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• **HAIER SMART HOME CO., LTD.**
Qingdao, Shandong 266101 (CN)

(72) Inventors:
• **LIU, Min**
Qingdao, Shandong 266101 (CN)
• **ZHOU, Zhixiang**
Qingdao, Shandong 266101 (CN)
• **WANG, Dong**
Qingdao, Shandong 266101 (CN)

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(71) Applicants:
• **QINGDAO HAIER REFRIGERATOR CO., LTD.**
Qingdao, Shandong 266101 (CN)
• **Qingdao Haier Smart Technology R&D Co., Ltd.**
Qingdao, Shandong 266101 (CN)

(74) Representative: **Winter, Brandl - Partnerschaft mbB**
Alois-Steinecker-Straße 22
85354 Freising (DE)

(54) **DOOR BODY COMPONENT AND REFRIGERATOR APPARATUS**

(57) The present application discloses a door body component and a refrigerator apparatus. The door body component comprises a door body, a door plate capable of being slidably connected to the door body, and an assembly component used for assembling the door body and the door plate; the assembly component comprises a base, a sliding element slidably connected to the base, and a positioning workpiece detachably matched with the

base and the sliding element; the positioning workpiece comprises a first pre-positioning structure, the sliding element comprises a second pre-positioning structure matched with the first pre-positioning structure, and the positioning workpiece and the sliding element are assembled at a pre-set position to match with the base. The positioning accuracy of component assembling is improved.

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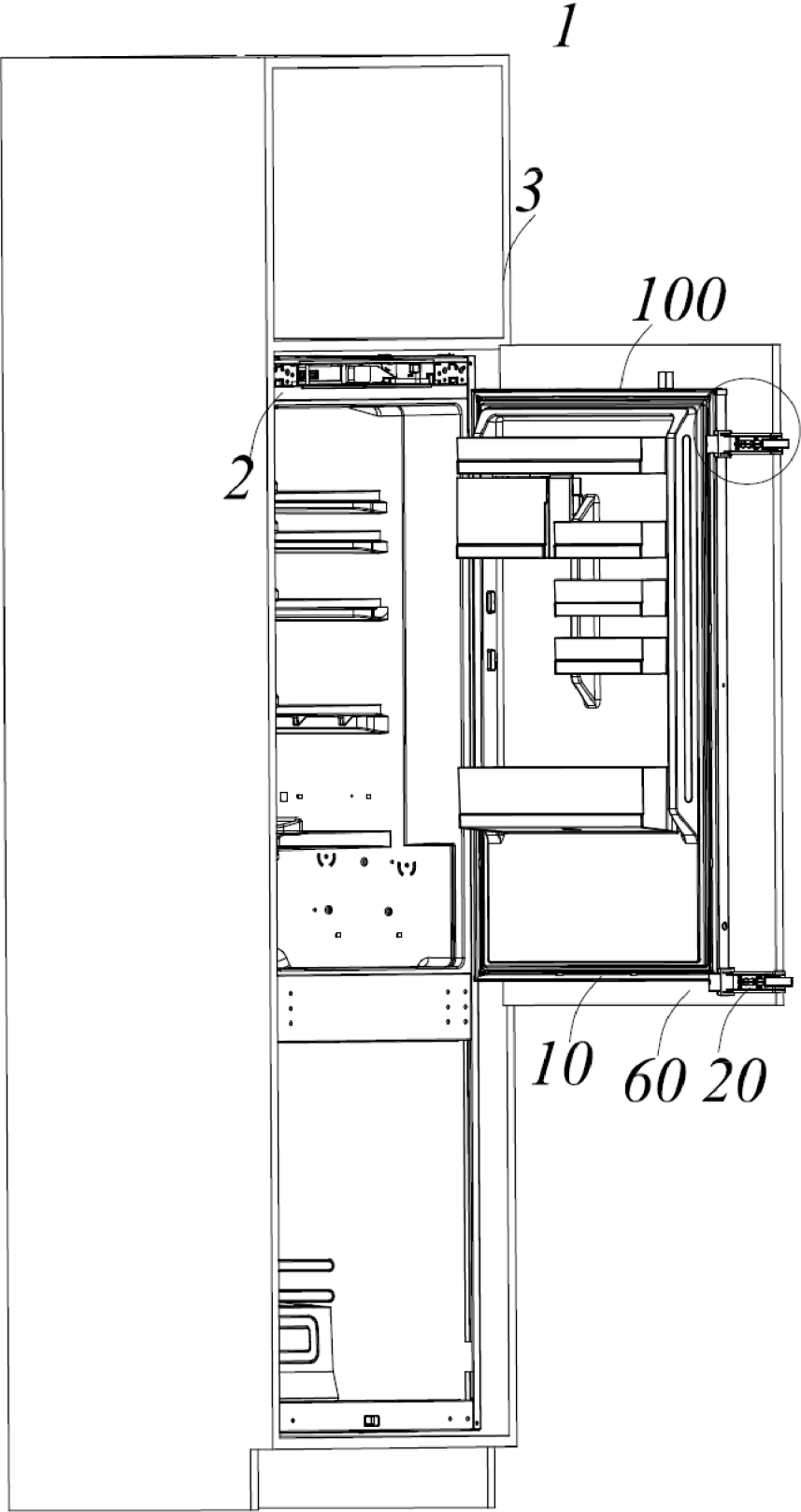


FIG. 1

Description

[0001] The present application is based on Chinese patent application No. 202311110154.1 filed on August 30, 2023, and claims priority to the Chinese patent application, the entire content of which is incorporated herein by reference.

TECHNICAL FIELD

[0002] The present application relates to the field of refrigeration, and in particular, to a door assembly and a refrigerator apparatus.

BACKGROUND

[0003] The connection between a refrigerator door and a cabinet of a built-in refrigerator could be achieved through folding hinges or pivot hinges. When the door was equipped with pivot hinges, the refrigerator door and a cupboard door panel needed to be arranged in sliding connection, so that when the refrigerator was installed into a cupboard, the door and the door panel were allowed to rotate simultaneously relative to each other to open or close the cabinet.

