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(54) **REFRIGERATOR AND STORAGE DEVICE FOR REFRIGERATOR**

(57) A storage device for a refrigerator, comprising a storage box body (10) and a rotary frame (20); the storage box body (10) comprises a bottom plate (11), and the storage box body (10) is hinged to the rotary frame (20); and the rotary frame (20) comprises a rotary plate (21), wherein when the rotary frame (20) is at a first position relative to the storage box body (10), the rotary plate (21) is used as a side wall (30) of the storage device

(100), and the storage device (100) is in a normal state; and when the rotary frame (20) rotates relative to the storage box body (10) until the rotary frame (20) is at a second position relative to the storage box body (10), the rotary plate (21) and the bottom plate (11) of the storage box body (10) are jointly used as a bottom wall (40) of the storage device (100).

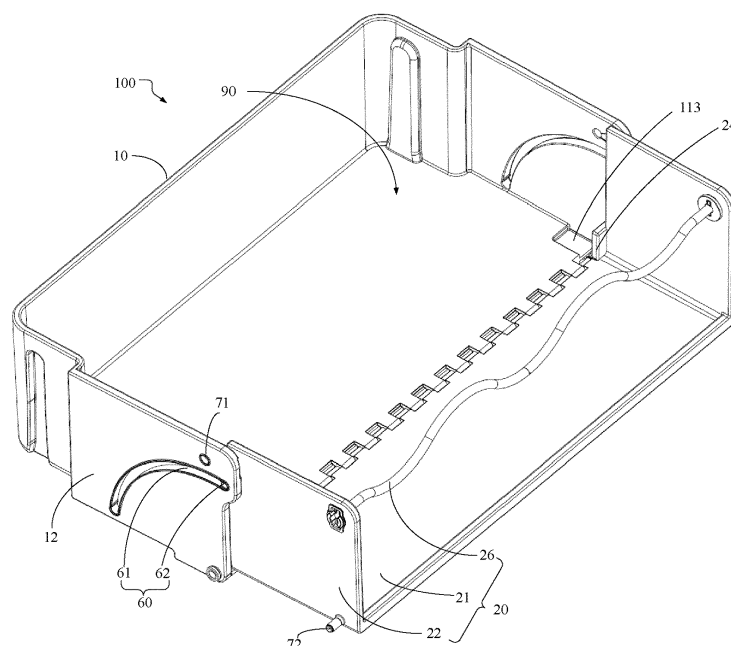


FIG. 3

Description

TECHNICAL FIELD

[0001] Embodiments of the present invention relate to the technical field of household appliances, and in particular, to a refrigerator and a storage device for a refrigerator.

BACKGROUND

[0002] With the popularity of refrigerators in people's daily life, increasingly more people start using a refrigerator to store food. At present, a storage device such as a bottle rack is generally placed on the door of the refrigerator for storage of bottles, cans, and some other items. However, at present, the storage space of the storage device such as a bottle rack is usually fixed, and when a relatively large number of items are required to be placed on the bottle rack, the storage space is generally insufficient, and the use flexibility of the storage space is relatively low.

SUMMARY

[0003] The technical problem solved by the present invention is the relatively low use flexibility of the storage space of the current storage device for a refrigerator.

[0004] In order to solve the above technical problem, an embodiment of the present invention provides a storage device for a refrigerator. The storage device includes a storage box body, and further includes a rotary frame. The storage box body includes a bottom plate, and the storage box body is hinged to the rotary frame. The rotary frame includes a rotary plate. When the rotary frame is at a first position relative to the storage box body, the rotary plate is used as a side wall of the storage device, and the storage device is in a normal state. When the rotary frame rotates relative to the storage box body until the rotary frame is at a second position relative to the storage box body, the rotary plate and the bottom plate of the storage box body are jointly used as a bottom wall of the storage device, the storage device is in an expanded state, and a storage space of the storage device in the expanded state is larger than the storage space in the normal state.

[0005] Compared with the prior art, the technical solutions of the embodiments of the present invention have the following beneficial effects:

The storage device for a refrigerator provided in the embodiment of the present invention may include a storage box body and a rotary frame. The storage box body is hinged to the rotary frame. The rotary frame includes a rotary plate. When the rotary frame is at a first position relative to the storage box body, the rotary plate is used as a side wall of the storage device, and the storage device is in a normal state. When the rotary frame rotates relative to the storage box body until the rotary frame is

at a second position relative to the storage box body, the rotary plate and the bottom plate of the storage box body are jointly used as a bottom wall of the storage device, the storage device is in an expanded state, and a storage space of the storage device in the expanded state is larger than the storage space in the normal state. By configuring the relative positions of the rotary frame and the storage box body, a size of the storage space of the storage device may be adjusted, so as to expand the storage space according to the actual demand, thereby improving the use flexibility of the storage space.

[0006] Optionally, the rotary plate is hinged to the bottom plate, and the rotary frame is rotatable around a hinge joint of the rotary plate and the bottom plate relative to the storage box body.

[0007] Optionally, the rotary frame includes a stop. When the storage device is in the normal state, the stop is constructed to partition the storage space of the storage device into two parts. When the storage device is in the expanded state, the stop is constructed to limit a side surface of the storage space of the storage device. Optionally, the stop includes a stop rod.

[0008] Optionally, the stop includes a baffle. When the storage device is in the normal state, the baffle is parallel to the rotary plate, and when the storage device is in the expanded state, the baffle is perpendicular to the rotary plate. Therefore, the position of the baffle in the mounting channel can be flexibly adjusted according to the state change of the storage device, so that the baffle varies with the expansion change of the storage device. An item in the storage device can be effectively protected and prevented from falling while the space use flexibility of the storage device is taken into account.

[0009] Optionally, the rotary frame includes a pair of first side plates. The pair of first side plates are respectively connected to two ends of the rotary plate. The rotary frame further includes a mounting channel arranged on the pair of first side plates. The mounting channel includes a first channel and a second channel in communication with each other. The first channel and the second channel respectively extend vertically and horizontally when the storage device is in the normal state. A connecting portion adapted to be received in the mounting channel is formed on each of two ends of the baffle facing the first side plates. When the storage device is in the normal state, the connecting portion is located in the first channel, and when the storage device is in the expanded state, the connecting portion is located in the second channel.

[0010] Optionally, the storage device for a refrigerator further includes a guide assembly. The guide assembly includes a guide groove and a guide member. One of the guide groove and the guide member is arranged on the storage box body, and the other of the guide groove and the guide member is arranged on the rotary frame. When the rotary frame rotates around the hinge joint with the storage box body relative to the storage box body, the guide member moves along the guide groove. The guide

assembly may be configured to guide the relative movement between the rotary frame and the storage box body, and may be further configured to limit the maximum moving position of the rotary frame relative to the storage box body. On the other hand, when the storage device is in the expanded state, the guide groove may further play the role of supporting the guide member, which can increase the support force of the rotary frame and improve the bearing capacity of the storage device after expansion.

[0011] Optionally, the rotary frame includes a pair of first side plates. The pair of first side plates are respectively connected to two ends of the rotary plate. The other of the guide groove and the guide member is arranged on each of the first side plates.

[0012] Optionally, the rotary frame includes a stop, and two ends of the stop are detachably connected to the pair of first side plates respectively. The stop is configured to be detachably connected to the pair of first side plates according to the use state of the storage device. The stop may be mounted or removed according to requirements when the storage device is in a normal state, which improves the utilization flexibility of the storage space. When the storage device is in an expanded state, the stop is mounted, so as to better protect the item stored in the storage device and prevent the item from falling.

[0013] Optionally, the storage box body includes a pair of second side plates. The pair of second side plates are respectively connected to two ends of the bottom plate. One of the guide groove and the guide member is arranged on each of the second side plates.

[0014] Optionally, in a process that the storage device is changed from the normal state to the expanded state, an overlapping area of the first side plate and the second side plate gradually decreases. In this way, a neat appearance may be ensured for the storage device while the storage device is expanded.

[0015] Optionally, the storage device further includes a limiting assembly. When the storage device is in the normal state, the limiting assembly is configured to prevent the rotation of the rotary frame relative to the storage box body. In this way, when the storage device is in a normal state, it may be ensured that the relative positions of the rotary frame and the storage box body are fixed, to avoid a situation that the rotary frame rotates relative to the storage box body due to the dumping of item in the storage device during the use of the storage device.

[0016] Optionally, the limiting assembly includes a limiting slot and a limiting bulge. One of the limiting slot and the limiting bulge is arranged on the second side plate, the other of the limiting slot and the limiting bulge is arranged on the first side plate, and the limiting slot matches the limiting bulge.

[0017] Optionally, the rotary plate has a rotary shaft, the bottom plate is provided with a first receiving cavity, and the rotary shaft is rotatably arranged in the first receiving cavity, so as to realize the hinge between the rotary frame and the storage box body. An embodiment

of the present invention further provides a refrigerator, including a door and a storage device in any of the above. The storage box body of the storage device is connected to the door.

BRIEF DESCRIPTION OF THE DRAWINGS

[0018]

FIG. 1 is a schematic diagram of a storage device according to an embodiment of the present invention in a normal state.

FIG. 2 is an exploded view of FIG. 1.

FIG. 3 is a schematic diagram of a storage device according to an embodiment of the present invention in an expanded state.

FIG. 4 is an exploded view of FIG. 3.

FIG. 5 is a schematic diagram of a state of a torsion spring when a storage device according to an embodiment of the present invention is in a normal state.

FIG. 6 is a schematic diagram of a state of a torsion spring from a perspective when a storage device according to an embodiment of the present invention is in an expanded state.

FIG. 7 is a schematic diagram of a state of a torsion spring from another perspective when a storage device according to an embodiment of the present invention is in an expanded state.

FIG. 8 is a partial schematic diagram of hinging of a rotary frame and a storage box body when a storage device according to an embodiment of the present invention is in a normal state.

FIG. 9 is a partial schematic diagram of hinging of a rotary frame and a storage box body when a storage device according to an embodiment of the present invention is in an expanded state.

FIG. 10 is a partial schematic diagram of engagement of a bump and a groove when a storage device according to an embodiment of the present invention is in a normal state.

FIG. 11 is a partial schematic diagram of relative positions of a bump and a groove when a storage device according to an embodiment of the present invention is in an expanded state.

FIG. 12 is a partial schematic diagram of relative positions of a bump and a groove from another perspective when a storage device according to an embodiment of the present invention is in an expanded state.

FIG. 13 is a schematic diagram of mounting of an assembling member and a mounting port according to an embodiment of the present invention.

FIG. 14 is a schematic structural diagram of an assembling member according to an embodiment of the present invention.

FIG. 15 is a partial schematic structural diagram of a first side plate according to an embodiment of the present invention.

FIG. 16 is a schematic diagram of relative positions of an assembly mating portion and a stop according to an embodiment of the present invention.

FIG. 17 is a schematic diagram of relative positions of a rotary shaft and a torsion spring as well as a fixing portion according to an embodiment of the present invention.

FIG. 18 is a schematic structural diagram of a fixing portion according to an embodiment of the present invention.

Descriptions of numerals in the drawings:

[0019] Storage device-100; Side wall-30; Bottom wall-40; Storage space-90; Storage box body-10; Bottom plate-11; First receiving cavity-111; Opening-1111; Groove-1112; Second stop surface-1114; Second receiving cavity-112; Second side plate-12; Shaft hole-121; First recessed portion-122; A second recessed portion-113; Rotary frame-20; Rotary plate-21; Stop-26; First side plate-22; Rotary shaft-211; Torsion spring-23; First end of the torsion spring-231; Second end of the torsion spring-232; Abutting plate-24; Bump-25; First stop surface-251; Mounting port-261; Assembling member-262; Assembly mating portion-263; Limiting rib-2631; Hooking portion-2621; Accommodating portion-2622; Guide assembly-60; Guide groove-61; Guide member-62; Limiting assembly-70; Limiting slot-71; Limiting bulge-72; Guiding portion-73; Fixing portion-80; Receiving groove-81; Protrusion-82.

