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(54) A PANEL ADJUSTMENT APPARATUS AND A COOLING DEVICE

(57) A panel adjustment apparatus suitable for use in a cooling device (S) which comprises the first body (2); the door (3); and the panel (4) with a channel (5) on a lower surface thereof, wherein the panel adjustment apparatus comprises the bracket (8) having the first surface (6a) and the second surface (6b) which are connected at a right angle, the first hole (7a) located on the first surface (6a) and the second hole (7b) located on the second surface (6b), wherein the bracket (8) is adapted to be mounted on an area of the first body (2) between the door (3) and the panel (4) through the first hole (7a); the adjustment pin (10) having the second body (11), threads (13) and the flange (12), wherein the second body (11) is adapted to pass through the second hole (7b) and the channel (5), wherein the threads (13) allow the second body (11) to move up and down in the second hole (7b) and the channel (5) when the second body (11) is rotated, wherein the flange (12) is located at an end of the second body (11) and rests against the second surface (6b) so as to prevent second body (11) from moving further in the second hole (7b); and the supporting unit (9) in the form of a ring, which is made of a flexible material and is adapted to be attached to the second body (11) so as to be located between the second hole (7b) and the channel (5).

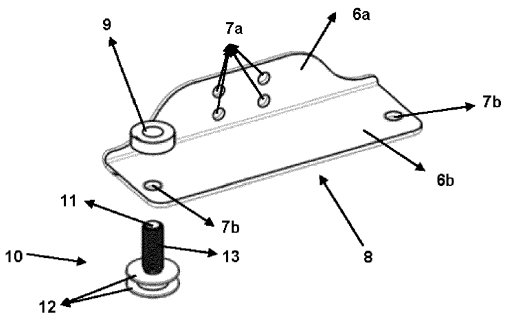

Figure – 4

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Description

Technical Field

[0001] The present invention relates to a panel adjustment apparatus for adjusting a distance between a panel and a door of a cooling device in cooling devices, especially in cooling devices with an upper panel, to a panel group comprising said panel adjustment apparatus, and to a cooling device comprising said panel group.

Background of the Invention

[0002] Cooling devices generally comprise a body having at least one inner chamber suitable for receiving the materials to be cooled, wherein an opening is provided on a front surface of the body, which communicates into the inner chamber. During the production process, at least one door for controlling access into the inner chamber is mounted on the front surface of the body where the opening is located, and the door is mounted to the body by means of hinges. Said cooling devices may comprise an upper panel which is removably mounted on the upper part of the body. However, in refrigerators with upper panels, an undesired level of opening may occur between the door and the upper panel. In addition, vibration and similar effects to which the cooling device is exposed during its transportation may cause the position of the upper panel to change and the opening between the door and the upper panel to increase.

[0003] Patent document US7752709B2 discloses a refrigerator comprising a height adjustable door, wherein the refrigerator comprises a body having at least one storage area comprising a front opening. The door is mounted on the body to close/open the storage area, and a hinge hole is formed at the lower surface of the door. A hinge frame is fixed from the lower part of the body to the front surface thereof and comprises a hinge shaft inserted in the hinge hole and thus supporting the door rotatably. The hinge shaft is covered by a hinge collar, a part of which is inserted into the hinge hole. The hinge collar comprises a flange portion at its lower end to support the lower surface of the door. A height adjustment screw is attached to a screw hole in the hinge frame so as to move in a vertical direction. An upper end of the height adjustment screw abuts against the lower surface of the hinge collar so that when rotated, the height adjustment screw raises/lowers the hinge bush to adjust the height of the door. However, in said document, while height of the door mounted on the cooling device body can be adjusted; there is no function for adjusting the height of the upper panel located on the upper part of the body.

Brief Description of the Invention

[0004] The panel adjustment apparatus according to the present invention is suitable for use in a cooling device which comprises at least a first body with at least one inner chamber; at least one door which is mounted on a front face of the first body; at least one panel which is removably mounted on an upper surface of the first body and has at least one channel on a lower surface thereof that faces the first body; wherein the panel adjustment apparatus comprises:

- at least one bracket having at least a first surface and at least a second surface which are connected at a right angle, at least a first hole located on the first surface and at least a second hole located on the second surface, wherein the bracket is adapted to be mounted on an area of the first body between the door and the panel through the first hole by means of a connection means, such that the second surface thereof extends parallel to the panel;
- at least one adjustment pin having at least a second body, threads and at least one flange, wherein the second body is adapted to pass through the second hole and the channel, wherein the threads are located on the second body and allow the second body to move up and down in the second hole and the channel when the second body is rotated by the user, wherein the flange is located at an end of the second body and rests against the second surface so as to prevent second body from moving further in the second hole; and
- at least one supporting unit in the form of a ring, which is adapted to be attached to the second body so as to be located between the second hole and the channel, and maintains the distance between the panel and the door.

[0005] According to the present invention, there is also provided a panel group comprising the panel and the panel adjustment apparatus; and a cooling device comprising the panel group.

[0006] The panel adjustment apparatus according to the invention eliminates undesired opening between the door and the panel, which occurs in cooling devices with panels, and enables said opening to be adjusted by the bracket and the adjustment pin and to be maintained by the supporting unit.

Object of the Invention

[0007] An object of the present invention is to provide a panel adjustment apparatus for adjusting panel height in cooling devices, a panel group comprising the panel adjustment apparatus and a cooling device comprising the panel group.