[0004] A connection component and a positioning tooling for assisting the installation of the connection component were generally provided between the door and the door panel. The positioning tooling needed to ensure that the connection component was installed at optimal positions on the door and the door panel, so as to ensure that no relative friction occurred when the door and the door panel opened or closed the cabinet at maximum angles. Therefore, the accuracy of the positioning tooling in assisting the positioning of the connection component needed to be further improved.

[0005] Any related art mentioned in the description did not constitute an acknowledgment or suggestion that the related art formed part of the common general knowledge in any jurisdiction, or that the related art could reasonably be expected to be understood, regarded as relevant and/or combined with other related art by a person skilled in the art.

SUMMARY

[0006] One of the objects of the present application is to provide a door assembly to solve the technical problem of insufficient accuracy in positioning of assembly components of door assemblies in related art.

[0007] One of the objects of the present application is to provide a refrigerator apparatus.

[0008] To achieve one of the above objects, an embodiment of the present application provides a door assembly, comprising a door, a door panel covering the door, and an assembly component for mounting and fixing the door with the door panel, wherein the assembly component comprises a base for fixing to the door and a sliding

member for fixing to the door panel, the sliding member is slidably connected to the base such that the door panel is slidably connected to the door; the assembly component further comprises a positioning fixture detachably engaged with the base and the sliding member, the positioning fixture comprises a first pre-positioning structure, the sliding member comprises a second pre-positioning structure engaged with the first pre-positioning structure, and the positioning fixture and the sliding member are assembled together with the base after pre-positioning assembly.

[0009] Compared with related art, the beneficial effects of the present application lie in: the sliding member and the positioning fixture are pre-assembled through the first pre-positioning structure and the second pre-positioning structure, improving the accuracy of positioning.

[0010] The term "comprise" used herein and variations of the term, such as "comprises", "comprised", "comprising", "including", "containing", do not exclude other features, components, elements or steps unless the context clearly requires otherwise.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011]

FIG. 1 is a perspective view of a refrigerator apparatus in an embodiment of the present application.

FIG. 2 is a front view of an assembly component in an embodiment of the present application.

FIG. 3 is an exploded view of an assembly component in an embodiment of the present application.

FIG. 4 is a schematic view from another angle of FIG. 3.

FIG. 5 is an assembly view of a sliding member and a positioning fixture in an embodiment of the present application.

FIG. 6 is a state diagram of the sliding member and positioning fixture assembled together and then assembled with a base in an embodiment of the present application.

FIG. 7 is a state diagram of the sliding member and positioning fixture assembled into the base in an embodiment of the present application.

FIG. 8 is a state diagram of detaching the positioning fixture in an embodiment of the present application.

FIG. 9 is a cross-sectional view along a vertical direction in an embodiment of the present application.

DETAILED DESCRIPTION OF EMBODIMENTS

[0012] The present application will be described in detail below in conjunction with specific embodiments shown in the accompanying drawings. However, these embodiments do not limit the present application, and structural, methodological, or functional variations made by those of ordinary skill in the art based on these

embodiments are included within the protection scope of the present application.

[0013] Terms indicating spatial relative positions used herein, such as "upper", "above", "lower", "below", are used for the purpose of facilitating description to describe the relationship of one unit or feature relative to another unit or feature as shown in the drawings. Terms of spatial relative positions may be intended to include different orientations of the device in use or operation in addition to the orientation shown in the FIGs. For example, if the device in the FIGs is turned over, units described as being "below" or "beneath" other units or features would be positioned "above" the other units or features. Thus, the exemplary term "below" can encompass both orientations of above and below. The device may be otherwise oriented (rotated 90 degrees or at other orientations) and the spatially relative descriptors used herein interpreted accordingly.

[0014] Referring to FIG. 1, an embodiment of the present application provides a refrigerator apparatus 1, the refrigerator apparatus 1 comprises a refrigerator 2 and a cupboard 3, the refrigerator 2 is embedded and installed within a household cupboard 3, the refrigerator 2 comprises a cabinet with a storage chamber formed therein and a door assembly 100 rotatably arranged relative to the cabinet, the door assembly 100 is configured to open or close the cabinet.

[0015] As shown in FIGs. 2-5, the door assembly 100 comprises a door 10, a door panel 60 covering the door 10, and an assembly component 20 for mounting and fixing the door 10 with the door panel 60. The door 10 is rotatably connected to the cabinet through a pivot hinge, the door panel 60 is connected to and covers the door 10, the door panel 60 is simultaneously connected to the cupboard 3 through another hinge and rotates relative to the cupboard 3. It can be seen that the door 10 rotates around an axis of the pivot hinge, while the door panel 60 rotates around an axis of the another hinge, and the axes of the two hinges do not coincide. The assembly component 20 is fixedly connected to the door 10 and the door panel 60 respectively, and allows relative sliding between the door 10 and the door panel 60, enabling the door 10 and the door panel 60 to open and close synchronously relative to the cabinet 200.

[0016] Preferably, the assembly component 20 comprises a base 30 for fixing to the door 10 and a sliding member 40 for fixing to the door panel 60, the sliding member 40 is slidably connected to the base 30 such that the door panel 60 is slidably connected to the door 10; the assembly component 20 further comprises a positioning fixture 50 detachably engaged with the base 30 and the sliding member 40, the positioning fixture 50 is configured to assist in positioning the sliding member 40.

[0017] The positioning fixture 50 comprises a first pre-positioning structure 511, the sliding member 40 comprises a second pre-positioning structure 421 engaged with the first pre-positioning structure 511, and the positioning fixture 50 and the sliding member 40 are as-

sembled together with the base 30 after pre-positioning assembly, improving the accuracy of auxiliary positioning.

[0018] In a specific embodiment, the first pre-positioning structure 511 is a positioning post arranged toward the sliding member 40, and the second pre-positioning structure 421 is a positioning hole; or the first pre-positioning structure 511 is a positioning hole, and the second pre-positioning structure 421 is a positioning post arranged toward the positioning fixture. The pre-positioning structures are configured as positioning posts and positioning holes that engage with each other, which makes alignment simple and installation convenient, and also facilitates the positioning fixture 50 to be pulled out from the sliding member 40 during subsequent disassembly.

