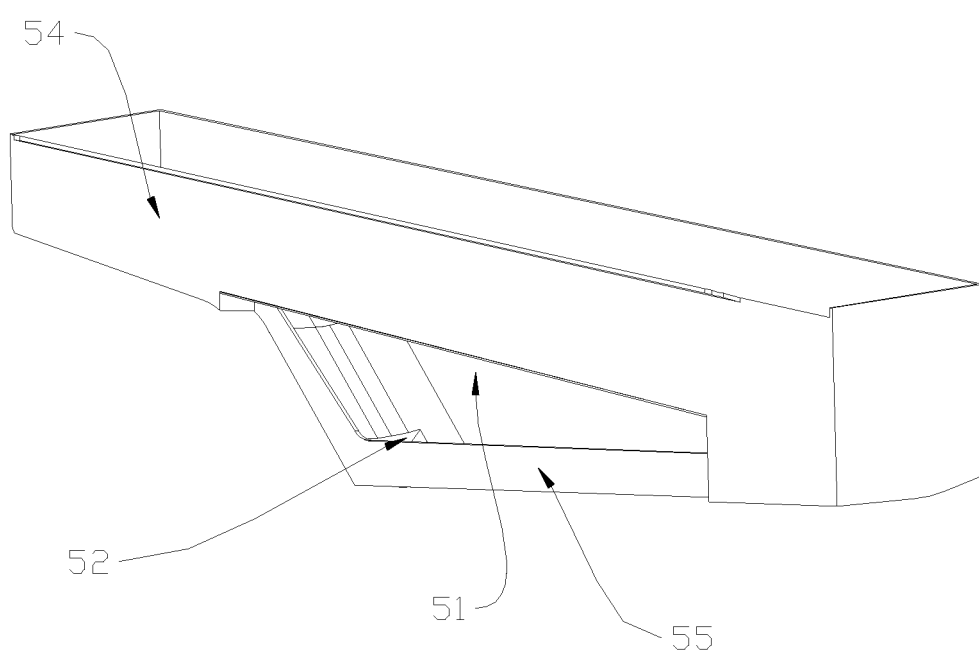


FIG. 12

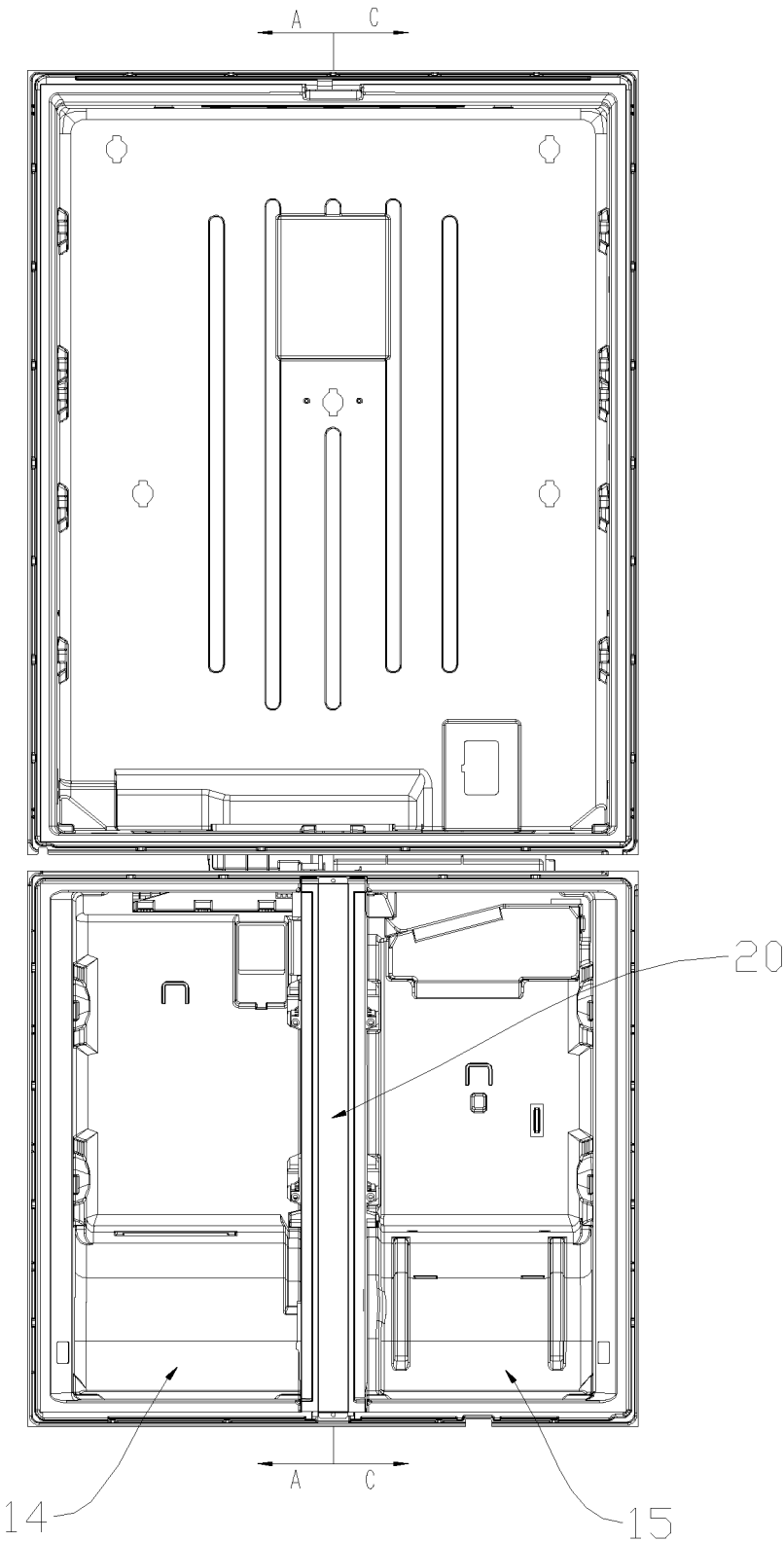


FIG. 13

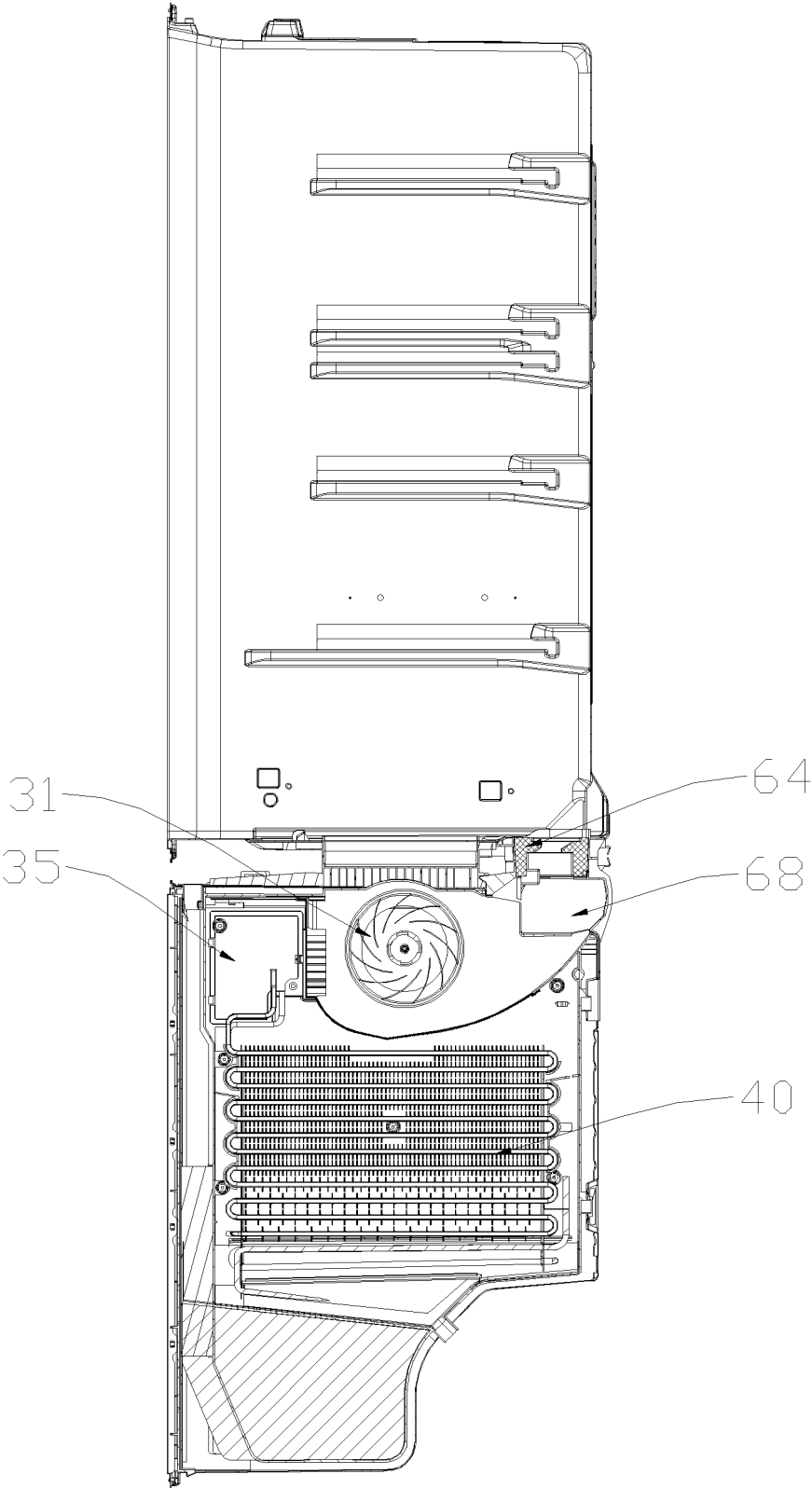


FIG. 14

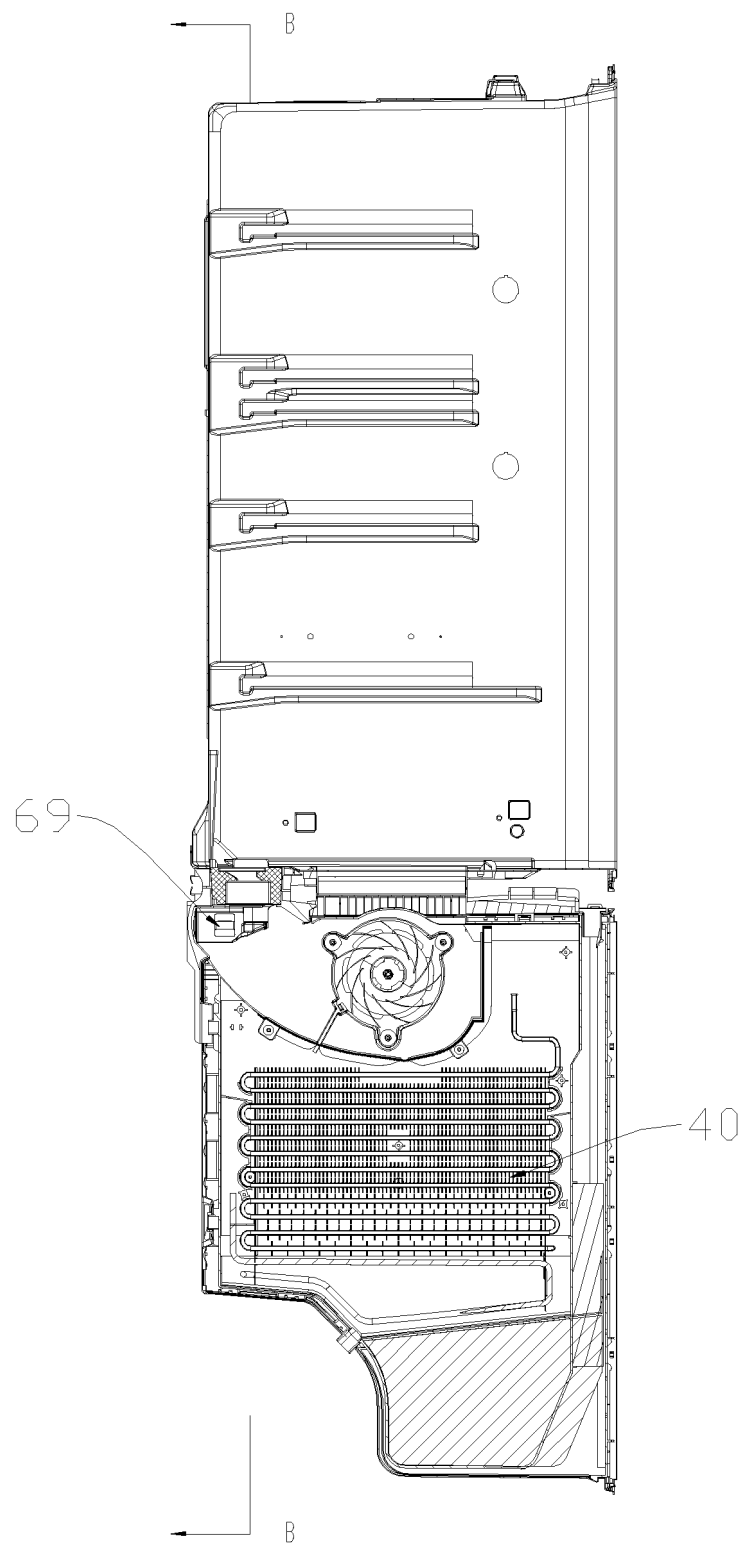


FIG. 15

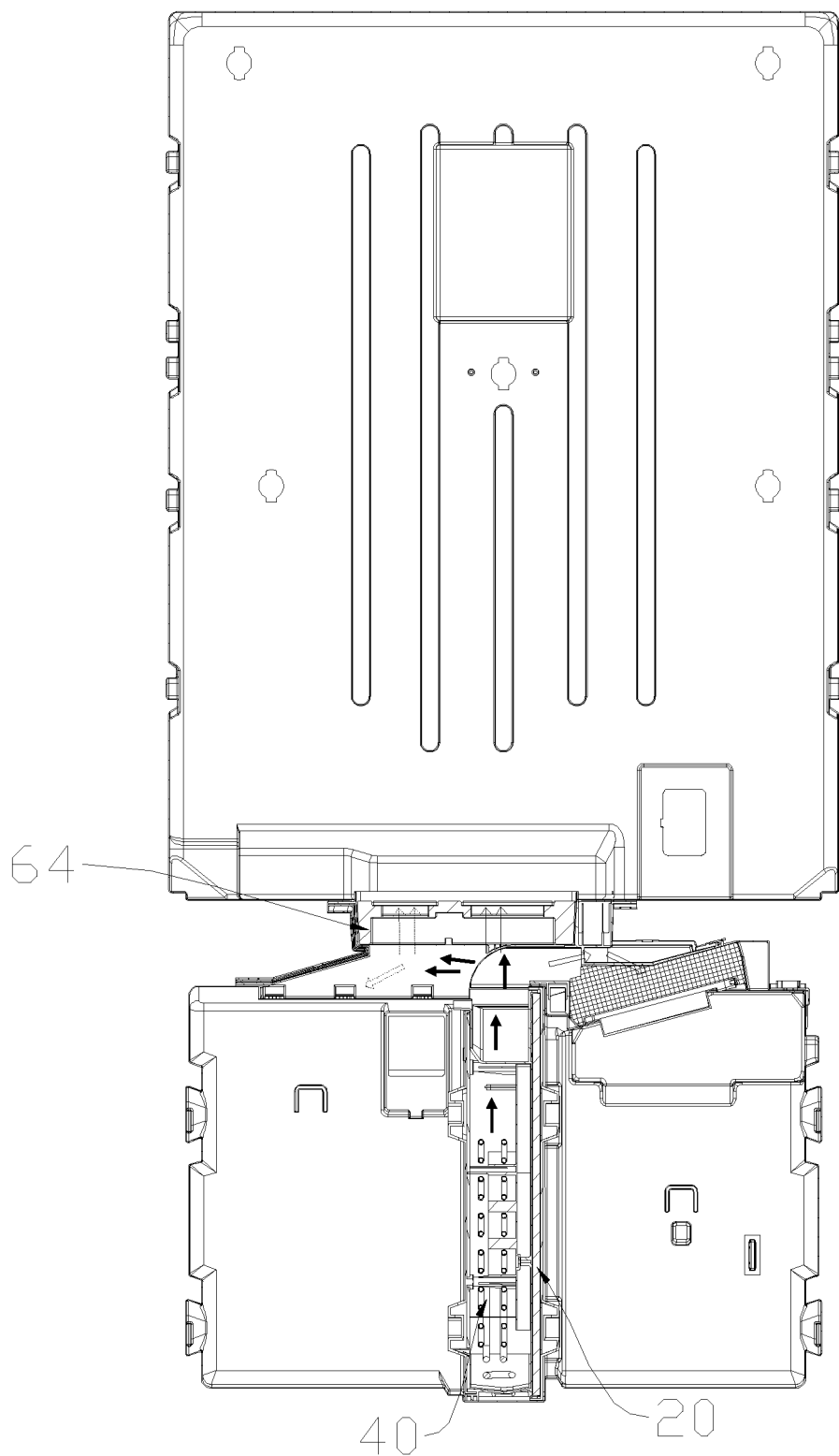


FIG. 16

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2023/087217

A. CLASSIFICATION OF SUBJECT MATTER

F25D17/06(2006.01)i; F25D17/08(2006.01)i; F25D21/04(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)

IPC:F25D

