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(54) Refrigeration appliance comprising two doors

(57) The present invention relates to a refrigeration appliance. The refrigeration appliance (1) comprises a body (2) having an opening (3); a first door (4) and a second door (5) fixed side by side to a front side of the body (2); a bar (6) fixed to an edge of the first door (4), wherein the bar (6) can be pivoted between a retraction position and an extension position, and the bar is in the extension position when the first door (4) is closed; and a guiding mechanism (7) for guiding the bar (6) to rotate. The guiding mechanism (7) comprises a guiding projection (10) disposed on one of the bar (6) and the body (2) and a guiding groove (11) disposed on the other of the bar (6) and the body (2), and the guiding projection (10) can be moved within the guiding groove (11) to cause the bar (6) to rotate. According to the present invention, the guiding mechanism (7) is configured such that the guiding projection (10) can enter the guiding groove (11) to close the first door (4) when the bar (6) is in the extension position.

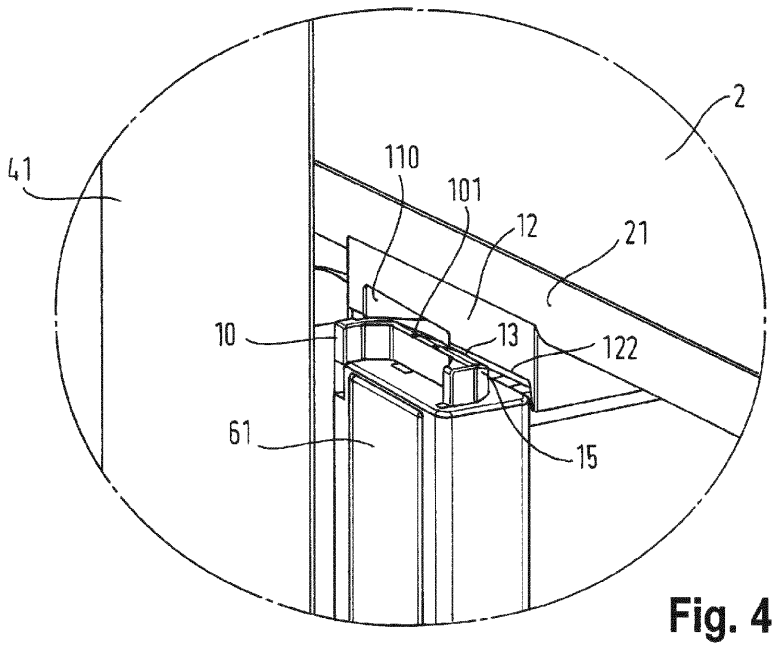

Fig. 4

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Description

Technical Field

[0001] The present invention relates to a refrigeration appliance comprising two doors, in particular a domestic refrigeration appliance, such as a refrigerator.

Background Art

[0002] WO2007/115868 discloses a refrigeration device, comprising a body, a pair of side-by-side doors connected to opposite sides of the body and a bar rotatably connected on a first door. The bar can be pivoted between an extension position and a retraction position by a guiding projection capable of displacing in a guiding groove, wherein the bar is in the extension position when the first door is closed, and the bar is in the retraction position when the door is opened. In the position when the first door is closed, an edge of the second door opposite to a fixed edge of the second door is applied onto the bar. In the position when the first door is opened, the bar can pass through the closed second door. The guiding projection can displace with respect to the first door in a direction of a pivot axis of the first door. Thus, it may be ensured that a top end of the guiding projection contact with a bottom of the guiding groove such that no air can enter an interior of the refrigeration device through the guiding projection.

[0003] Although the bar may be rotated into the retraction position via a movement of the guiding projection within the guiding groove under cooperation of the guiding projection with the guiding groove, there is such a possibility in which the bar may be unintentionally rotated into the extension position by a user. In this case, if the first door is forcibly closed by the user, the guiding projection may be rebounded due to intensive collision of the guiding projection with a groove wall defining the guiding groove, which may lead to damage of the refrigeration appliance.

Content of the Invention

[0004] It is an object of the present invention to overcome at least one of the above-mentioned technical problems and thus provide a refrigeration appliance having a prolonged useful life and improved usage convenience.

[0005] Thus, one aspect of the present invention relates to a refrigeration appliance, comprising: a body, a front end of which has an opening; a first door and a second door each comprising a first edge and a second edge opposite to said first edge, the first edges of the first door and the second door being fixed to opposite sides of said opening respectively; a bar fixed to the second edge of said first door and being able to be pivoted between a retraction position and an extension position, the bar being in the extension position when the first door is closed, wherein said bar can pass through the closed second door when the bar is in said retraction position; and a guiding mechanism for guiding said bar to rotate, said guiding mechanism comprising a first guiding member disposed on said bar and a second guiding member disposed on an edge of said opening, wherein one of said first guiding member and said second guiding member comprises a guiding projection, the other of said first guiding member and said second guiding member comprises a guiding groove, and said guiding projection can be moved within said guiding groove to cause said bar to rotate, **characterized in that** said guiding mechanism is configured such that said guiding projection can enter said guiding groove to close said first door when said bar is in said extension position.