[0019] Specifically, after the positioning fixture 50 and the sliding member 40 are pre-positioned and assembled, the fixed connection between them may also be strengthened through a snap structure. As shown in FIG. 4, the positioning fixture 50 is provided with an elastic snap 512 adjacent to the first pre-positioning structure 511, the sliding member 40 is provided with a snap hole 422 engaged with the elastic snap 512, and the elastic snap 512 and the snap hole 422 are combined to strengthen the stability of the connection between them.

[0020] Preferably, the door panel 60 comprises a mounting surface 601 facing the door, the sliding member 40 is fixed to the mounting surface 601 through a first fastener 71, the base 30 is fixed to a side surface of the door 10 through a second fastener 72, and the first fastener 71 and the second fastener 72 may both be configured as screws. The screw comprises a head and a shank, and the positioning fixture 50 is configured for installation and positioning of the sliding member 40, so that it has an accurate positional relationship relative to the base 30, to allow relative sliding and common rotation between the door 10 and the door panel 60.

[0021] The base 30 is provided with a second screw hole 310, the second screw hole 310 comprises a mounting hole having a size larger than the head of the screw and a fixing hole having a size smaller than the head of the screw but larger than the shank of the screw. The mounting hole is a circular hole, and the fixing hole is an elongated hole communicating with the mounting hole. Specifically, when installing the base 30, the second fastener 72 that comes with the door 10 foam assembly does not need to be removed, it is only necessary to rotate the second fastener 72 outward for a certain distance, align the mounting hole with the head of the screw for installation, then move the base 30 in the direction where the mounting hole and the fixing hole communicate, so that the second fastener 72 is assembled into the fixing hole, and then rotate and tighten the second fastener 72, thereby completing the base 30 being attached and fixed to the side surface of the door 10.

[0022] Specifically, the surface around the second screw hole 310 may be further provided with elongated

slots 311 to form anti-slip grooves, the anti-slip grooves may be engaged with the second fastener 72, so that the second fastener 72 will not slip during assembly.

[0023] The base 30 is provided with a sliding slot 32 on a side close to the door panel 60, for the sliding member 40 to be installed and move therein. The sliding member 40 has an overall longitudinally elongated sheet shape, wherein a first end 41 is installed within the base 30, a main body 42 located in the middle is configured to engage with the positioning fixture 50 and be fixed to the mounting surface 601, and a second end 43 away from the first end 41 is formed as a rotatable cover, configured for subsequent covering of the main body 42.

[0024] The first fastener 71 is installed on the main body 42, the main body 42 is provided with a first screw hole 420 for installation of the first fastener 71, the first screw hole 420 is an elongated hole, and the first screw hole 420 may be further provided with a positioning rib engaged with the shank of the first fastener 71. The positioning rib may abut against the shank of the first fastener 71, preventing the first fastener 71 from moving during installation, and serving the functions of guidance and limiting.

[0025] Referring to this embodiment, the second pre-positioning structure 421 and the first screw hole 420 are both formed in the main body 42, and may be formed as through holes arranged at intervals.

[0026] Preferably, the positioning fixture 50 comprises a positioning plate 51, a mounting plate 53 bent from one end of the positioning plate 51 toward the door 10, and a reference plate 55 bent from another end of the positioning plate 51 toward the door panel 60; as shown in FIGs. 3-4, the mounting plate 53 is installed to the base 30, that is, faces the side surface of the door 10, and the reference plate 55 covers the side surface of the door panel 60. It can be seen that the positioning fixture 50 may be configured to precisely position the distance between the side edges of the door 10 and the door panel 60 as well as the distance between the door 10 and the door panel 60 in the thickness direction, allowing the door 10 and the door panel 60 to remain parallel when opened or closed at maximum angles, without friction occurring.

[0027] In this embodiment, the positioning plate 51 is pre-positioned on a side of the sliding member 40 away from the mounting surface 601, the positioning plate 51 is provided with the first pre-positioning structure 511 on a surface facing the sliding member 40, configured for pre-positioning assembly with the sliding member 40, and the positioning plate 51 is also provided with the elastic snap 512 on the surface facing the sliding member 40, configured for snap-fit fixing after assembly with the sliding member 40.

[0028] The positioning plate 51 is provided with a screw boss 513 for accommodating the first fastener 71, the head of the first fastener 71 interferes with an inner wall surface of the screw boss 513, and the first fastener 71 may be pre-installed within the screw boss 513, preventing the first fastener 71 from falling out after insertion into

the screw boss 513, avoiding the need to additionally search for accessories during installation and the occurrence of accessory loss.

[0029] The inner wall surface of the screw boss 513 is provided with a limiting rib 514 engaged with the shank of the first fastener 71. When the first fastener 71 is inserted into the screw boss 513, the limiting rib 514 may contact the threads of the first fastener 71, thereby limiting the movement of the first fastener 71.

[0030] Preferably, the sliding member 40 is provided with the first screw hole 420 corresponding to the screw boss 513, for the first fastener 71 to be installed into the door panel 60. The limiting rib 514 is connected to the inner wall surface of the screw boss 513 through a connecting bar, the connecting bar is in a frangible configuration such that the limiting rib 514 can be separated from the screw boss 513, and the first screw hole 420 is provided with an open slot surface 4201 facing the positioning fixture 50 for accommodating the separated limiting rib 514. Thus, after the limiting rib 514 breaks, it may be caught between the screw head and the first screw hole 420, without affecting the tightening of the screw.

[0031] Preferably, an outer wall of the screw boss 513 is provided with a plurality of elongated slots 515 along an axial direction, such that the outer wall is divided into a plurality of arcuate walls arranged at intervals along a circumferential direction, to provide elasticity for the first fastener 71 screwing into the door panel 60.

[0032] The mounting plate 53 is provided with a mounting space 530 on a side facing the door 10, the base 30 is located within the mounting space 530 and is snap-fit fixed with the mounting plate 53, and the reference plate 55 covers the side surface of the door panel 60.