DETAILED DESCRIPTION

[0020] To make the objectives, features and beneficial effects of the embodiments of the present invention more comprehensible, specific embodiments of the present invention are further described in detail below with reference to the accompanying drawings.

[0021] Embodiments of the present invention provide a storage device for a refrigerator. Referring to FIG. 1, FIG. 1 is a schematic diagram of a storage device according to an embodiment of the present invention in a normal state. FIG. 2 is an exploded view of FIG. 1. FIG. 3 is a schematic diagram of a storage device according to an embodiment of the present invention in an expanded state. FIG. 4 is an exploded view of FIG. 3. A structure of the storage device is described below with reference to FIG. 1 to FIG. 4.

[0022] During specific implementation, a storage device 100 may be used in a refrigerator. In some embodiments, the storage device 100 may be connected to a door of the refrigerator. Further, the storage device 100 is connected to a side of the door of the refrigerator facing a storage compartment of the refrigerator.

[0023] The storage device 100 may include a storage box body 10 and a rotary frame 20. The rotary frame 20 may include a rotary plate 21. The storage box body 10 may include a bottom plate 11.

[0024] The storage box body 10 is hinged to the rotary frame 20. Since the storage box body 10 is hinged to the rotary frame 20, the rotary frame 20 may rotate relative to the storage box body 10. When the rotary frame 20 is at a first position relative to the storage box body 10, the rotary plate 21 is used as a side wall 30 of the storage device 100. In this case, the storage device 100 is in a normal state.

[0025] When the rotary frame 20 rotates relative to the storage box body 10 until the rotary frame 20 is at a second position relative to the storage box body 10, the rotary plate 21 and the bottom plate 11 of the storage box body 10 are jointly used as a bottom wall 40 of the storage device 100. In this case, the storage device 100 is in an expanded state. A storage space 90 of the storage device 100 in the expanded state is larger than the storage space 90 in the normal state. That is to say, when the storage device 100 is changed from the normal state to the expanded state, a size of the storage space 90 can be increased.

[0026] In some non-limiting embodiments, the side wall 30 may be parallel to the door.

[0027] In some embodiments, when the storage device 100 is used in the refrigerator, in order to facilitate the expansion operation of the storage device 100, the storage box body 10 is closer to the door than the rotary frame 20, and is connected to the door through the storage box body 10. The storage device 100 is configured to be far away from the door relative to the rotary frame 20, to cause the rotary frame 20 to be exposed to the outside, thereby providing a larger operating space. In this way, the storage device 100 may be expanded without disassembly when needed, enabling a more convenient expansion operation.

[0028] In some non-limiting embodiments, the rotary plate 21 is hinged to the bottom plate 11, and the rotary frame 20 is rotatable around a hinge joint of the rotary frame 20 and the bottom plate 11 relative to the storage box body 10.

[0029] During specific implementation, the rotary frame 20 may further include a stop 26. When the storage device 100 is in the normal state, the stop 26 is constructed to partition the storage space 90 of the storage device 100 into two parts.

[0030] When the storage device 100 is in the expanded state, the stop 26 is constructed to limit a side surface of the storage space 90 of the storage device 100, and is used as the side wall 30 of the storage device 100. Through such arrangement of the stop 26, on the one hand, when the storage device 100 is in the normal state, the stop 26 does not affect the utilization of the storage space 90 of the storage device 100, and on the other hand, when the storage device 100 is in the expanded state, the stop 26 is used as the side wall 30 of the storage device 100 to define the storage space 90. The stop 26 can protect the item placed in the storage device 100 to prevent the item in the storage device 100 from falling.

[0031] During specific implementation, the stop 26

may be configured in various suitable shapes. For example, the stop 26 may be configured as a stop rod, a baffle, or the like.

[0032] In FIG. 1 to FIG. 4, a structure of the stop 26 is illustrated by using the stop rod as an example. The stop rod may be in a suitable shape such as a straight-line shape, a curved wave shape, or the like. When the stop rod is curved and wavy, the storage space 90 of the storage device 100 may be unevenly partitioned into two parts, so that the two spaces resulting from the partitioning may present alternating smaller and larger internal sizes, thereby satisfying placing requirements of items of different sizes. In addition, the curved and wavy stop rod may have a plurality of different blocking heights when being used as the side wall 30 of the storage device 100, to satisfy storage requirements of items with different heights.

[0033] In order to further improve the flexibility of utilization of the storage space 90 of the storage device 100, the connection mode of the stop 26 is configured as detachable connection. For example, when the rotary frame 20 includes a pair of first side plates 22 opposite to each other, two ends of the stop 26 are detachably connected to the pair of first side plates 22 respectively. The stop 26 is configured to be detachably connected, so that the stop 26 is reasonably mounted or detached according to a use state of the storage device 100. For example, when the storage device 100 is in the expanded state, the stop 26 may be mounted, and the stop 26 may be used as the side wall 30 of the storage space 90 to protect the item stored in the storage device 100 from falling. In another example, when the storage device 100 is in the normal state, in this case, the stop 26 may be disassembled to ensure the integrity of the storage space 90, so as to fully and flexibly utilize the storage space, without being limited by the partitioning of the storage space 90 by the stop 26.

[0034] Referring to FIG. 13, FIG. 13 is a schematic diagram of mounting of an assembling member and a mounting port according to an embodiment of the present invention. Referring to FIG. 14, FIG. 14 is a schematic structural diagram of an assembling member according to an embodiment of the present invention. Referring to FIG. 15, FIG. 15 is a partial schematic structural diagram of a first side plate according to an embodiment of the present invention. With reference to FIG. 1 to FIG. 4 and FIG. 13 to FIG. 15, during specific implementation, the storage device 100 may further include an assembling member 262 and an assembly mating portion 263 which are detachable and mountable and configured to mate with the stop 26.

[0035] A number of assembly mating portions 263 may be two, which are respectively arranged at two ends of the stop 26, and the assembly mating portion 263 matches the assembling member 262.

[0036] In some embodiments, the assembly mating portion 263 may be integrally formed on the stop 26 and is used as a part of the stop 26.

[0037] In some other embodiments, the assembly mating portion 263 may further be relatively independent from the stop 26, and may be detachably connected to the stop 26 through suitable connection modes such as bonding, engagement, threaded connection, and the like, or fixedly connected to the stop 26 through suitable connection modes such as welding, riveting, and the like.

[0038] During specific implementation, referring to FIG. 16, the assembly mating portion 263 may be provided with a limiting rib 2631. The limiting rib 2631 protrudes from an outer surface of the assembly mating portion 263 and extends away from the outer surface of the assembly mating portion 263. After the assembly mating portion 263 and the assembling member 262 are mounted, the limiting rib 2631 may be used to limit relative positions of the assembly mating portion 263 and the assembling member 262 to prevent the assembly mating portion 263 from moving relative to the assembling member 262, to ensure the assembly firmness of the stop rod 26, and prevent the stop rod 26 from loosening, thereby preventing the item in the storage device 100 from falling due to the loosening of the stop rod 26.

[0039] Referring to FIG. 13 to FIG. 15, the first side plate 22 may be provided with a mounting port 261, the mounting port 261 matches the assembling member 262 to connect the assembling member 262 to the mounting port 261. Specifically, with reference to FIG. 14, the assembling member 262 may be provided with a pair of hooking portions 2621 and an accommodating portion 2622. The hooking portion 2621 may be a pair of hooks. The pair of hooks may be deformed after being squeezed by the mounting port 261, and is caught by the mounting port 261 after passing through the mounting port 261, to connect the stop 26 to the first side plate 22. The accommodating portion 2622 is configured to accommodate the assembly mating portion 263.

[0040] In some embodiments, when the stop 26 is a baffle, the baffle may be configured to rotate relative to the rotary plate 21. Specifically, when the storage device 100 is in a normal state, the baffle is parallel to the rotary plate 21, and when the storage device 100 is in the expanded state, the baffle is perpendicular to the rotary plate 21. In this way, when the storage device 100 is in a normal state, the baffle is parallel to the rotary plate 21, so that the occupation of the opening of the storage space 90 by the baffle can be minimized, which facilitates full utilization of the storage space 90. When the storage device 100 is in the expanded state, the baffle is perpendicular to the rotary plate 21. In this case, the rotary plate 21 is used as the bottom wall 40 of the storage device 100, that is to say, the baffle is perpendicular to the bottom wall 40. In this way, the baffle can have a better resisting effect, better protect the item in the storage device 100, and prevent the item from falling.

[0041] The rotary frame 20 may include a pair of first side plates 22. The pair of first side plates 22 are respectively connected to two ends of the rotary plate 21. The rotary frame 20 may further include a mounting channel,

and the pair of first side plates 22 are respectively provided with the mounting channel. The mounting channel includes a first channel and a second channel in communication with each other. When the storage device 100 is in the normal state, the first channel extends vertically and the second channel extends horizontally. A connecting portion adapted to be received in the mounting channel is formed on each of two ends of the baffle facing the first side plates 22, that is, the connecting portion is connected to the mounting channel. When the storage device 100 is in the normal state, the connecting portion is located in the first channel. In this case, the baffle is parallel to the rotary plate 21, to minimize the occupation of the opening of the storage device 100 by the baffle, which facilitates full utilization of the storage space 90. When the storage device 100 is in the expanded state, the connecting portion is located in the second channel. In this case, the rotary plate 21 is used as the bottom wall 40 of the storage device 100, that is to say, the baffle is perpendicular to the bottom wall 40. In this way, the baffle can have a better resisting effect, better protect the item in the storage device 100, and prevent the item from falling. Therefore, the position of the baffle in the mounting channel can be flexibly adjusted according to the state change of the storage device 100, so that the baffle varies with the expansion change of the storage device 100. The item in the storage device 100 can be effectively protected and prevented from falling while the space use flexibility of the storage device 100 is taken into account.

[0042] During specific implementation, the storage device 100 may include a guide assembly 60. The guide assembly 60 may include a guide groove 61 and a guide member 62. One of the guide groove 61 and the guide member 62 is arranged on the storage box body 10.

[0043] The other of the guide groove 61 and the guide member 62 is arranged on the rotary frame 20. When the rotary frame 20 rotates relative to the storage box body 10 around the hinge joint with the storage box body 10, the guide member 62 moves along the guide groove 61. The guide assembly 60 may be configured to guide the relative movement between the rotary frame 20 and the storage box body 10, and may be further configured to limit the maximum moving position of the rotary frame 20 relative to the storage box body 10. On the other hand, when the storage device 100 is in the expanded state, the guide groove 61 may further play the role of supporting the guide member 62, which can increase the support force of the rotary frame 20 and improve the bearing capacity of the storage device 100 after expansion. The accompanying drawings given by the embodiments of the present invention are illustrated by using the guide groove 61 arranged on the storage box body 10 and the guide member 62 arranged on the rotary frame 20 as examples. When the guide groove 61 is arranged on the rotary frame 20 and the guide member 62 is arranged on the storage box body 10, it is only necessary to make adaptive modification according to the above illustration,

which is not illustrated herein again by the accompanying drawings.

[0044] Further, in order to improve the smoothness and stability of the rotary frame 20 during rotation relative to the storage box body 10, the guide groove 61 may be arc-shaped. The guide member 62 may be cylindrical. In some embodiments, as long as a shape of the guide member 62 matches the guide groove 61, the guide groove 61 and the guide member 62 may be in other suitable shapes.