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, ENTXT, ENTXTC, VEN, WPABS: 分割, 分隔, 风道, 风管, 风路, 王剑, 许婷婷, 胡明松, 黄承成, 朱涛, 湖北美的, 路径, 距离, 空间, 容积, 容量, 体积, 缩减, 增大, 增加, 占, 蒸发, capacity, space, volume, wall, freez
+, divid+, refrigerat+, partition+

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
PX	CN 115540457 A (HUBEI MIDEA REFRIGERATOR CO., LTD.) 30 December 2022 (2022-12-30) description, paragraphs 62-116, and figures 1-16	1-15
X	CN 111609616 A (QINDAO HAIER REFRIGERATOR CO., LTD. et al.) 01 September 2020 (2020-09-01) description, paragraphs 39-63, and figures 1-4	1-3, 6-11, 15
Y	CN 111609616 A (QINDAO HAIER REFRIGERATOR CO., LTD. et al.) 01 September 2020 (2020-09-01) description, paragraphs 39-63, and figures 1-4	12-14
Y	CN 103047813 A (HEFEI HUALING CO., LTD.) 17 April 2013 (2013-04-17) description, paragraphs 27-48, and figures 1-4	12-13
Y	KR 20110085589 A (LG ELECTRONICS INC.) 27 July 2011 (2011-07-27) description, paragraphs 20-119, and figures 1-11	14
X	CN 107883644 A (LG ELECTRONICS INC.) 06 April 2018 (2018-04-06) description, paragraphs 49-83 and 116-126, and figures 1-8 and 16-17	1-3, 6-7, 15

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

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“E” earlier application or patent but published on or after the international filing date

“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

14 June 2023

Date of mailing of the international search report

20 July 2023

Name and mailing address of the ISA/CN

China National Intellectual Property Administration (ISA/
CN)
China No. 6, Xitucheng Road, Jimenqiao, Haidian District,
Beijing 100088

Authorized officer

Telephone No.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2023/087217

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	CN 111664629 A (CHANGHONG MEILING CO., LTD.) 15 September 2020 (2020-09-15) entire document	1-15
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