[0033] Referring to FIGs. 6-9, the assembly process of the assembly component 20 will be briefly described below in conjunction with this embodiment:

[0034] First, the base 30 is fixed to the side surface of the door 10 through the second fastener 72; the sliding member 40 and the positioning fixture 50 are positioned and pre-installed through the first pre-positioning structure 511 and the second pre-positioning structure 421, and then the two are snap-fit fixed through the elastic snap 512 and the snap hole 422, thus, the sliding member 40 and the positioning fixture 50 complete assembly.

[0035] Next, the assembled sliding member 40 and positioning fixture 50 are assembled laterally into the base 30 on the door 10, wherein the first end 41 of the sliding member 40 is installed into the sliding slot 32 of the base 30 and slides relative to the base 30 within the sliding slot 32, while the mounting plate 53 of the positioning fixture 50 is snap-fit fixed with the base 30, and the reference plate 55 covers the side surface of the door panel 60.

[0036] Then, the positioning fixture 50 is pre-installed with the first fastener 71, and the first fastener 71 is tightened with a screwdriver. The first fastener 71 screws into the door panel 60 along the screw boss 513, and the

limiting rib 514 within the screw boss 513 serves a limiting function. When the head of the first fastener 71 presses against the limiting rib 514, it will drive the limiting rib 514 to break from the screw boss 513 and follow the head of the first fastener 71 moving toward the sliding member 40. As shown in FIG. 9, the first fastener 71 will screw in until it tightly engages with the first screw hole 420 of the sliding member 40, and the broken limiting rib 514 is caught in the open slot surface 4201, without affecting the tightening of the first fastener 71. Thus, the sliding member 40 is fixed to the door panel 60 with the assistance of the positioning fixture 50.

[0037] Then, an inclined force is applied to the positioning fixture 50 to detach the positioning fixture 50 from the base 30 and the sliding member 40.

[0038] Finally, after the positioning fixture 50 is detached from the base 30 and the sliding member 40, the second end 43 of the sliding member 40 rotates toward the base to be fixed to the main body 42 and cover a portion of the main body 42, thereby covering the first screw hole 420 and the first fastener 71, serving the function of aesthetic decoration; the door assembly comprises a base cover 33, after the positioning fixture 50 is detached from the base 30 and the sliding member 40, the base cover 33 is fixedly assembled with the base 30 and covers the base 30, serving the function of aesthetic decoration, and the base cover 33 and the base 30 are integrally formed or separately formed.

[0039] Wherein, the cover of the sliding member 40 is provided with a first recess, the main body is provided with a second recess corresponding to the first recess, and the first recess and the second recess form an operating portion 431 for operation, to facilitate opening of the cover.

[0040] The beneficial effects of the present application lie in: the sliding member 40 and the positioning fixture 50 are pre-assembled and fixed through pre-positioning structures and snap structures, improving the accuracy of positioning; the positioning fixture 50 is pre-installed with the first fastener 71, and the limiting rib 514 is provided for limiting to prevent movement of the first fastener 71; the first screw hole 420 is provided with an open slot surface 4201 for accommodating the broken limiting rib 514, without affecting the tightening of the first fastener 71.

[0041] It should be understood that although the Description is described according to embodiments, not every embodiment contains only one independent technical solution. This narrative manner of the Description is merely for clarity. Those skilled in the art should regard the Description as a whole, and the technical solutions in the various embodiments may also be appropriately combined to form other embodiments understandable to those skilled in the art.

[0042] The series of detailed descriptions listed above are merely specific descriptions of feasible embodiments of the present application, and are not intended to limit the protection scope of the present application. Any equivalent

embodiments or modifications made without departing from the technical spirit of the present application should be included within the protection scope of the present application.

Claims

1. A door assembly, **characterized by** comprising a door, a door panel covering the door, and an assembly component for mounting and fixing the door with the door panel, wherein the assembly component comprises a base for fixing to the door and a sliding member for fixing to the door panel, the sliding member is slidably connected to the base such that the door panel is slidably connected to the door; the assembly component further comprises a positioning fixture detachably engaged with the base and the sliding member, the positioning fixture comprises a first pre-positioning structure, the sliding member comprises a second pre-positioning structure engaged with the first pre-positioning structure, and the positioning fixture and the sliding member are assembled together with the base after pre-positioning assembly.
2. The door assembly according to claim 1, **characterized in that** the first pre-positioning structure is a positioning post arranged toward the sliding member, and the second pre-positioning structure is a positioning hole; or the first pre-positioning structure is a positioning hole, and the second pre-positioning structure is a positioning post arranged toward the positioning fixture.
3. The door assembly according to claim 1, **characterized in that** the door panel comprises a mounting surface facing the door, and the sliding member is fixed to the mounting surface through a first fastener; the positioning fixture comprises a positioning plate, a mounting plate bent from one end of the positioning plate toward the door, and a reference plate bent from another end of the positioning plate toward the door panel; the positioning plate is pre-positioned on a side of the sliding member away from the mounting surface, the positioning plate is provided with the first pre-positioning structure, the mounting plate is provided with a mounting space on a side facing the door, the base is located within the mounting space and is snap-fit fixed with the mounting plate, and the reference plate covers a side surface of the door panel.
4. The door assembly according to claim 3, **characterized in that** the first fastener is a screw, the screw comprises a head and a shank, the positioning plate is provided with a screw boss for accommodating the first fastener, the head of the first fastener interferes

with an inner wall surface of the screw boss, and the inner wall surface of the screw boss is provided with a limiting rib engaged with the shank of the first fastener.