[0045] Further, in some embodiments, when the rotary frame 20 includes a pair of first side plates 22, the pair of first side plates 22 are respectively connected to two ends of the rotary plate 21. The other of the guide groove 61 and the guide member 62 is arranged on each of the first side plates 22.

[0046] During specific implementation, the storage box body 10 further includes a pair of second side plates 12. The pair of second side plates 12 are respectively connected to two ends of the bottom plate 11. The other of the guide groove 61 and the guide member 62 is arranged on each of the second side plates 12. That is to say, the guide groove 61 is arranged on the second side plate 12, and the guide member 62 is arranged on the first side plate 22. Alternatively, the guide groove 61 is arranged on the first side plate 22, and the guide member 62 is arranged on the second side plate 12.

[0047] For example, the guide groove 61 is arranged on the second side plate 12, and the guide member 62 is arranged on the first side plate 22. In order to facilitate the mounting and rotation of the rotary frame 20, the pair of first side plates 22 may be located inside the pair of second side plates 12, so that a distance between the pair of first side plates 22 is less than a distance between the pair of second side plates 12.

[0048] The guide groove 61 may extend through the second side plate 12, so as to observe the position of the guide member 62 in the guide groove 61, which also facilitates the assembly of the guide member 62 and the guide groove 61. The guide groove 61 may not extend through the second side plate 12. Specifically, the guide groove 61 does not extend through an outer surface of the second side plate 12, and a recess is formed by an inner surface of the second side plate 12 toward the outer surface. In this way, aesthetics of the overall appearance of the storage device 100 can be improved. The guide member 62 may be arranged on a side of the first side plate 22 facing the second side plate 12, that is to say, the guide member is arranged on an outer surface of the first side plate 22.

[0049] Further, referring to FIG. 1, when the pair of first side plates 22 are located inside the pair of second side plates 12, in order to improve the aesthetics and orderliness of the internal structure of the storage device 100, the second side plate 12 may further include a first recessed portion 122 recessed toward the inside of the storage space 90. The inner surface of the first recessed portion 122 is basically on the same surface as the inner

surface of the first side plate 22. In this way, the orderliness of the inner surface of the storage device 100 can be ensured when the storage device 100 is in a normal state.

[0050] In addition, the first recessed portion 122 may be provided with a catching portion 1221. The catching portion 1221 is configured to mount the storage device 100 to the door. It should be noted that the catching portion 1221 is not limited to the roughly inverted U-shaped structure shown in the figure, but may be other suitable structures, as long as the storage device 100 can be mounted to the door, which is not limited herein.

[0051] During specific implementation, in a process that the storage device 100 is changed from the normal state to the expanded state, an overlapping area of the first side plate 22 and the second side plate 12 gradually decreases. When the storage device 100 is in the normal state, an overlapping area of the first side plate 22 and the second side plate 12 is the largest. When the storage device 100 is in the expanded state, an overlapping area of the first side plate 22 and the second side plate 12 is the smallest.

[0052] During specific implementation, with reference to FIG. 2, the storage device 100 may further include a limiting assembly 70. When the storage device 100 is in the normal state, the limiting assembly 70 may be configured to prevent the rotation of the rotary frame 20 relative to the storage box body 10. In this way, when the storage device 100 is in the normal state, it may be ensured that the relative positions of the rotary frame 20 and the storage box body 10 are fixed, to avoid a situation that the rotary frame 20 rotates relative to the storage box body 10 due to the dumping of item in the storage device 100 during the use of the storage device 100.

[0053] In some non-limiting embodiments, the limiting assembly 70 may include a limiting slot 71 and a limiting bulge 72. One of the limiting slot 71 and the limiting bulge 72 is arranged on the second side plate 12, and the other of the limiting slot 71 and the limiting bulge 72 is arranged on the first side plate 22. The limiting slot 71 matches the limiting bulge 72, and the relative positions of the storage box body 10 and the rotary frame 20 may be limited by the engagement of the limiting slot 71 and the limiting bulge 72.

[0054] It should be noted that the accompanying drawings given by the embodiment of the present invention shows that the limiting slot 71 is arranged on the second side plate 12 and the limiting bulge 72 is arranged on the first side plate 22 by way of example. When the limiting slot 71 is arranged on the first side plate 22 and the limiting bulge 72 is arranged on the second side plate 12, the limiting slot and the limiting bulge may be adaptively deformed based on the given schematic diagrams, which are not illustrated herein.

[0055] In some embodiments, the limiting slot 71 may be a hole, and the limiting bulge 72 may be a columnar structure protruding from the second side plate 12. When the limiting bulge 72 is located in the limiting slot 71, the

relative movement of the first side plate 22 and the second side plate 12 may be limited, and then the relative movement of the rotary frame 20 relative to the storage box body 10 is limited. When the storage device 100 needs to be expanded, the limiting bulge 72 exits from the limiting slot 71, the engagement of the limiting bulge 72 with the limiting slot 71 is released, and the storage device 100 is changed from the normal state to the expanded state. It should be noted that the limiting slot 71 is not limited to the hole shown in the figure, and the limiting bulge 72 is not limited to the cylindrical structure, but may further be other structures with suitable shapes, as long as an internal shape of the limiting slot 71 matches an external shape of the limiting bulge 72.

[0056] It may be understood that the specific structural form of the limiting assembly 70 is not limited to the limiting slot 71 and the limiting bulge 72 described above, and may further be other structural forms, such as an engagement structure, a hook structure, and the like, as long as the limiting assembly 70 can limit the relative positions of the storage box body 10 and the rotary frame 20 when the storage device 100 is in a normal state, to avoid the relative movement of the positions of the storage box body and the rotary frame.

[0057] Further, in order to cause the limiting bulge 72 to enter the limiting slot 71 more easily, the limiting assembly 70 may further include a guiding portion 73. The guiding portion 73 is configured to guide the limiting bulge 72 into the limiting slot 71. When the limiting slot 71 is arranged on the second side plate 12 and the limiting bulge 72 is arranged on the first side plate 22, the guiding portion 73 is arranged on the second side plate 12. The guiding portion 73 may extend from the limiting slot 71 to a first edge of the second side plate 12, the first edge of the second side plate 12 faces the rotary frame 20, and a surface of the guiding portion 73 is lower than a surface of the second side plate 12. That is to say, a partial region of the second side plate 12 is recessed to form the guiding portion 73.

[0058] In some non-limiting embodiments, from the limiting slot 71 to the first edge of the second side plate 12, a width of the guiding portion 73 is gradually increased, and the guiding portion 73 is generally trumpet-shaped to better guide the limiting bulge 72 into the limiting slot 71.

[0059] The hinging between the rotary frame 20 and the storage box body 10 can be realized in a plurality of manners. In some non-limiting embodiments, the rotary plate 21 has a rotary shaft 211, the bottom plate 11 is provided with a first receiving cavity 111, and the rotary shaft 211 is rotatably arranged in the first receiving cavity 111, to realize the rotation of the rotary frame 20 relative to the storage box body 10. Specifically, the first receiving cavity 111 is arranged at a first edge of the bottom plate 11 facing the rotary frame 20. The rotary shaft 211 is arranged at an edge of the rotary plate 21 facing the storage box body 10. Referring to FIG. 8, FIG. 8 is a partial schematic diagram of hinging of a rotary frame

and a storage box body when a storage device according to an embodiment of the present invention is in a normal state. Referring to FIG. 9, FIG. 9 is a partial schematic diagram of hinging of a rotary frame and a storage box body when a storage device according to an embodiment of the present invention is in an expanded state. During specific implementation, with reference to FIG. 2, FIG. 8, and FIG. 9, in order to facilitate the mounting of the rotary frame 20 and the storage box body 10, the first receiving cavity 111 has an opening 1111. An extending direction of the first opening 1111 is the same as an axial direction of the rotary shaft 211.

[0060] In some non-limiting embodiments, a width of the first opening 1111 may be less than a radius of the rotary shaft 211, to prevent the rotary shaft 211 from falling off from the first receiving cavity 111 while facilitating the mounting of the rotary shaft 211 in the first receiving cavity 111.

[0061] Referring to FIG. 10, FIG. 10 is a partial schematic diagram of engagement of a bump and a groove when a storage device according to an embodiment of the present invention is in a normal state. FIG. 11 is a partial schematic diagram of relative positions of a bump and a groove when a storage device according to an embodiment of the present invention is in an expanded state. FIG. 12 is a partial schematic diagram of relative positions of a bump and a groove from another perspective when a storage device according to an embodiment of the present invention is in an expanded state. Referring to FIG. 2 and FIG. 10 to FIG. 12, in some embodiments, the rotary frame 20 may further include a plurality of bumps 25 arranged at intervals. The plurality of bumps 25 are connected to a partial surface of the rotary shaft 211. A plurality of grooves 1112 are arranged at intervals in the first receiving cavity 111. The grooves 1112 are used for receiving the bumps 25.

[0062] In some embodiments, each of the bumps 25 has a first stop surface 251, and the groove 1112 has a second stop surface 1114. When the storage device 100 is in a normal state, the first stop surface 252 is engaged with the second stop surface 1114 to prevent the rotation of the rotary frame 20 relative to the storage box body 10.

[0063] The storage box body 10 includes a pair of second side plates 12. The pair of second side plates 12 are respectively connected to two ends of the bottom plate 11. Each of the second side plates 12 is provided with a shaft hole 121, and the two ends of the rotary shaft 211 respectively extend through the corresponding shaft holes 121 to connect the rotary plate 21 to the storage box body 10.

[0064] FIG. 17 is a schematic diagram of relative positions of a rotary shaft and a torsion spring as well as a fixing portion according to an embodiment of the present invention. During specific implementation, the storage device 100 may further include a fixing portion 80. The fixing portion 80 extends through the shaft hole 121 and is sleeved on an end of the rotary shaft 211 to rotatably connect the rotary shaft 211 to the second side plate 12.

[0065] FIG. 18 is a schematic structural diagram of a fixing portion according to an embodiment of the present invention. In some non-limiting embodiments, with reference to FIG. 17 and FIG. 18, in order to improve the firmness of the connection between the fixing portion 80 and the rotary shaft 211, the inside of the fixing portion 80 has a receiving groove 81, and the rotary shaft 211 has a protrusion 82. The receiving groove 81 matches the protrusion 82 and is used for receiving the protrusion 82. Specifically, the receiving groove 81 is ring-shaped and is formed by recessing an inner surface of the fixing portion 80. The protrusion 82 may be formed by protruding an outer surface of the rotary shaft 211 toward the outside, and the protrusion 82 may be a continuous ring-shaped protrusion, or may be formed by a plurality of sub-protrusions axially arranged along the outer surface of the rotary shaft 211.

[0066] It may be understood that the receiving groove 81 may further be arranged on the rotary shaft 211, and the protrusion 82 may further be arranged on the fixing portion 80. Specifically, the receiving groove 81 may be ring-shaped and is formed by recessing an outer surface of the rotary shaft 211 toward the inside. The protrusion 82 may be formed by protruding the inner surface of the fixing portion 80 toward the inside, and the protrusion 82 may be a continuous ring-shaped protrusion, or may be formed by a plurality of sub-protrusions axially arranged along the outer surface of the rotary shaft 211.