[0006] Therefore, even though the bar is in the extension position, it is also possible to successfully close the first door, which improves usage convenience. In addition, the first guiding member and the second guiding member do not intensively collide with each other so as to cause damage when the first door is closed in the case that the bar is in the extension position, thereby it being beneficial to improve useful life of the refrigeration appliance.

[0007] Other individual features or features combined with other features so as to be considered as features of the present invention will be set forth in the accompanying claims.

[0008] According to one preferable embodiment of the present invention, said bar and said first door define an angle therebetween, which keeps constant when said first door is closed in the case that said bar is in the extension position. This benefits simplification of structures of the guiding groove and the guiding projection. For example, it is possible to keep design of the known guiding groove unchanged.

[0009] According to one preferable embodiment of the present invention, said guiding projection is linearly moved with respect to said first door when said first door is closed in the case that said bar is in the extension position. This benefits reduction of complexity of the guiding groove and the guiding projection, and it is possible to keep design of the known guiding groove unchanged.

[0010] According to one preferable embodiment of the present invention, said guiding projection extends over a groove wall of said guiding groove facing said guiding projection so as to enter said guiding groove. This provides a great possibility in which design of the known guiding groove can be kept and change of the known guiding mechanism is reduced to a minimum extent.

[0011] According to one preferable embodiment of the present invention, at least one of said guiding projection and said groove wall can be displaced with respect to said first door along a direction of a pivot axis of said first door. Thus, at least one of the guiding projection and the groove wall can be moved away from each other when the guiding projection and the groove wall contact with each other. Further, this benefits return of the displaceable member to an initial position to prevent the guiding

projection within the groove wall from moving away from the groove wall after the contact between the guiding projection and the groove wall has been released.

[0012] According to one preferable embodiment of the present invention, a tip face of at least one of said guiding projection and said groove wall has a guiding slope, and a height of said guiding projection and/or said groove wall at respective guiding slope become smaller while getting closer to each other.

[0013] According to one preferable embodiment of the present invention, the entire tip face of at least one of said guiding projection and said groove wall forms said guiding slope. This may cause the guiding projection to more easily extend over the groove wall to enter the guiding groove.

[0014] According to one preferable embodiment of the present invention, said guiding slope has a plurality of protuberances. This benefits reduction of a friction force between the guiding projection and the groove wall.

[0015] According to one preferable embodiment of the present invention, said protuberances comprise ribs extending along an inclination direction of said guiding slope.

[0016] While the first door may be closed in the case that the bar is in the extension position, according to one preferable embodiment of the present invention, said guiding projection is rotated along the guiding groove and causes said bar to rotate into the retraction position, which cause the bar to automatically arrive in the retraction position after the first door is opened, thereby, in a normal condition, it is possible to close the first door by rotating the guiding projection along the guiding groove.

[0017] The inventive construction and other inventive objects and beneficial effects of the present invention will become more apparent by describing these preferable embodiments in connection with the drawings.

Description of the Drawings

[0018] As a part of the description, the drawings show some specific embodiments of the present invention to further understand the present invention. In the drawings,

Fig. 1 is a schematic perspective view of a refrigeration appliance according to one preferable embodiment of the present invention.

Fig. 2 is a schematic perspective view of a second guiding member having a guiding groove according to one preferable embodiment of the present invention.

Fig. 3 shows a schematic partial perspective view when a bar in a retraction position enters the guiding groove during closing of a left door.

Fig. 4 shows a schematic partial perspective view when the bar in an extension position approaches the second guiding member.

Fig. 5 shows a schematic partial cross sectional view when the bar in the extension position approaches the second guiding member.

Fig. 6 shows a schematic partial cross sectional view when a guiding projection of the bar in the extension position will extend over a groove wall of the guiding groove facing the bar during closing of the left door.

Fig. 7 shows a schematic partial cross sectional view when the guiding projection has entered the guiding groove.

Fig. 8 shows a schematic view of a relative position of a first guiding member and a second guiding member according to another preferable embodiment of the present invention, wherein the left door is in an open position and the bar is in the extension position.

Detailed Description of the Invention

[0019] Referring to the drawings, firstly in particular referring to Fig. 1-Fig. 3, a refrigeration appliance 1 comprises a heat insulation body 2, a left door 4 and a right door 5 fixed to two opposite sides of the body 2. The body 2 defines a refrigeration chamber 20 with a front opening 3. The left door 4 and the right door 5 are connected to a front side of the body 2, in order to selectively open or close the refrigeration chamber 20.