5. The door assembly according to claim 4, **characterized in that** an outer wall of the screw boss is provided with a plurality of elongated slots along an axial direction, such that the outer wall is divided into a plurality of arcuate walls arranged at intervals along a circumferential direction. 5 10
6. The door assembly according to claim 5, **characterized in that** the sliding member is provided with a first screw hole corresponding to the screw boss, the limiting rib is connected to the inner wall surface of the screw boss through a connecting bar, the connecting bar is in a frangible configuration such that the limiting rib can be separated from the screw boss, and the first screw hole is provided with an open slot surface facing the positioning fixture for accommodating the separated limiting rib. 15 20
7. The door assembly according to claim 6, **characterized in that** the first screw hole is an elongated hole, and the first screw hole is further provided with a positioning rib engaged with the shank of the first fastener. 25
8. The door assembly according to claim 1, **characterized in that** the sliding member comprises a main body provided with a first screw hole and a cover located at an end of the main body away from the base, after the positioning fixture is detached from the base and the sliding member, the cover rotates toward the base to be fixed to the main body and cover the first screw hole, the cover is provided with a first recess, the main body is provided with a second recess corresponding to the first recess, and the first recess and the second recess form an operating portion for operation. 30 35 40
9. The door assembly according to claim 8, **characterized in that** the base is fixed to a side surface of the door through a second fastener, the second fastener is a screw, the base is provided with a second screw hole, and the second screw hole comprises a mounting hole having a size larger than the head of the screw and a fixing hole having a size smaller than the head of the screw but larger than the shank of the screw. 45 50
10. The door assembly according to claim 8, **characterized in that** the door assembly comprises a base cover, after the positioning fixture is detached from the base and the sliding member, the base cover is fixedly assembled with the base and covers the base; the base cover and the base are integrally 55

formed or separately formed.

11. A refrigerator apparatus, **characterized by** comprising a cabinet, a housing body accommodating the cabinet, and the door assembly according to any one of claims 1-7, wherein the door assembly is rotatably arranged relative to the cabinet to open or close the cabinet.