[0067] FIG. 5 is a schematic diagram of a state of a torsion spring when a storage device according to an embodiment of the present invention is in a normal state. Referring to FIG. 6 and FIG. 7, FIG. 6 and FIG. 7 are respectively schematic diagrams of states of a torsion spring from different perspectives when a storage device according to an embodiment of the present invention is in an expanded state. With reference to FIG. 1 to FIG. 7, during specific implementation, in order to ensure the firmness of fixing the relative positions of the rotary frame 20 and the storage box body 10 when the storage device 100 is in the expanded state, the storage device 100 may further include a torsion spring 23. The torsion spring 23 is sleeved on two ends of the rotary shaft 211. A first end 231 of the torsion spring 23 is connected to the bottom plate 11, and a second end 232 of the torsion spring 23 is connected to the rotary frame 20. The torsion spring 23 may be configured such that when the storage device 100 is in a normal state, the torsion spring 23 is in a compressed state, and when the storage device 100 is in an expanded state, the torsion spring 23 is in a free state.

[0068] In this way, when the torsion spring 23 is in a free state, the first end 231 of the torsion spring 23 abuts against the bottom plate 11, and the second end 232 of the torsion spring 23 abuts against the rotary frame 20, to avoid the relative movement of the storage box body 10 and the rotary frame 20 at the limited relative positions of the rotary frame 20 and the storage box body 10.

[0069] In some embodiments, the torsion spring 23

may adopt a 90° torsion spring. When the storage device 100 includes the limiting assembly 70, and when the limiting bulge 72 is disengaged from the limiting slot 71, the torsion spring 23 is to be recovered from the compressed state to the free state. An elastic force of the torsion spring 23 can drive the rotary frame 20 to rotate relative to the storage box body 10, thereby realizing automatic switching of the storage device 100 from the normal state to the expanded state, and improving the simplicity of the expansion operation.

[0070] Further, with reference to FIG. 5 and FIG. 6, the bottom plate 11 is provided with a second receiving cavity 112. The second receiving cavity 112 is used for receiving the first end 231 of the torsion spring 23. That is to say, the first end 231 of the torsion spring 23 is connected to the bottom plate 11 through the second receiving cavity 112.

[0071] Further, with reference to FIG. 5 to FIG. 7, the rotary frame 20 is provided with an abutting plate 24. The abutting plate 24 is used for abutting against the second end 232 of the torsion spring 23. When the storage device 100 is in the normal state, the abutting plate 24 is substantially parallel to the bottom plate 11. When the storage device 100 is in the expanded state, the abutting plate 24 is substantially perpendicular to the bottom plate 11.

[0072] Further, in order to ensure flatness of the bottom wall 40 of the storage device 100, the bottom plate 11 may be further provided with a second recessed portion 113. The second recessed portion 113 is located above the second receiving cavity 112. The second recessed portion 113 is used for receiving the abutting plate 24.

[0073] During specific implementation, the storage device 100 may further include a side wall connected to the second side plate 12, and the side wall, a pair of second side plates 12, the bottom plate 11, and the rotary frame 20 jointly define a storage space 90 of the storage device 100.

[0074] It may be learned from the above that the storage device for a refrigerator provided in the embodiment of the present invention may include the storage box body and the rotary frame. The storage box body is hinged to the rotary frame. The rotary frame includes a rotary plate. When the rotary frame is at a first position relative to the storage box body, the rotary plate is used as a side wall of the storage device, and the storage device is in a normal state. When the rotary frame rotates relative to the storage box body until the rotary frame is at a second position relative to the storage box body, the rotary plate and the bottom plate of the storage box body are jointly used as a bottom wall of the storage device, the storage device is in an expanded state, and a storage space of the storage device in the expanded state is larger than the storage space in the normal state. By configuring the relative positions of the rotary frame and the storage box body, a size of the storage space of the storage device may be adjusted, so as to expand the storage space according to the actual demand, thereby improving the use

flexibility of the storage space.

[0075] An embodiment of the present invention further provides a refrigerator. The refrigerator includes a door and a storage device. The storage device is arranged on the door. The storage device may be the storage device 100 provided in any of the above embodiments, and the storage device 100 may be connected to the door through the storage box body 10 of the storage device 100. For a specific structure of the storage device 100, reference may be made to the description in the above embodiments, and details are not described herein again.

[0076] Although specific implementations have been described above, these implementations are not intended to limit the scope of the present invention, even if only one implementation is described with respect to specific features. The feature examples provided in the present invention are intended to be illustrative rather than limiting, unless otherwise stated. In a specific implementation, technical features of one or more dependent claim and technical features of independent claims are combined according to actual requirements and in a feasible technology. Technical features from corresponding independent claims may be combined by any proper manner rather than only by a specific combination exemplified in the claims.

[0077] Although the present invention is disclosed above, the present invention is not limited thereto. A person skilled in the art can make various changes and modifications without departing from the spirit and the scope of the present invention. Therefore, the protection scope of the present invention should be subject to the scope defined by the claims.

Claims

1. A storage device for a refrigerator, comprising a storage box body (10), **characterized in that** the storage device (100) further comprises a rotary frame (20);

the storage box body (10) comprises a bottom plate (11), and the storage box body (10) is hinged to the rotary frame (20); and the rotary frame (20) comprises a rotary plate (21), wherein

when the rotary frame (20) is at a first position relative to the storage box body (10), the rotary plate (21) is used as a side wall (30) of the storage device (100), and the storage device (100) is in a normal state; and

when the rotary frame (20) rotates relative to the storage box body (10) until the rotary frame (20) is at a second position relative to the storage box body (10), the rotary plate (21) and the bottom plate (11) of the storage box body (10) are jointly used as a bottom wall (40) of the storage device (100), the storage device (100) is in an expanded state, and a storage space (90) of the

storage device (100) in the expanded state is larger than the storage space (90) in the normal state.

2. The storage device according to claim 1, **characterized in that** the rotary plate (21) is hinged to the bottom plate (11), and the rotary frame (20) is rotatable around a hinge joint of the rotary plate (21) and the bottom plate (11) relative to the storage box body (10). 5
3. The storage device for a refrigerator according to claims 1 or 2, **characterized in that** the rotary frame (20) comprises a stop (26), wherein when the storage device (100) is in the normal state, the stop (26) is constructed to partition the storage space (90) of the storage device (100) into two parts, and when the storage device (100) is in the expanded state, the stop (26) is constructed to limit a side surface of the storage space (90) of the storage device (100). 10 15 20
4. The storage device according to claim 3, **characterized in that** the stop (26) comprises a stop rod.
5. The storage device according to claims 3 or 4, **characterized in that** the stop (26) comprises a baffle, wherein when the storage device (100) is in the normal state, the baffle is parallel to the rotary plate (21), and when the storage device (100) is in the expanded state, the baffle is perpendicular to the rotary plate (21). 25 30
6. The storage device according to one or more of claims 1 to 5, **characterized in that** the rotary frame (20) comprises a pair of first side plates (22), wherein the pair of first side plates (22) are respectively connected to two ends of the rotary plate (21), the rotary frame (20) further comprises a mounting channel arranged on the pair of first side plates (22), the mounting channel comprises a first channel and a second channel in communication with each other, and the first channel and the second channel respectively extend vertically and horizontally when the storage device (100) is in the normal state; and a connecting portion adapted to be received in the mounting channel is formed on each of two ends of the baffle facing the first side plates (22), when the storage device (100) is in the normal state, the connecting portion is located in the first channel, and when the storage device (100) is in the expanded state, the connecting portion is located in the second channel. 35 40 45 50
7. The storage device according to one or more of claims 1 to 6, **characterized by** further comprising a guide assembly (60), wherein the guide assembly (60) comprises a guide groove (61) and a guide member (62), one of the guide groove (61) and the guide member (62) is arranged on the storage box body (10), the other of the guide groove (61) and the guide member (62) is arranged on the rotary frame (20), and when the rotary frame (20) rotates around the hinge joint with the storage box body (10) relative to the storage box body (10), the guide member (62) moves along the guide groove (61). 55
8. The storage device according to claim 7, **characterized in that** the rotary frame (20) comprises a pair of first side plates (22), wherein the pair of first side plates (22) are respectively connected to two ends of the rotary plate (21), and the other of the guide groove (61) and the guide member (62) is arranged on each of the first side plates (22).
9. The storage device for a refrigerator according to claim 8, **characterized in that** the rotary frame (20) comprises a stop (26), wherein two ends of the stop (26) are detachably connected to the pair of first side plates (22) respectively.
10. The storage device according to one or more of claims 7 to 9, **characterized in that** the storage box body (10) comprises a pair of second side plates (12), wherein the pair of second side plates (12) are respectively connected to two ends of the bottom plate (11), and one of the guide groove (61) and the guide member (62) is arranged on each of the second side plates (12).
11. The storage device according to claim 10, **characterized in that** in a process that the storage device (100) is changed from the normal state to the expanded state, an overlapping area of the first side plate (22) and the second side plate (12) gradually decreases.
12. The storage device according to one or more of claims 10, **characterized in that** the storage device (100) further comprises a limiting assembly (70), wherein when the storage device (100) is in the normal state, the limiting assembly (70) is configured to prevent the rotation of the rotary frame (20) relative to the storage box body (10).
13. The storage device according to claim 12, **characterized in that** the limiting assembly (70) comprises a limiting slot (71) and a limiting bulge (72), wherein one of the limiting slot (71) and the limiting bulge (72) is arranged on the second side plate (12), the other of the limiting slot (71) and the limiting bulge (72) is arranged on the first side plate (22), and the limiting slot (71) matches the limiting bulge (72).
14. The storage device according to one more of claims 1 to 13, **characterized in that** the rotary plate (21) has a rotary shaft (211), the bottom plate (11) is provided with a first receiving cavity (111), and the rotary

shaft (211) is rotatably arranged in the first receiving cavity (111).

15. A refrigerator, comprising a door, **characterized by** further comprising the storage device (100) according to any of claims 1 to 14, wherein the storage box body (10) of the storage device (100) is connected to the door.

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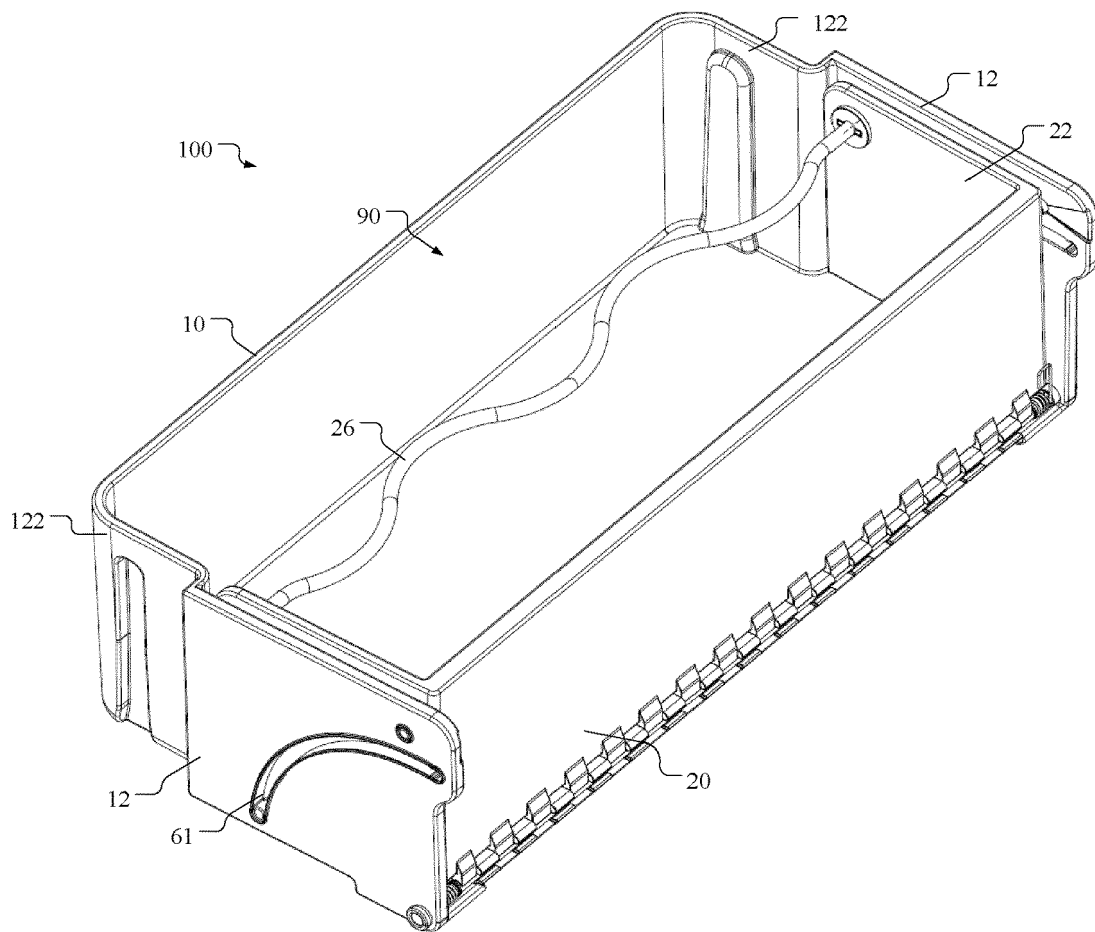