[0020] The left door 4 and the right door 5 are each fixed on the body 2 by respective hinge units 22 so as to be capable of rotating around respective longitudinal axes. In Fig. 1, the left door 4 and the right door 5 are shown in an open position.

[0021] The left door 4 comprises a first edge 41 fixed to a left side of the opening 3 and a second edge 42 opposite to the first edge 41, and the right door 5 comprises a first edge 51 fixed to a right side of the opening 3 and a second edge 52 opposite to the first edge 51. There is a gap between the second edges 42, 52 of the left door 4 and the right door 5 when the left door 4 and the right door 5 each are closed.

[0022] For closing the gap, the refrigeration appliance 1 has a bar 6 fixed to the second edge 42 of the left door 4. It should be understood that the bar 6 may also be fixed to the right door 5.

[0023] The bar 6 is pivoted to the left door 4 so as to be capable of rotating around a vertical axis (not shown). The bar 6 can be pivoted between an extension position and a retraction position. In a normal condition, if the left door 4 is in an open state, the bar 6 having a rectangular cross section is retracted such that its narrow side faces the body 2. Then, the bar 6 does not extend beyond the second edge 42 of the left door 4. As a result, in a close state of the right door 5, the bar 6 can extend over the right door 5 if the left door 4 is closed.

[0024] If the left door 4 is closed, the bar 6 snaps into an interior of the body 2 and is rotated around the vertical axis during the process, such that a joint face 61 formed at a wide side of the bar 6 is flush with a front end face of a frame 21 of the body 2 after the bar 6 snaps into the body 2, and then the bar 6 is in the extension position, wherein the front end face can rest against seal gaskets 43, 53 of the left door 4 and the right door 5 in the close state. In this position, the frame 21 and the joint face 61 form a joint surface capable of covering the gap between the left door 4 and the right door 5, and the seal gaskets 43, 53 of the left door 4 and the right door 5 rest against said joint surface in a sealing manner.

[0025] The refrigeration appliance 1 comprises a guiding mechanism 7 for guiding the bar 6 to rotate. The guiding mechanism 7 comprises a first guiding member 8 disposed on at least one end of the bar 6 and a second guiding member 9 disposed at an edge of the opening 3. In Fig. 1, the first guiding member 8 and the second guiding member 9 are provided only on an upper end of the bar 6 and an upper edge of the opening 3 respectively. It should be understood that the guiding mechanism may also be provided between a lower end of the bar 6 and a lower edge of the opening 3. It is also possible to provide the guiding mechanism between two respective ends of the bar 6 and the body 2.

[0026] Referring to Fig. 2, Fig. 3 and Fig. 5, the first guiding member 8 comprises a guiding projection 10, while the second guiding member 9 comprises a guiding groove 11. The guiding projection 10 can be moved within the guiding groove 11 to cause the bar 6 to rotate. The guiding projection 10 has an arcuate cross section.

[0027] The guiding projection 10 can be moved with respect to the left door 4 along a direction of the pivot axis of the left door 4, and this means that the guiding projection 10 can be moved in a longitudinal direction in the present embodiment. In the present embodiment, the guiding projection 10 can be moved with respect to the bar 6. A cutout 63 for receiving the guiding projection 10 may be disposed at the end of the bar 6, and the guiding projection 10 is guided in the cutout 63 in a manner that it can be displaced vertically.

[0028] A sleeve 102 is provided at an inside of the guiding projection 10 and the sleeve 102 surrounds a pin 62 located within the bar 6. The guiding mechanism 7 also comprises a coil spring 71 located on the pin 62, in order to support the guiding projection 10. The coil spring 71 can push the guiding projection 10 upward when no external force is applied.

[0029] A tip face of the guiding projection 10 forms a first guiding slope 101. In a direction perpendicular to the joint face 61, a height of the guiding projection 10 at the respective first guiding slope 101 is smaller as it is closer to a rear face 64 facing away from the joint face 61, such that an edge of the tip face of the guiding projection 10 closest to the rear face 64 has a minimum height. In the extension position of the bar 6, as shown in Fig. 4 and Fig. 5, the guiding projection 10 has the minimum height at an edge thereof closest to the second guiding member 9.

[0030] Referring to Fig. 2 -Fig. 5, the guiding groove 11 of the second guiding member 9 has a curved shape. The guiding groove 11 has an inlet 110 facing the first guiding member 8. The second guiding member 9 comprises a first groove wall 12 facing the first guiding member 8 and a second groove wall 14 facing away from the first guiding member 8. For the guiding groove 11 disposed on the body 2, the first groove wall 12 is in front of the guiding groove 11, and the second groove wall 14 is behind the guiding groove 11.