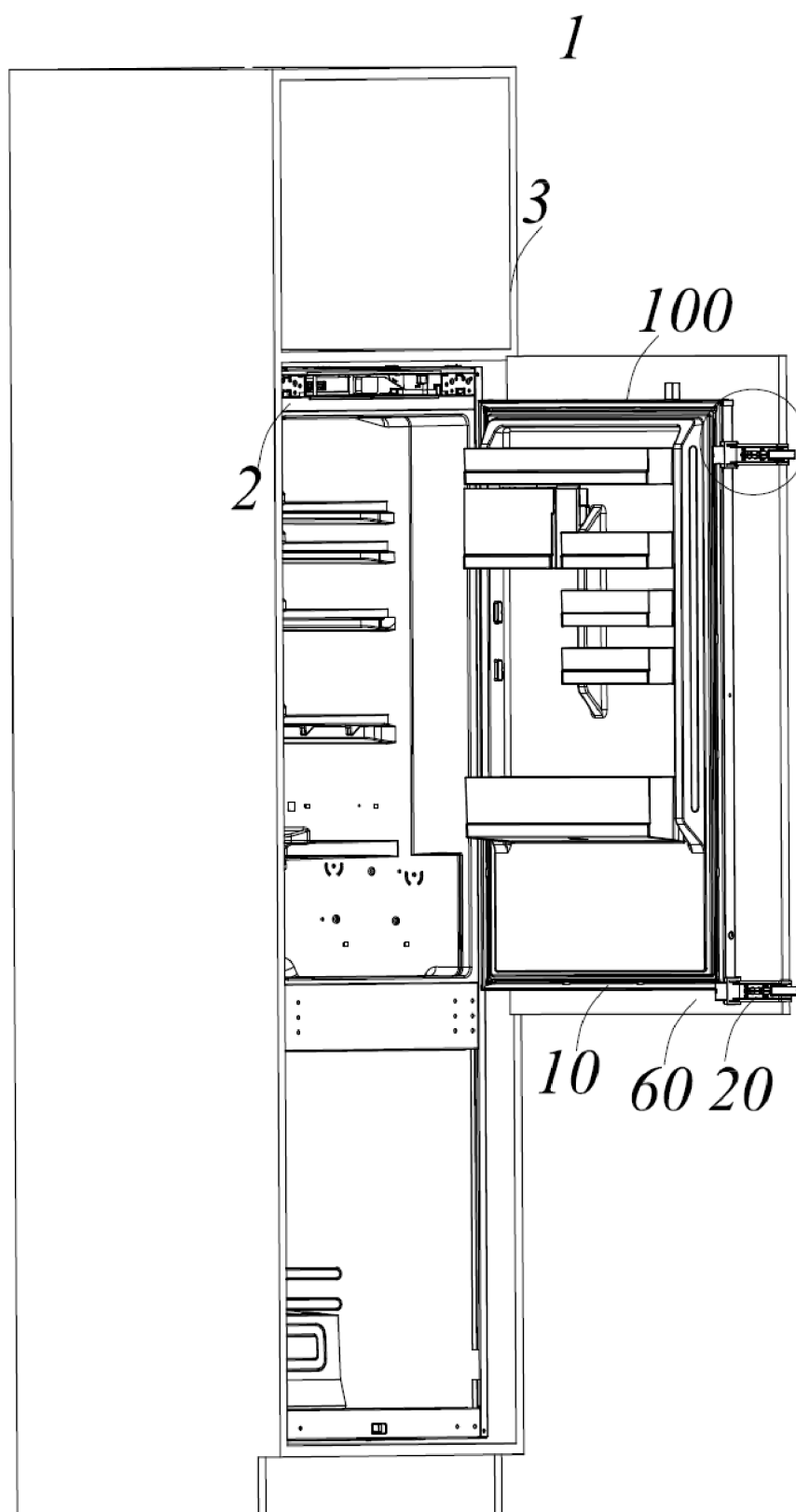


FIG. 1

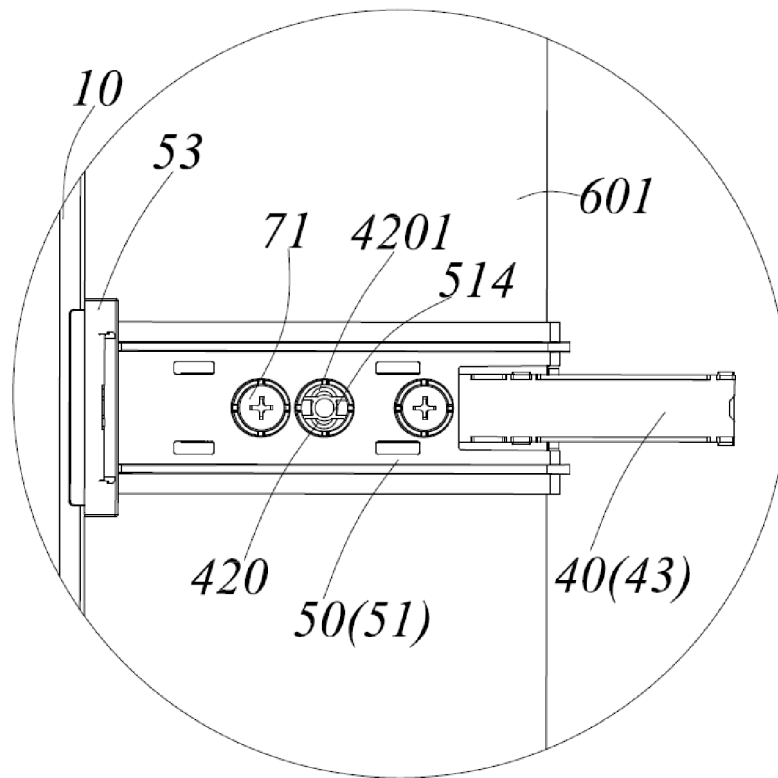


FIG. 2

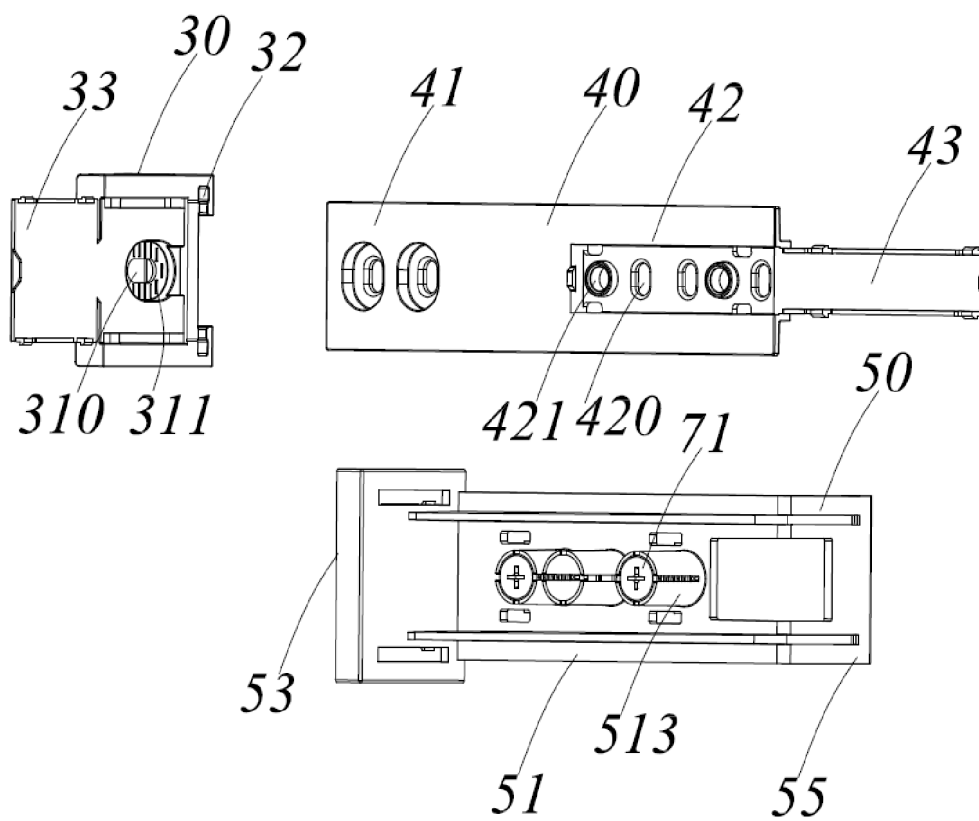


FIG. 3

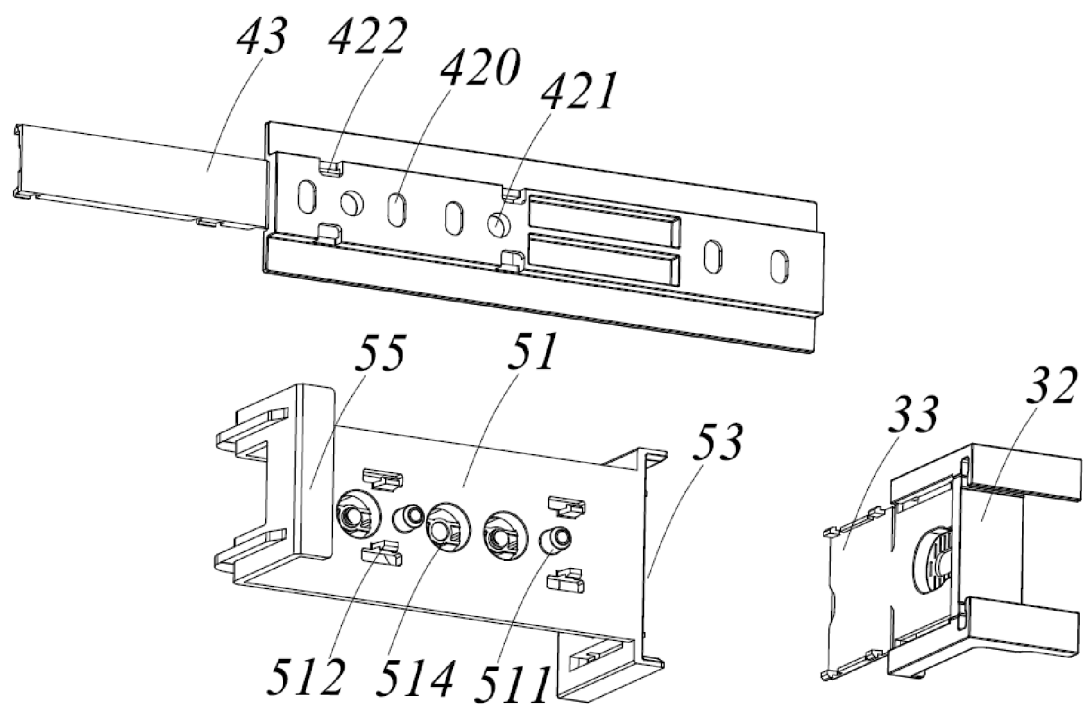


FIG. 4

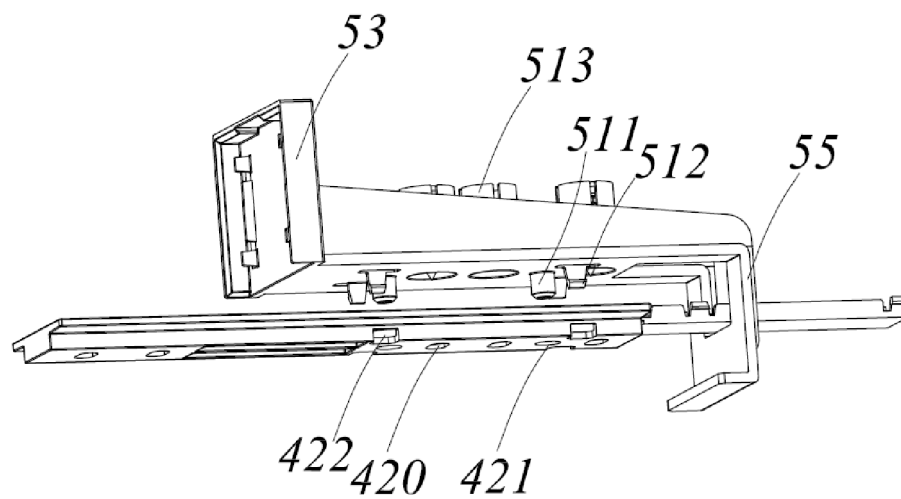


FIG. 5

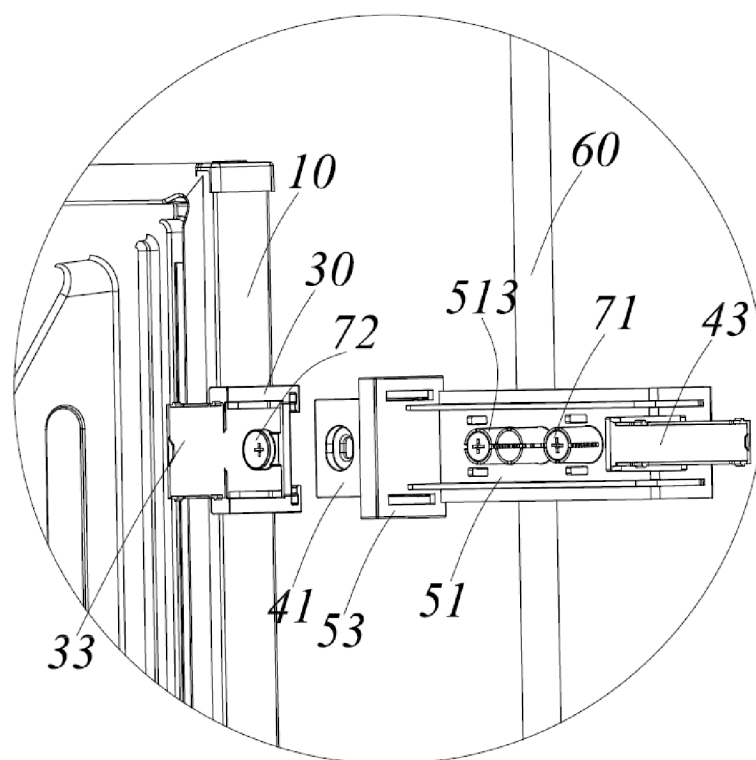


FIG. 6

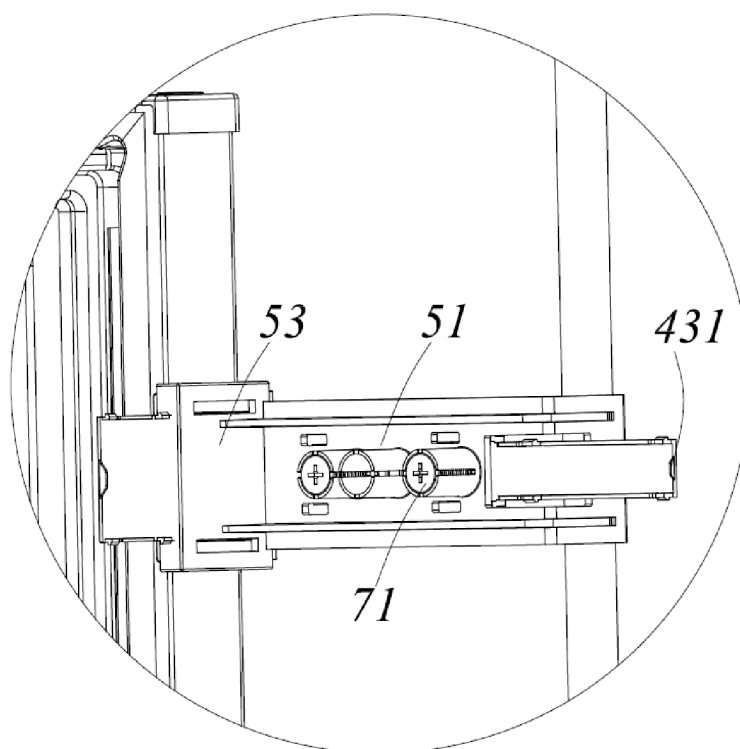


FIG. 7

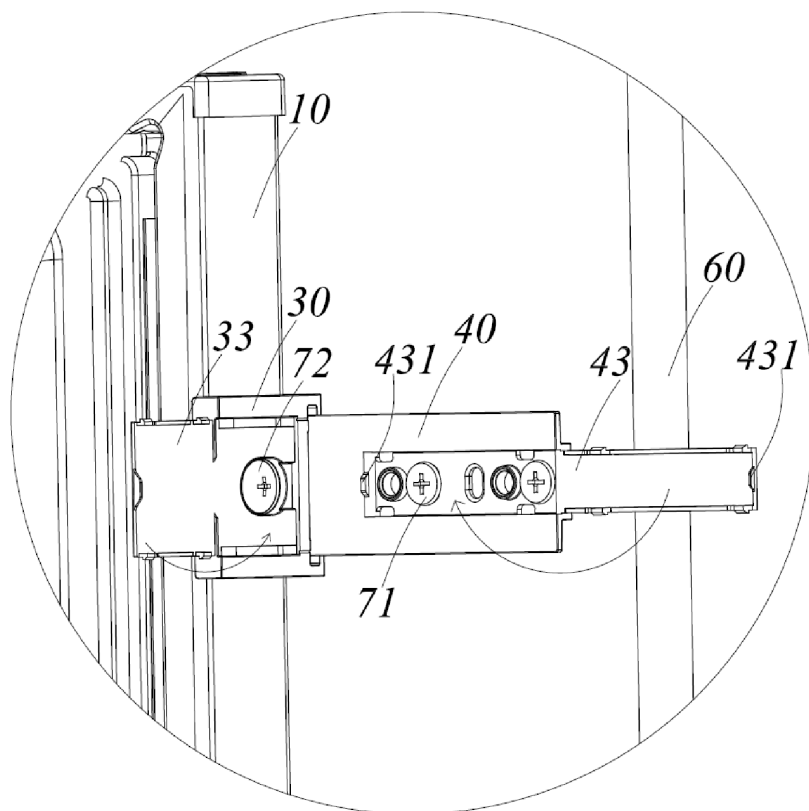


FIG. 8

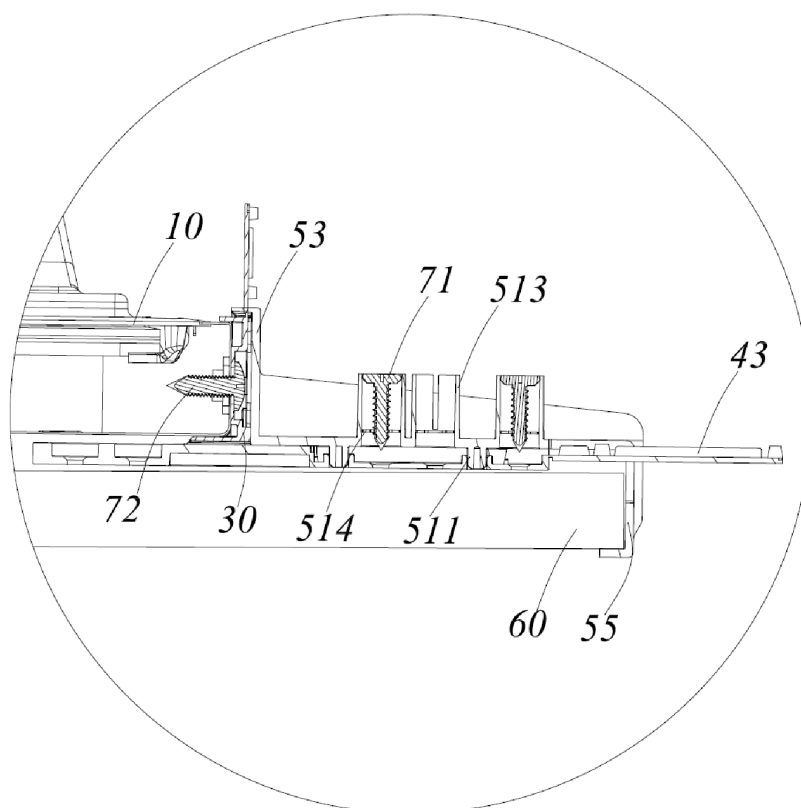


FIG. 9

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2024/113132

A. CLASSIFICATION OF SUBJECT MATTER

F25D23/02(2006.01)i; F25D23/10(2006.01)i; F25D11/00(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: F25D23, F25D11, E06B

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, ENTXTC, VEN: 冰箱, 嵌入, 橱柜, 门, 安装, 装配, 组装, 定位, 滑动, 拆, embedded, refrigerator, cabinet, door, fix, install, assemble, locat+, slid+, disassemble, separate

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