FIG. 1

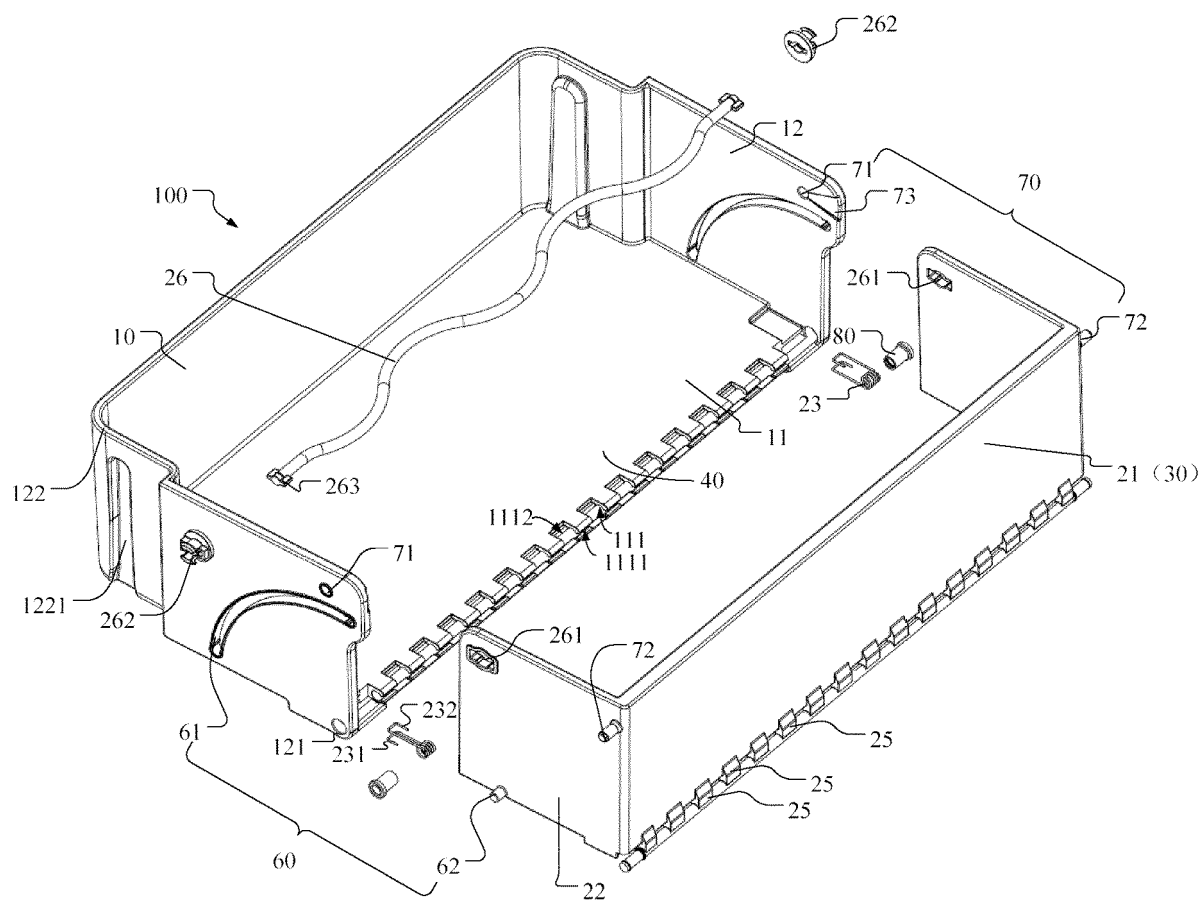


FIG. 2

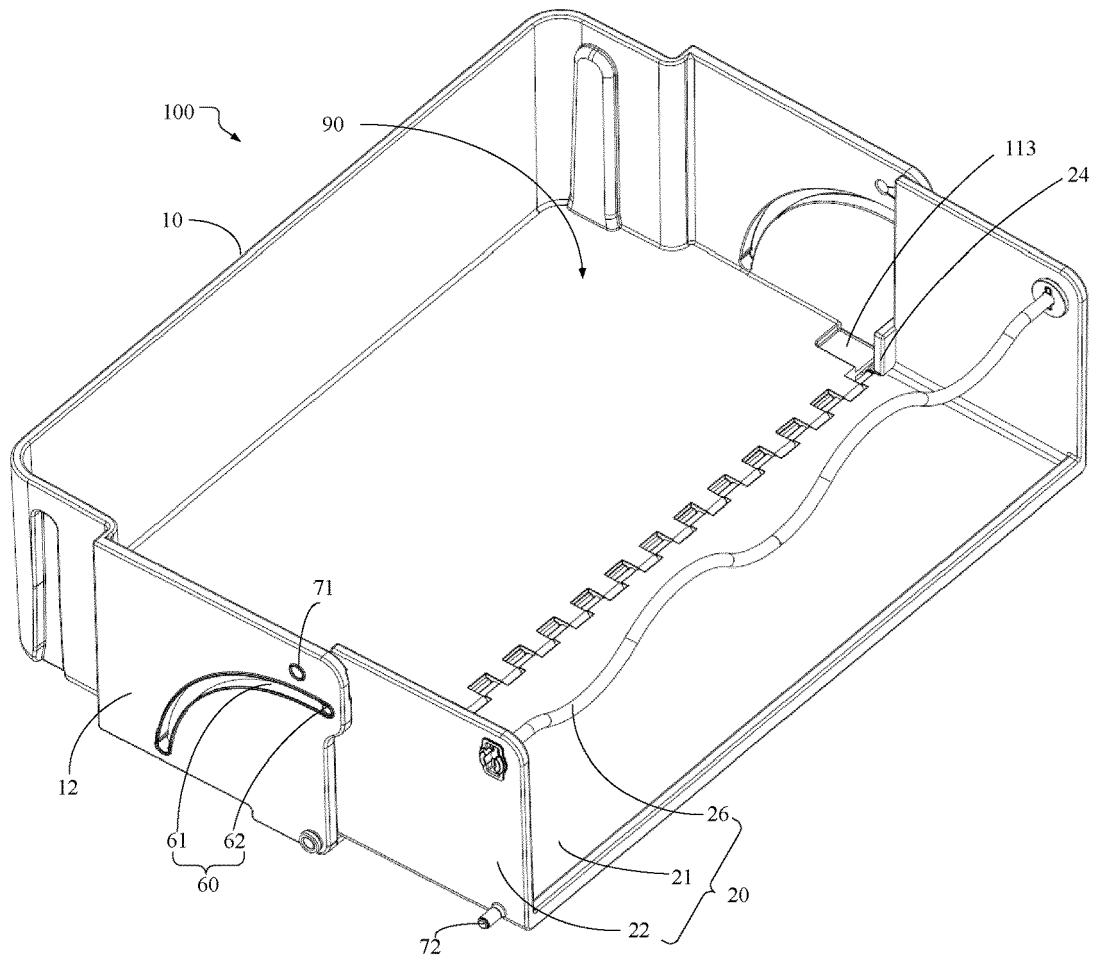


FIG. 3

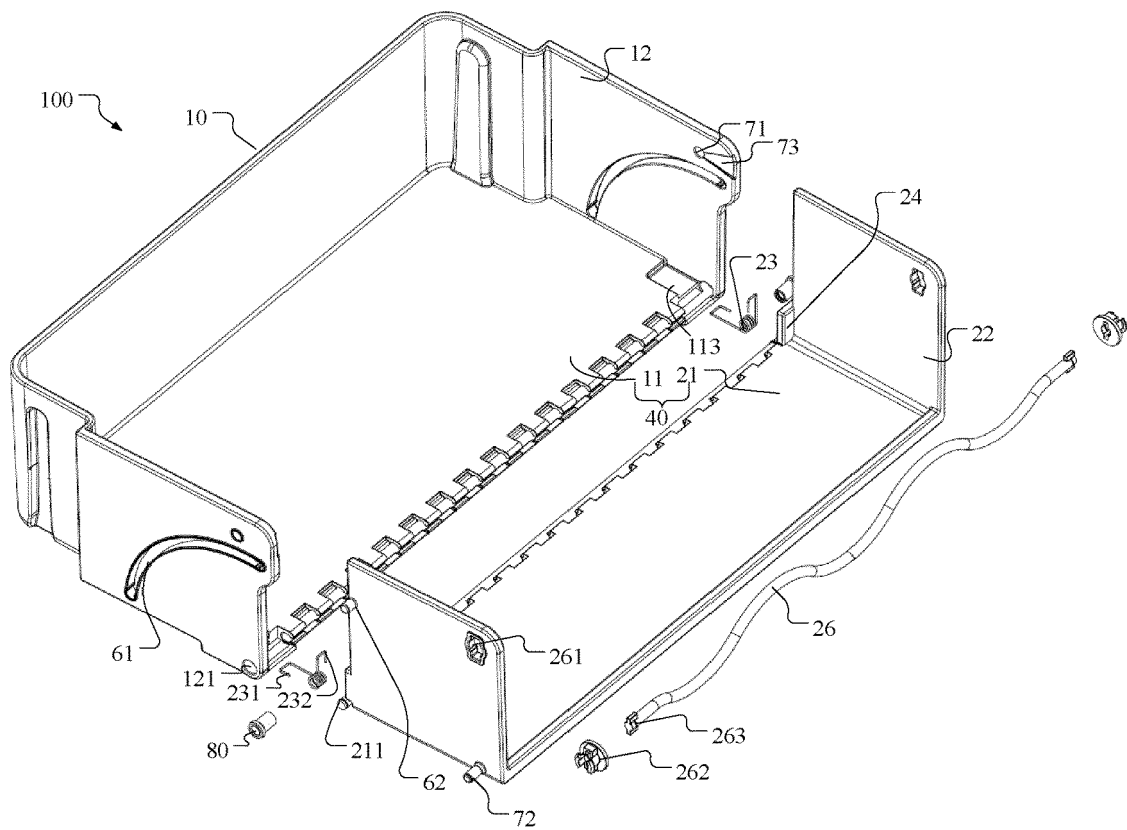


FIG. 4

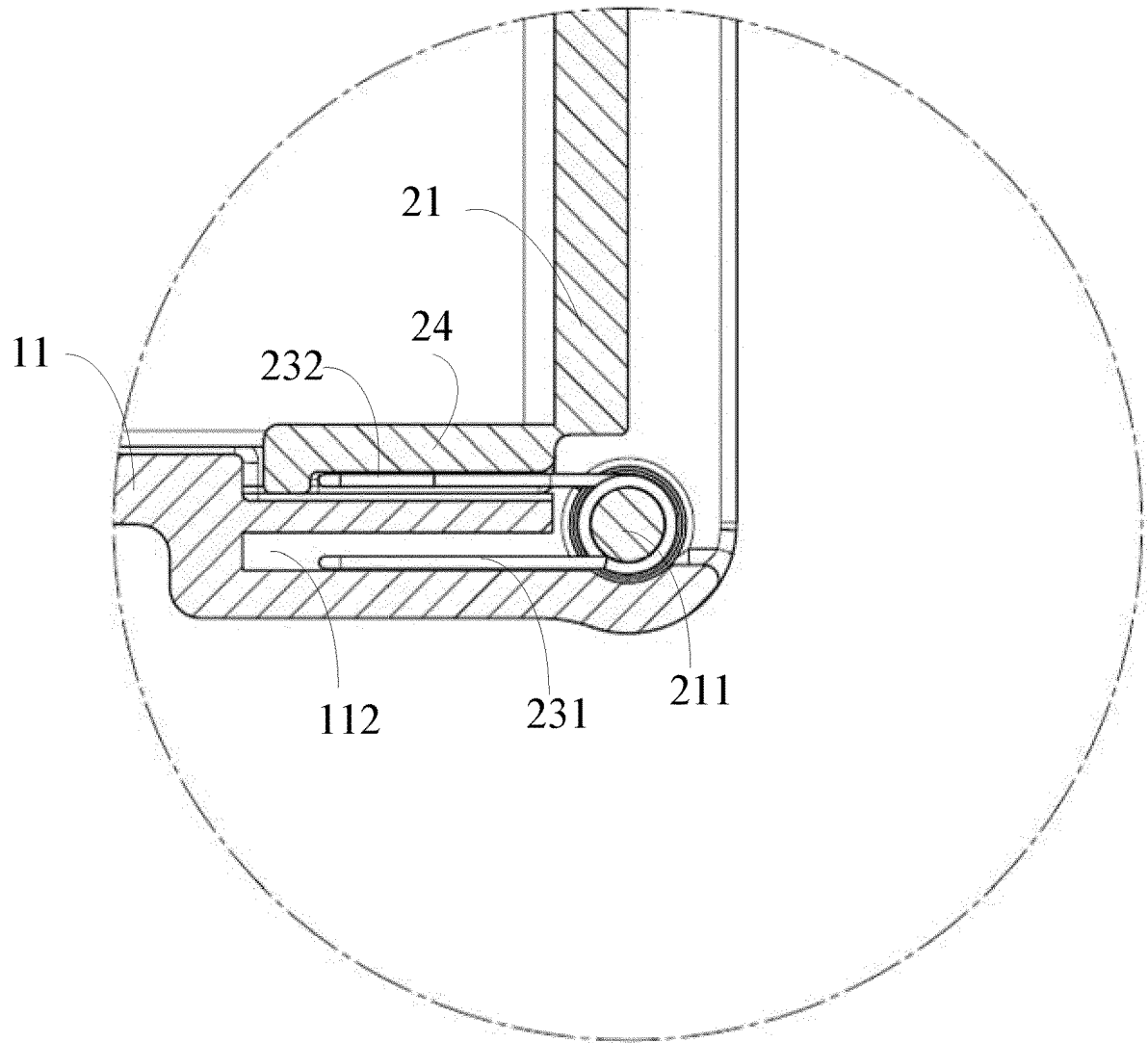


FIG. 5

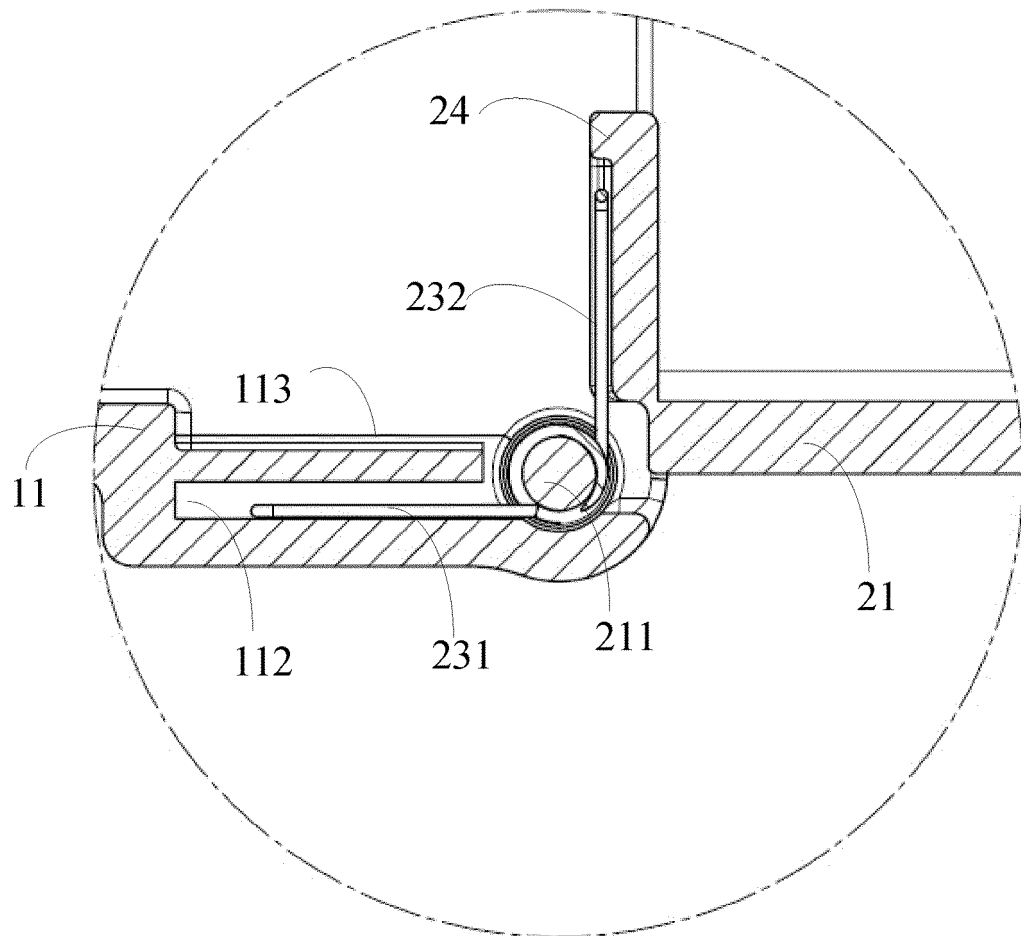


FIG. 6

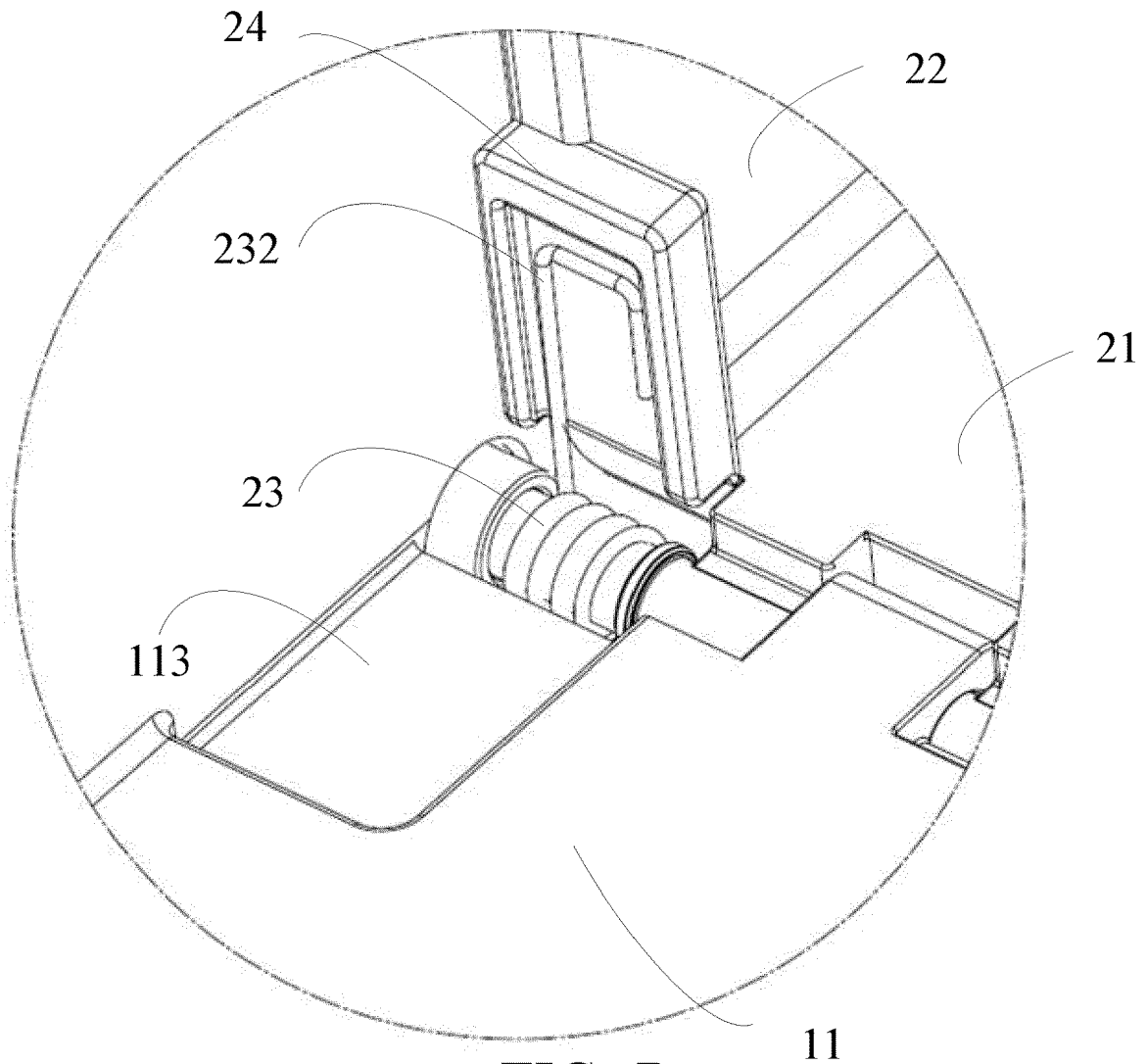


FIG. 7

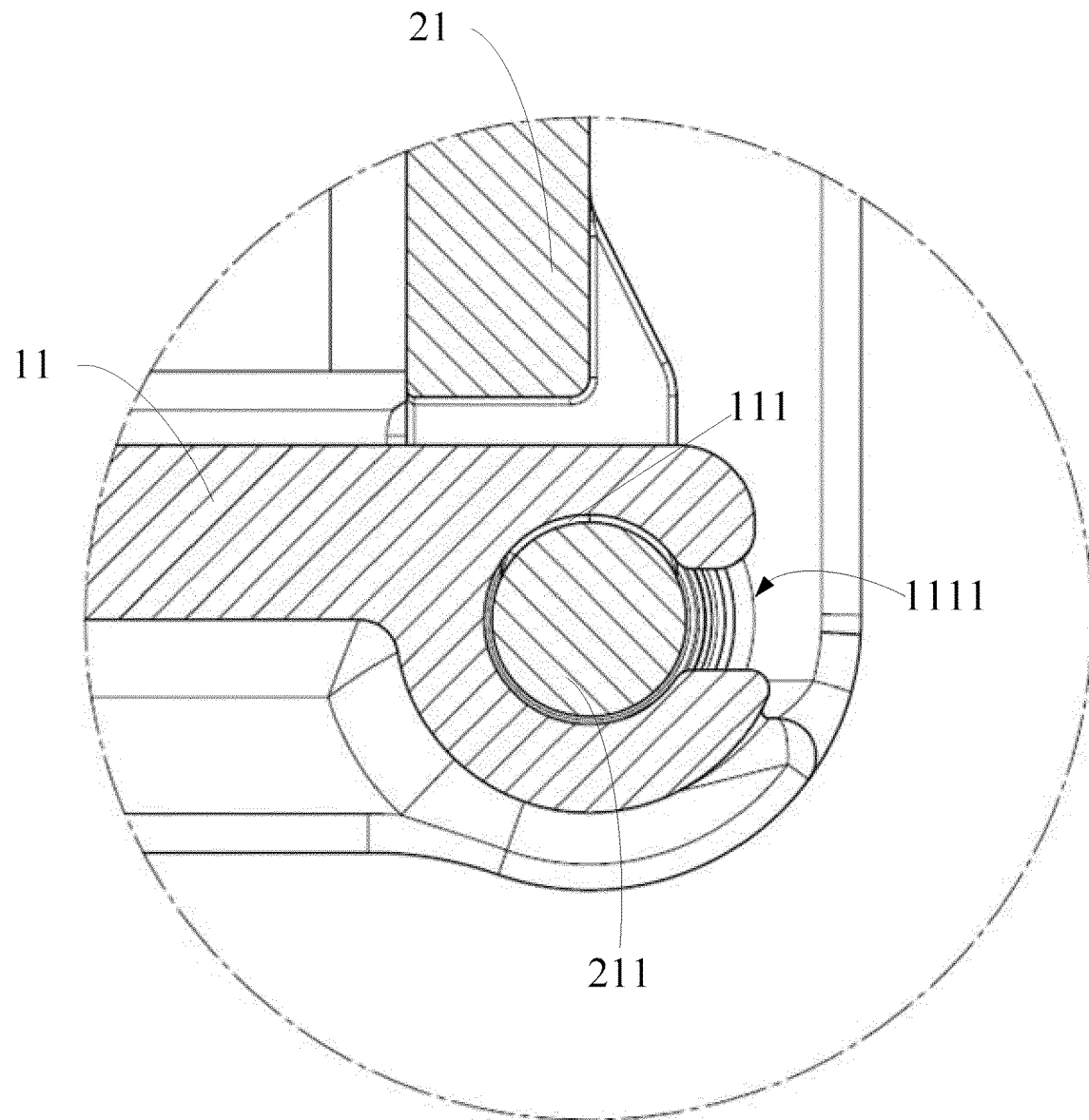


FIG. 8