[0031] A tip face of the first groove wall 12 has a second guiding slope 122 corresponding to the first guiding slope 101. In a direction perpendicular to the frame 21, a height of the first groove wall 12 at the respective second guiding slope 122 is smaller as it is closer to the guiding projection 10, such that the height of the first groove wall 12 at a front edge of the respective tip face is minimum. In the extension position of the bar 6 shown in Fig. 4 and Fig. 5, the first groove wall 12 has a minimum height at an edge closest to the guiding projection 10 in the direction perpendicular to the frame 21/the joint face 61.

[0032] In a normal condition, as shown in Fig. 3, if the left door 4 is closed, an end, close to the narrow side, of the guiding projection 10 located on the bar 6 in the retraction position enters the inlet 110 of the guiding groove 11, and a projection side edge 15 of the guiding projection 10 begins to contact with the second groove wall 14 of the guiding groove 11. As the left door 4 is further closed, the projection side edge 15 slides along a side face of the second groove wall 14 facing the guiding groove 11, thereby causing the bar 6 to rotate around the vertical axis until the bar 6 is in the extension position where the joint face 61 is flush with the frame 21.

[0033] Similarly, if the left door 4 is opened, the guiding projection 10 is also rotated within the guiding groove 11 so as to cause the bar 6 to rotate into the retraction position such that the bar 6 can pass through the closed right door 5. Therefore, the left door 4 can be opened in the case of a closed state of the right door 5.

[0034] As described above, in a normal condition, after the left door 4 is opened, the bar 6 may automatically be rotated into the retraction position so as to not interfere with the right door 5. However, the bar 6 may unintentionally be rotated into the extension position due to misoperation of a user.

[0035] According to the present invention, the guiding projection 10 can also enter the guiding groove 11 to close the left door 4 even though the bar 6 is in the extension position. Figs 4-7 schematically shows closing process of the left door 4 when the bar 6 is in the extension position.

[0036] As shown in Fig. 4 and Fig. 5, if the bar 6 in the extension position approaches the body 2, the guiding slope 101 of the guiding projection 10 is slightly lower at a side close to the body 2 than the most front side of the tip face of the first groove wall 12 in the longitudinal di-

rection, thus the guiding slope 101 and the first groove wall 12 overlap each other in the longitudinal direction. If the left door 4 is further pushed, the tip face of the guiding projection 10 and the tip face of the first groove wall 12 contact with and press each other so as to compress the spring 71, therefore, the guiding projection 10 supported by the spring 71 move downward, as shown in Fig. 6.

[0037] As shown in Fig. 7, the guiding projection 10 has extended over the first groove wall 12 and entered the guiding groove 11. After the contact and press between the guiding projection 10 and the first groove wall 12 has been released, the guiding projection 10 is moved toward a bottom wall of the guiding groove 11 under a support force of the spring 71. The guiding projection 10 and the first groove wall 12 overlap each other in the direction perpendicular to the joint face 61, in order to prevent the guiding projection 10 from extending over the first groove wall 12 to exit the guiding groove 11.

[0038] In this process, namely if the left door 4 is closed in the case that the bar 6 is in the extension position, the guiding projection 10 is not rotated with respect to the first door 4, but linearly moved with respect to the left door 4. Therefore, if the left door 4 is closed in the case that the bar 6 is in the extension position, an angle defined between the bar 6 and the left door 4 keeps constant and the bar 6 is translationally pushed into the body 2.

[0039] For reducing friction between the guiding projection 10 and the tip face of the first groove wall 12, the first guiding slope 101 is provided with a plurality of protuberances 13. The protuberances 13 may be formed by ribs extending in a slope direction of the first guiding slope 101. In an alternative embodiment, the protuberances 13 may also be provided on the second guiding slope 122.

[0040] In addition, a wear resistant layer for reducing wear may also be provided on the tip face of the guiding projection 10 and the tip face of the first groove wall 12.

[0041] In the above embodiments, the entire tip face of the guiding projection 10 forms the first guiding slope 101. However, in an alternative embodiment, the first guiding slope 101 may also be formed by a part of the tip face of the guiding projection 10. Similarly, the second guiding slope 121 may also be formed by the entire tip face of the first groove wall 12 or a part of the tip face of the first groove wall 12.

[0042] Further, in an alternative embodiment, it is also possible that only the tip face of one of the guiding projection 10 and the first groove wall 12 forms the guiding slope, while the height of another of the guiding projection 10 and the first groove wall 12 is entirely reduced, as shown in Fig. 8.

[0043] In addition, in the above embodiments, the guiding projection 10 may be moved along the direction of the pivot axis of the left door 4 under the support force of the spring 17. However, in an alternative embodiment, it is also possible that the entire guiding member provided with the guiding groove or only the first groove wall therein can be moved in the vertical direction under a support force of a spring such that the bar in the extension position can extend over the first groove wall to be translationally pushed into the guiding groove.