PX	CN 220771557 U (QINGDAO HAIER REFRIGERATOR CO., LTD. et al.) 12 April 2024 (2024-04-12) specific embodiments, and the drawings	1-11
A	CN 106839620 A (HEFEI HUALING CO., LTD. et al.) 13 June 2017 (2017-06-13) description, paragraphs [0045]-[0077], and figures 1-15	1-11
A	CN 205980539 U (HEFEI HUALING CO., LTD. et al.) 22 February 2017 (2017-02-22) entire document	1-11
A	CN 106766599 A (HEFEI HUALING CO., LTD. et al.) 31 May 2017 (2017-05-31) entire document	1-11
A	CN 201874375 U (HEFEI MIDEA ROYALSTAR REFRIGERATOR CO., LTD. et al.) 22 June 2011 (2011-06-22) entire document	1-11
A	CN 113899149 A (QINGDAO HAIER REFRIGERATOR CO., LTD. et al.) 07 January 2022 (2022-01-07) entire document	1-11

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

* Special categories of cited documents:	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
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"E" earlier application or patent but published on or after the international filing date	"&" document member of the same patent family
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"O" document referring to an oral disclosure, use, exhibition or other means	
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search 15 November 2024	Date of mailing of the international search report 26 December 2024
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/CN2024/113132

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C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	CN 112781312 A (HEFEI SNOWKY ELECTRIC CO., LTD.) 11 May 2021 (2021-05-11) entire document	1-11
A	CN 218884433 U (QINGDAO HAIER REFRIGERATOR CO., LTD. et al.) 18 April 2023 (2023-04-18) entire document	1-11
A	WO 2023077874 A1 (QINGDAO HAIER REFRIGERATOR CO., LTD. et al.) 11 May 2023 (2023-05-11) entire document	1-11

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

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