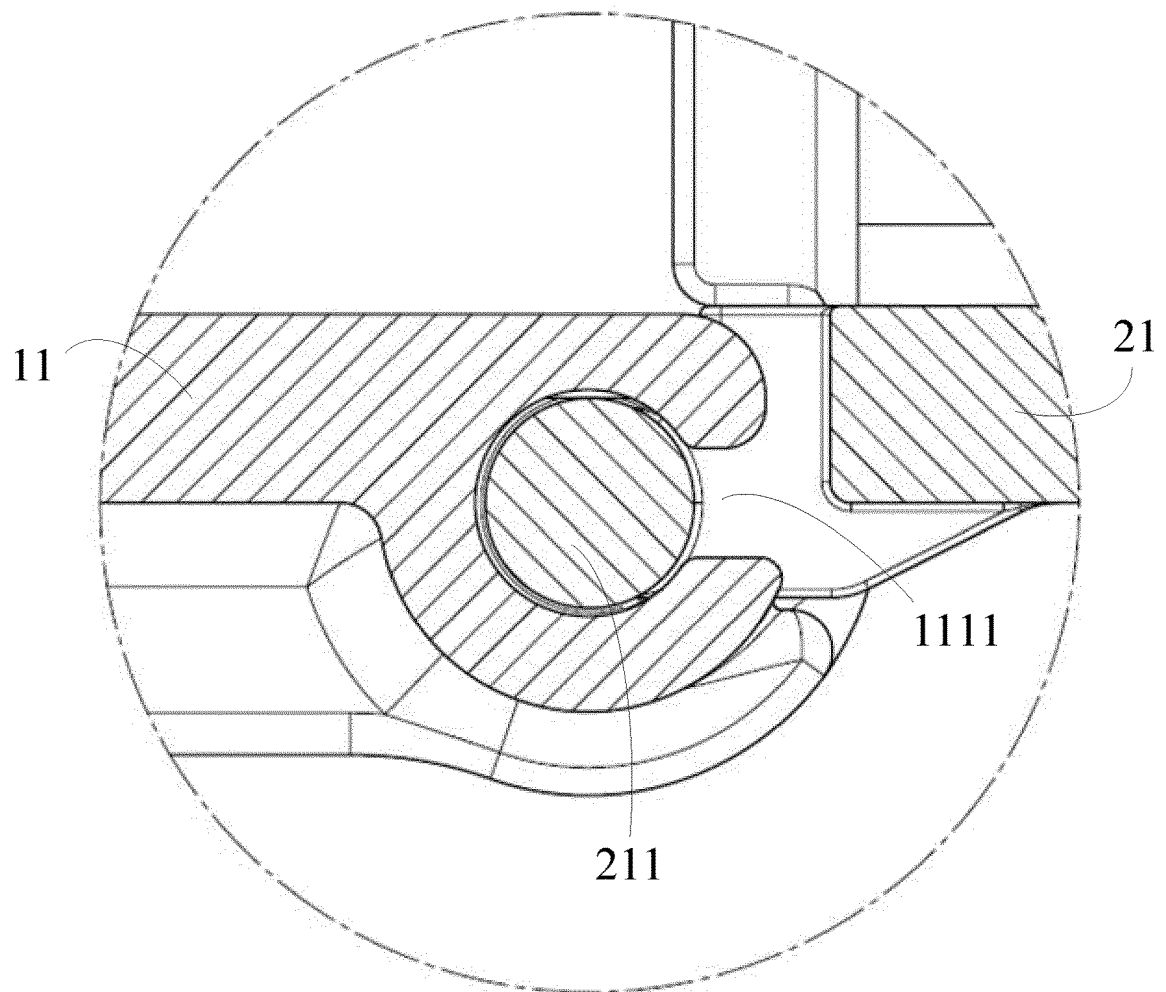


FIG. 9

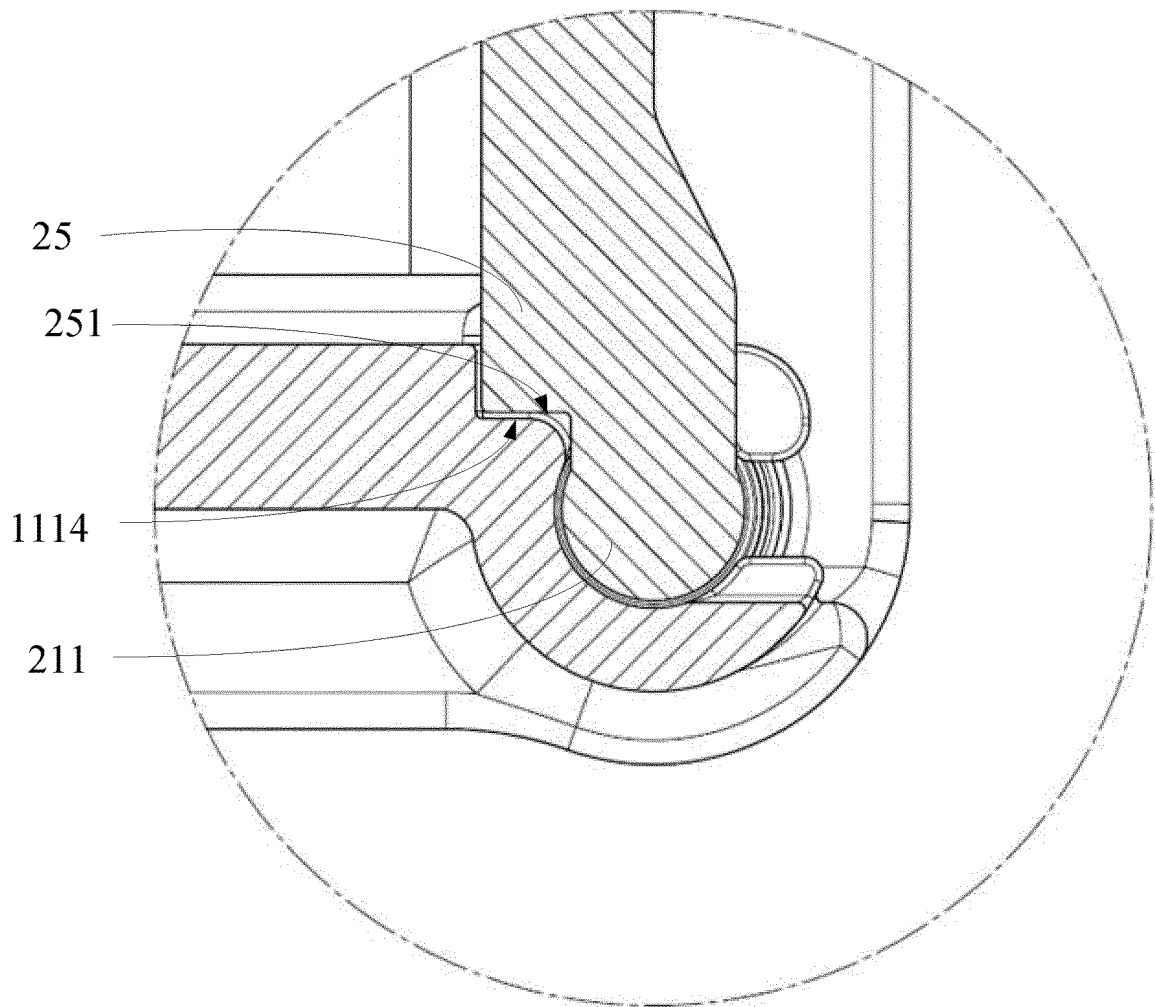


FIG. 10

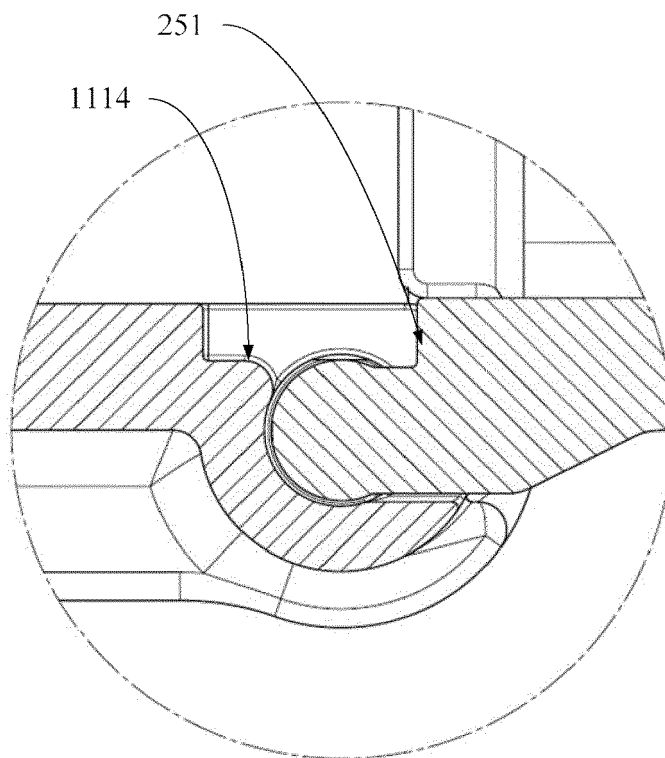


FIG. 11

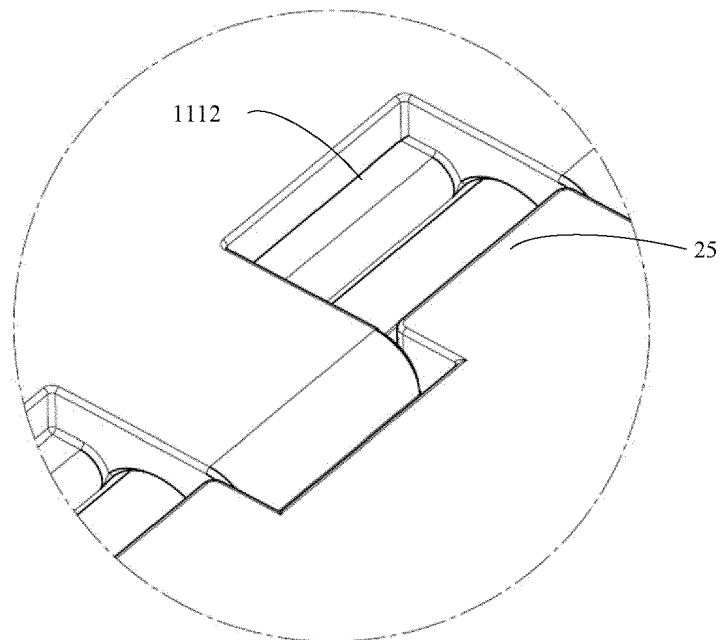


FIG. 12

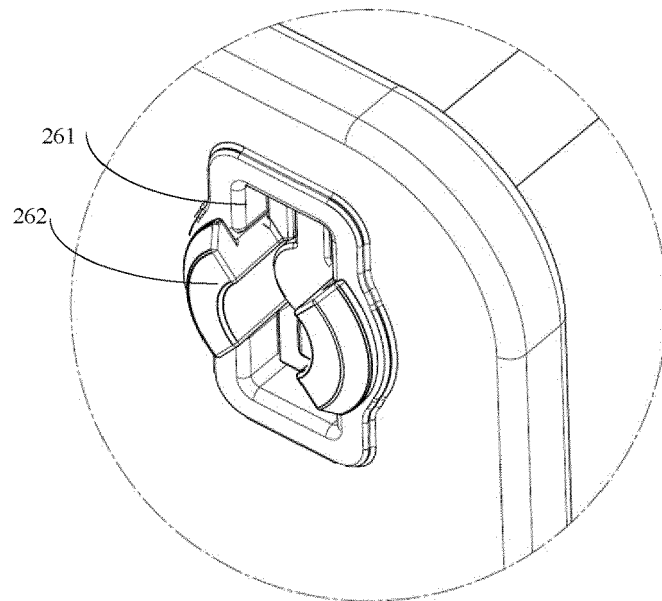


FIG. 13

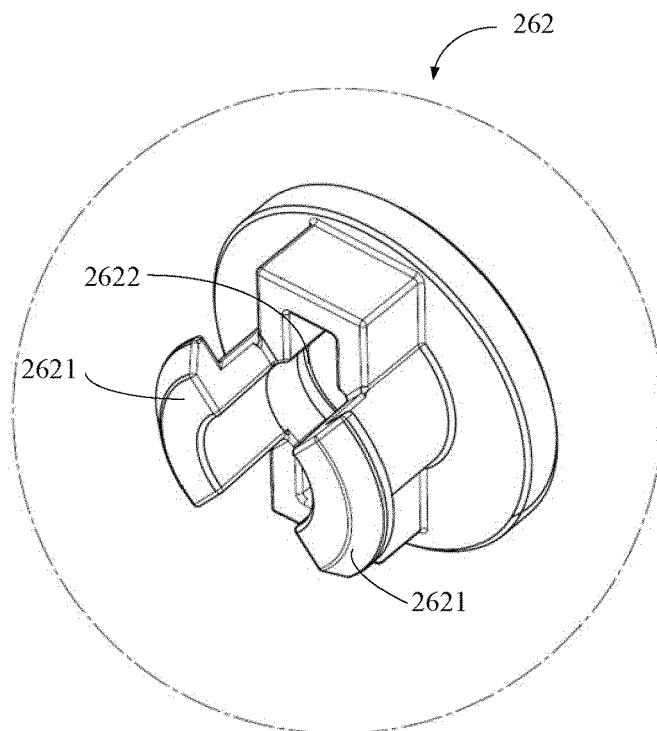


FIG. 14

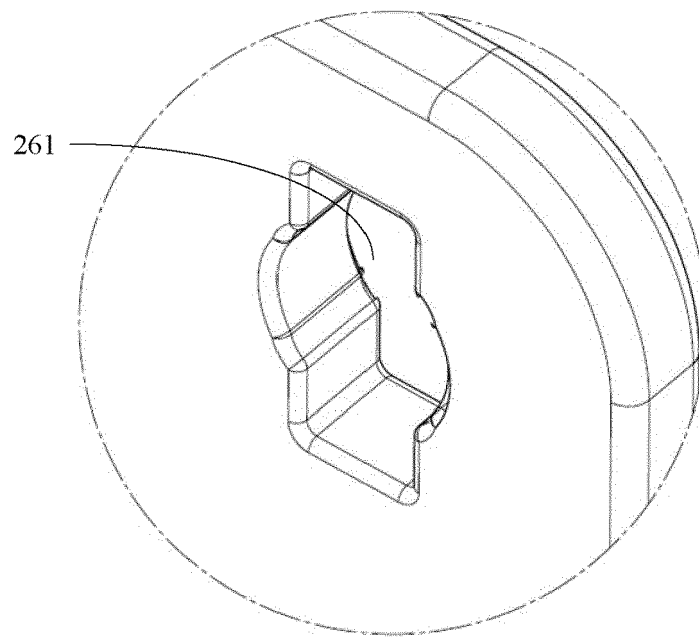


FIG. 15