[0044] Furthermore, in the above embodiments, the first guiding member 8 mounted on the bar 6 is provided with the guiding projection 10, while the second guiding member 9 on the body 2 is provided with the guiding groove 11 adapted to cooperate with the guiding projection 10. However, the present invention is not limited to this, but there are also other embodiments. For example, in an alternative embodiment, the guiding groove is disposed on the guiding member on the bar, while the guiding projection adapted to cooperate with the guiding groove is provided on the body.

Claims

1. A refrigeration appliance (1), comprising:

a body (2), a front end of which has an opening (3);
a first door (4) and a second door (5) each comprising a first edge (41, 51) and a second edge (42, 52) opposite to said first edge (41, 51), the first edges of the first door (4) and the second door (5) being fixed to opposite sides of said opening (3) respectively;
a bar (6) fixed to the second edge (42) of said first door (4) and being able to be pivoted between a retraction position and an extension position, the bar being in the extension position when the first door (4) is closed, wherein said bar (6) can pass through the closed second door (5) when the bar (6) is in said retraction position; and
a guiding mechanism (7) for guiding said bar (6) to rotate, said guiding mechanism (7) comprising a first guiding member (8) disposed on said bar (6) and a second guiding member (9) disposed on an edge of said opening (3), wherein one of said first guiding member (8) and said second guiding member (9) comprises a guiding projection (10), the other of said first guiding member (8) and said second guiding member (9) comprises a guiding groove (11), and said guiding projection (10) can be moved within said guiding groove (11) to cause said bar (6) to rotate,
characterized in that said guiding mechanism (7) is configured such that said guiding projection (10) can enter said guiding groove (11) to close said first door (4) when said bar (6) is in said extension position.

2. The refrigeration appliance according to claim 1, **characterized in that** said bar (6) and said first door (4) define an angle therebetween, which keeps con-

stant when said first door (4) is closed in the case that said bar (6) is in the extension position.

3. The refrigeration appliance according to claim 1 or 2, **characterized in that** said guiding projection (10) is linearly moved with respect to said first door (4) when said first door (4) is closed in the case that said bar (6) is in the extension position.

4. The refrigeration appliance according to claim 1, 2 or 3, **characterized in that** said guiding projection (10) extends over a groove wall (12) of said guiding groove (11) facing said guiding projection (10) so as to enter said guiding groove (11).

5. The refrigeration appliance according to claim 4, **characterized in that** at least one of said guiding projection (10) and said groove wall (12) can be displaced with respect to said first door (4) along a direction of a pivot axis of said first door (4).

6. The refrigeration appliance according to claim 4 or 5, **characterized in that** a tip face (101, 121) of at least one of said guiding projection (10) and said groove wall (12) has a guiding slope (101, 122), and a height of said guiding projection (10) and/or said groove wall (12) at respective guiding slope (101, 122) become smaller while getting closer to each other.

7. The refrigeration appliance according to claim 6, **characterized in that** the entire tip face of at least one of said guiding projection (10) and said groove wall (12) forms said guiding slope (101).

8. The refrigeration appliance according to claim 6 or 7, **characterized in that** said guiding slope (101) has a plurality of protuberances (13).

9. The refrigeration appliance according to claim 8, **characterized in that** said protuberances (13) comprise ribs extending along an inclination direction of said guiding slope (101).

10. The refrigeration appliance according to any one of the preceding claims, **characterized in that** said guiding projection (10) is rotated along the guiding groove (12) and causes said bar (6) to rotate into the retraction position, when the first door is being opened.

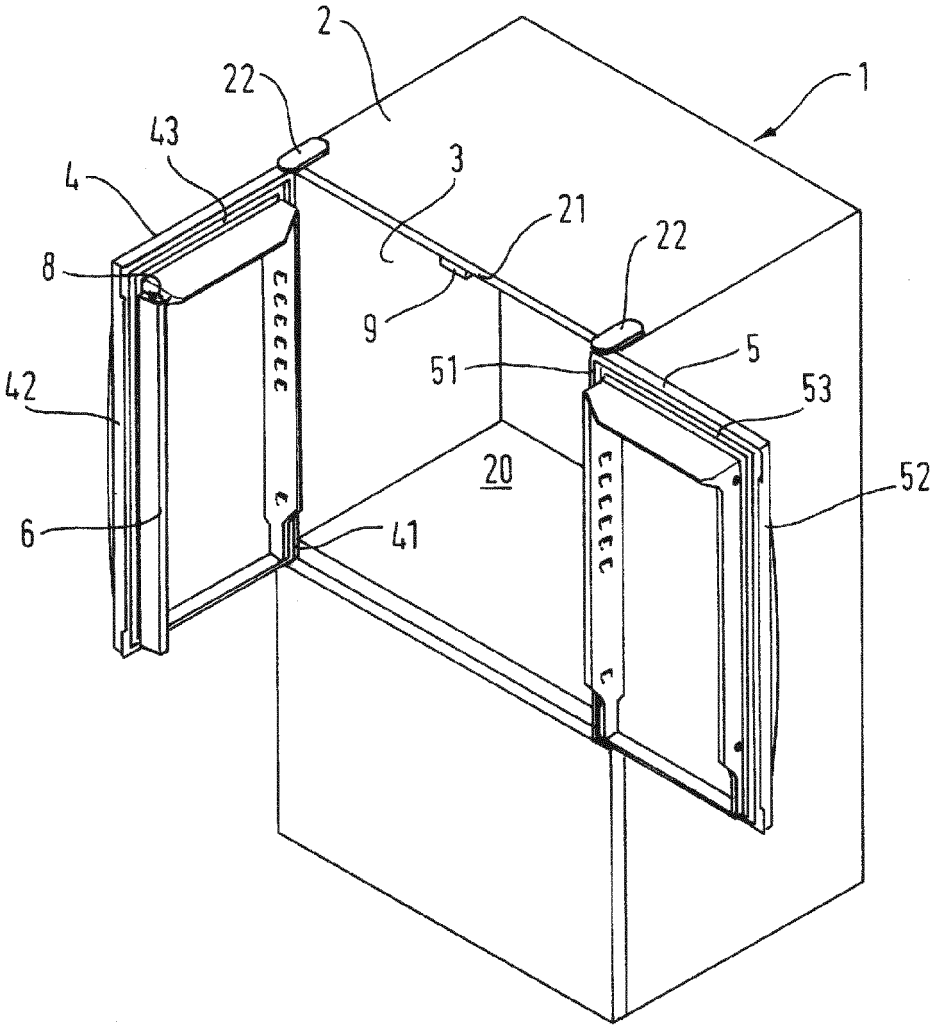

Fig. 1

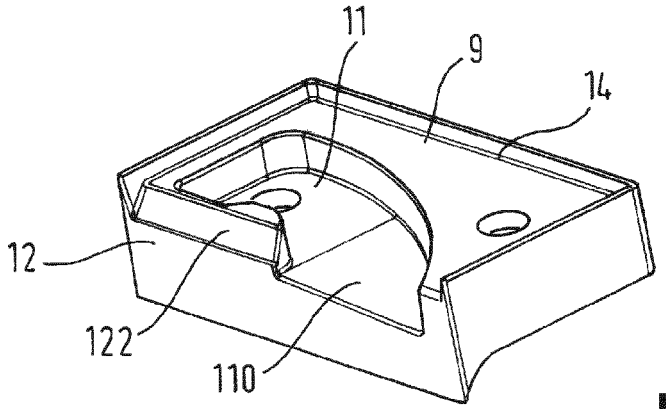

Fig. 2

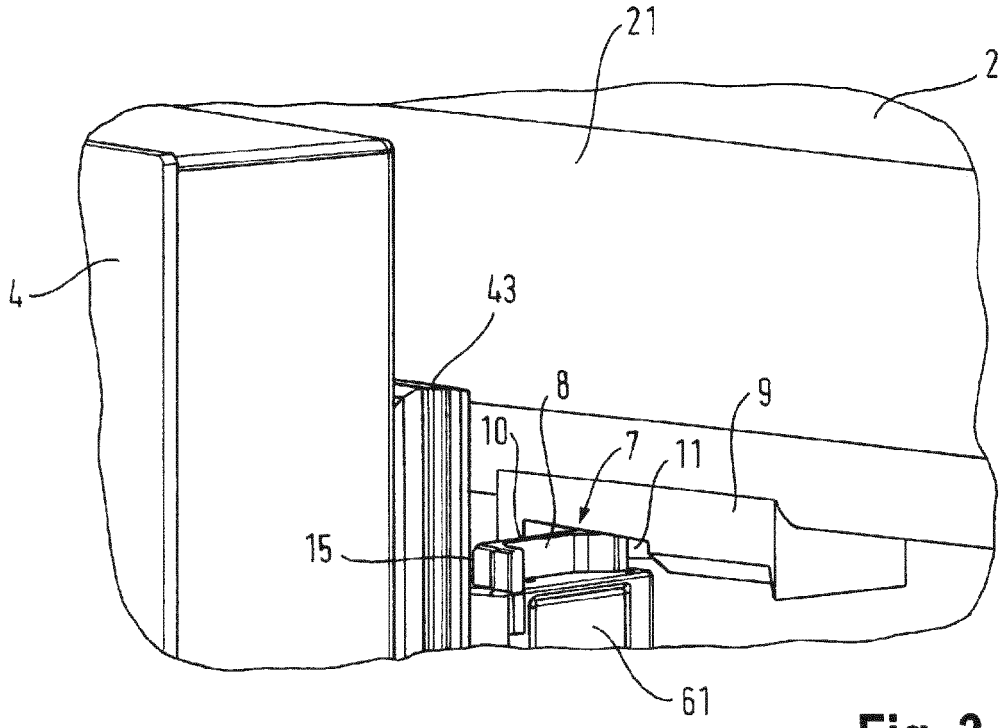

Fig. 3