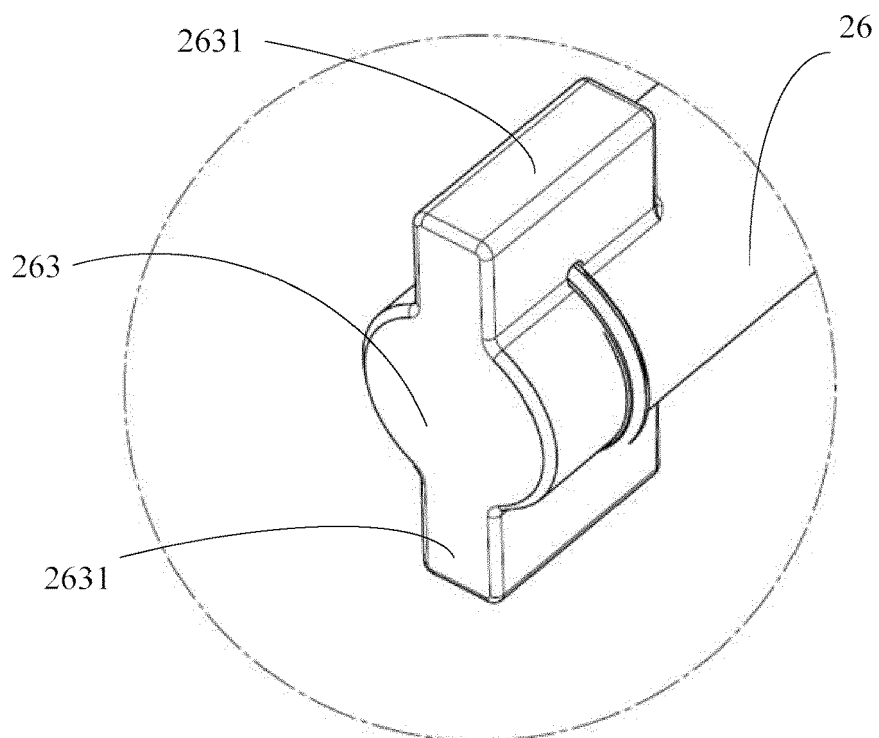


FIG. 16

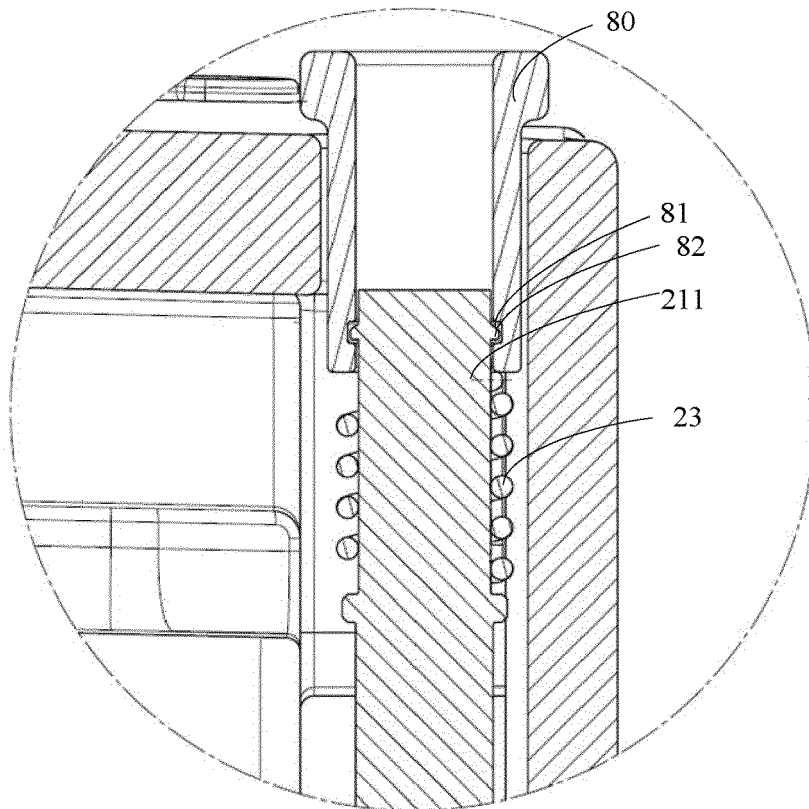


FIG. 17

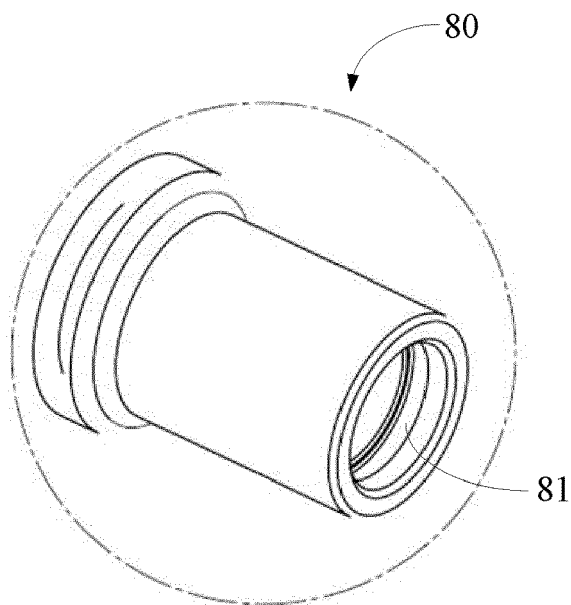


FIG. 18



EUROPEAN SEARCH REPORT

Application Number

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EPO FORM 1503 03.82 (P04C01)

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Y		9, 13	
A		5, 6	ADD. F25D25/00
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Y		13	
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Place of search The Hague		Date of completion of the search 20 April 2023	Examiner Canköy, Necdet
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 22 21 3423

5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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