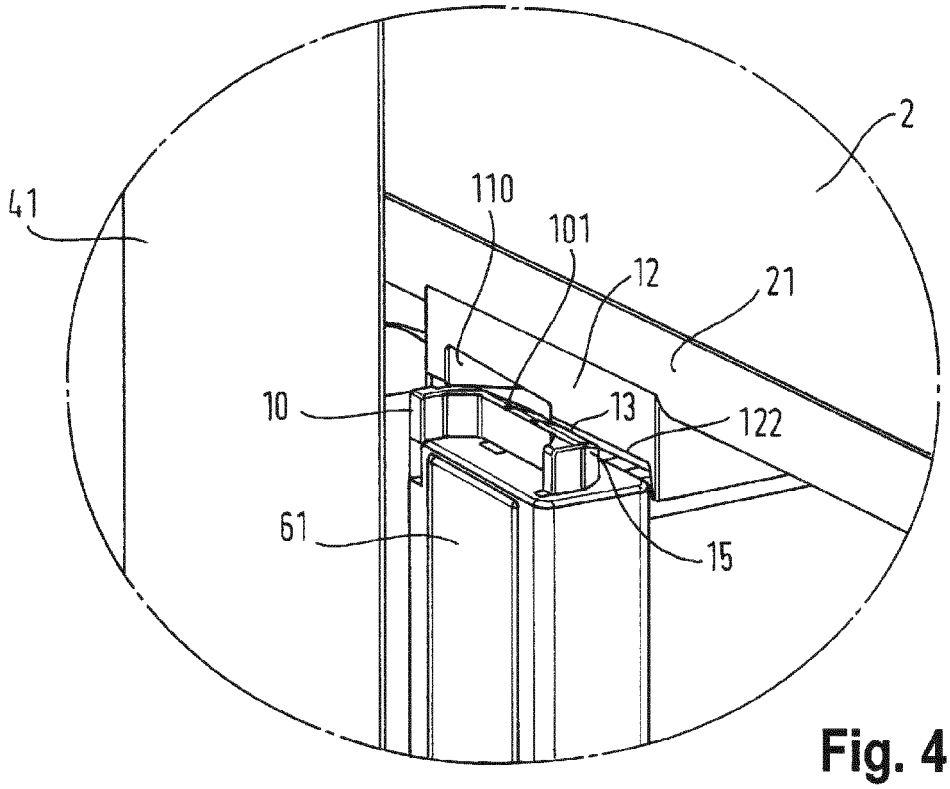

Fig. 4

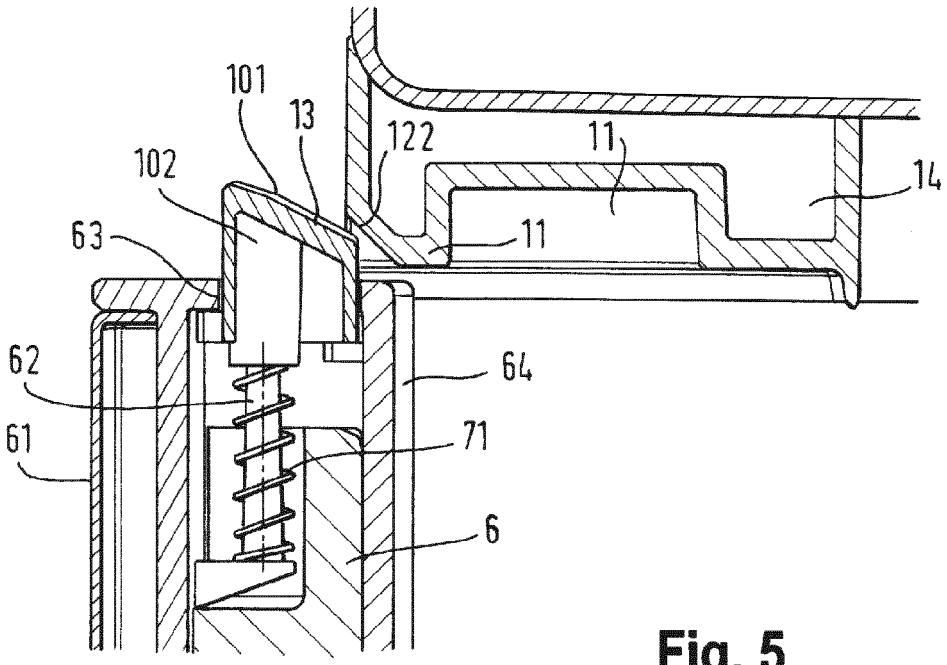

Fig. 5

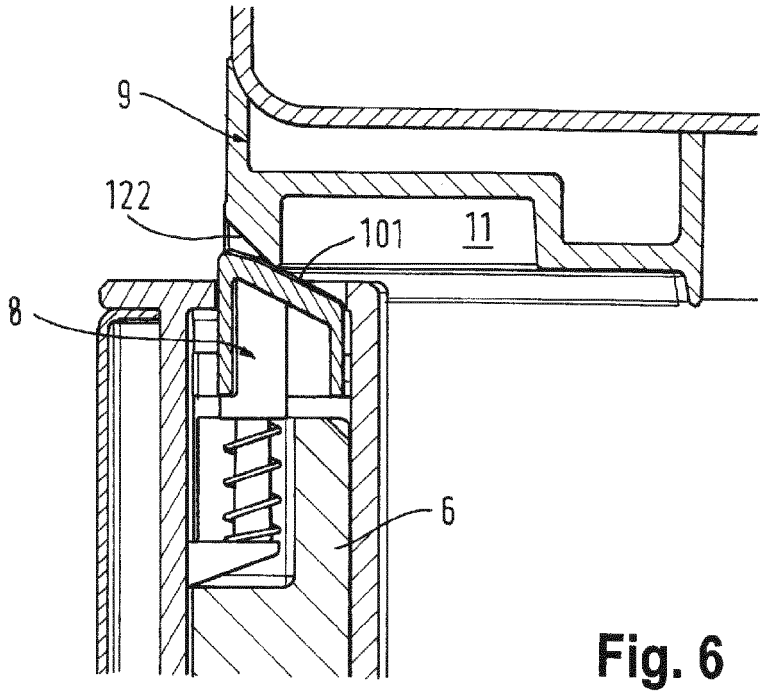

Fig. 6

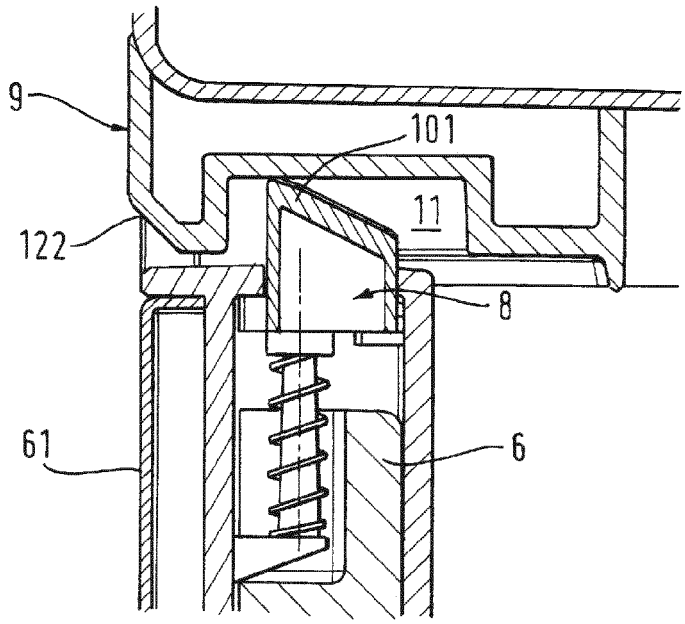

Fig. 7

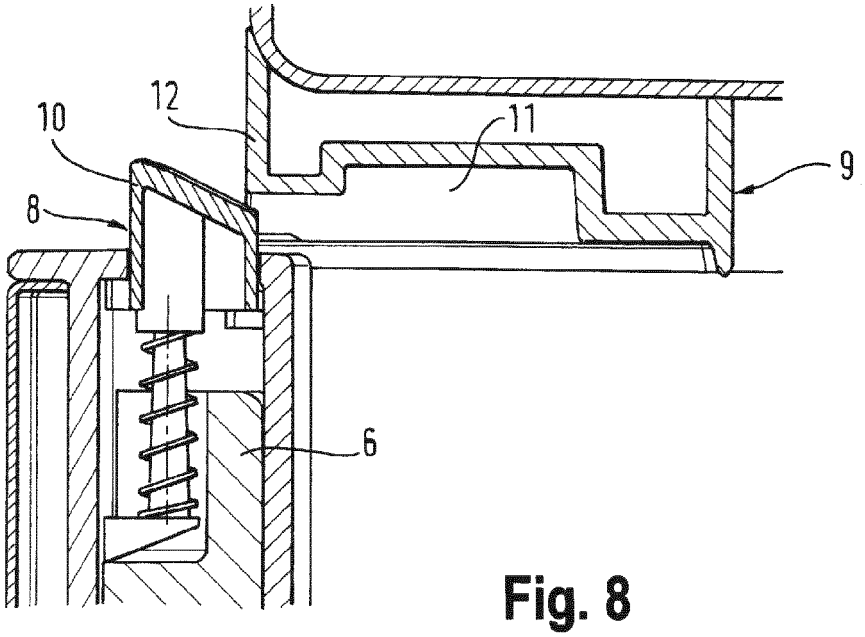

Fig. 8

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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