[0008] Another object of the present invention is to provide a panel adjustment apparatus for adjusting a distance between the panel and the door of the cooling device, a panel group comprising the panel adjustment apparatus and a cooling device comprising the panel group.

[0009] A further object of the present invention is to

provide a panel adjustment apparatus for maintaining the distance between the panel and the door during transportation of the cooling device, a panel group comprising the panel adjustment apparatus and a cooling device comprising the panel group.

[0010] Yet another object of the present invention is to provide a long-lasting and reliable panel adjustment apparatus, a panel group comprising the panel adjustment apparatus and a cooling device comprising the panel group.

Description of the Drawings

[0011] Exemplary embodiments of the panel adjustment apparatus, the panel group comprising the panel adjustment apparatus and the cooling device comprising the panel group according to the present invention are illustrated in the attached drawings, in which:

Figure 1 is a front perspective view of a cooling device comprising a panel.

Figure 2; is a bottom perspective view of a cooling device comprising a panel.

Figure 3; is a bottom perspective view of a cooling device comprising the panel group according to the invention.

Figure 4; is a perspective view of the panel adjustment apparatus according to the invention.

Figure 5; is a front view of an embodiment of the panel adjustment apparatus according to the invention.

Figure 6; is a front view of another embodiment of panel adjustment apparatus according to the invention.

Figure 7 is a perspective view of a panel of the panel adjustment group according to the invention.

Figure 8 is a perspective view of the assembly of the developed panel adjustment group to a cooling device.

[0012] All the parts illustrated in figures are individually assigned a reference numeral and the corresponding terms of these numbers are listed below:

Cooling device	(S)
Inner chamber	(1)
First body	(2)
Door	(3)
Panel	(4)
Channel	(5)
First surface	(6a)
Second surface	(6b)
Hole	(7)
Bracket	(8)
Supporting unit	(9)
Adjustment pin	(10)
Second body	(11)
Flange	(12)
Thread	(13)

Description of the Invention

[0013] Cooling devices may comprise an upper panel that is removably mounted on an upper part of the body. However, in refrigerators with an upper panel, an undesired level of opening may occur between the door and the upper panel. In addition, vibration and similar effects to which the cooling device is exposed during transportation may cause the position of the upper panel to change and the opening between the door and the upper panel to increase. Therefore, according to the present invention, there is developed a panel adjustment apparatus for cooling devices, which adjusts panel height and therefore the distance between the panel and the door of the cooling device, a panel group comprising the panel adjustment apparatus and a cooling device comprising the panel group.

[0014] The panel adjustment apparatus according to the present invention, as illustrated in figures 3-8, is suitable for use in a cooling device (S), such as a refrigerator, which comprises at least a first body (2) with at least one inner chamber (1); at least one door (3) which is mounted on a front face of the first body (2); at least one panel (4) which is removably mounted on an upper surface of the first body (2) and has at least one channel (5) on a lower surface thereof that faces the first body (2); wherein the panel adjustment apparatus comprises:

- at least one bracket (8) having at least a first surface (6a) and at least a second surface (6b) which are connected at a right angle of 90°, at least a first hole (7a) located on the first surface (6a) and at least a second hole (7b) located on the second surface (6b), wherein the bracket (8) is adapted to be mounted on an area of the first body (2) between the door (3) and the panel (4) through the first hole (7a) by means of a connection means such as a screw or the like (not shown in the figures), such that the second surface (6b) thereof extends parallel to the panel (4);
- at least one adjustment pin (10) having at least a second body (11), threads (13) and at least one flange (12), wherein the second body (11) is preferably in the form of a cylinder and is adapted to pass through the second hole (7b) and the channel (5), wherein the threads (13) are located on the second

body (11) and allow the second body (11) to move up and down in the second hole (7b) and the channel (5) when the second body (11) is rotated by the user, wherein the flange (12) is located at an end of the second body (11) (at an end of the second body opposite to the end thereof inserted through the second hole (7b) and the channel (5)) and rests against the second surface (6b) so as to prevent second body (11) from moving further in the second hole (7b); and

- at least one supporting unit (9) in the form of a ring, which is preferably made of a flexible material such as sponge, Styrofoam or the like, is adapted to be attached to the second body (11) so as to be located between the second hole (7b) and the channel (5), and maintains the distance between the panel (4) and the door (3).

[0015] In an exemplary embodiment of the invention, while producing the cooling device (S), the door (3) is mounted on the front surface of the first body (2) to control the access into the inner chamber (1) by opening or closing. Moreover, the panel (4) is mounted on the first body (2) in a removable manner, with a lower surface thereof facing the upper surface of the first body (2). The panel (4) comprises the channel (5) located on its lower surface. The bracket (8) of the panel adjustment apparatus according to the invention is mounted on the front surface of the first body (2), in an area between the panel (4) and the door (3). The assembly process can be performed by passing a screw or a similar connection means through the first hole (7a) located on the first surface (6a) and through a mounting hole located on the front surface of the first body (2). When the bracket (8) is mounted such that its first surface (6a) contacts the front surface of the first body (2), the second surface (6b) extends parallel to the panel (4). In this case, the second hole (7b) located on the second surface (6b) and the channel (5) located on the lower surface of the panel (4) are at least partially aligned. The second body (11) of the adjustment pin (10) is positioned such that one end thereof passes through the second hole (7b) and channel (5), and when the second body (11) is rotated by the user, the second body (11) moves up and down in the channel (5) and the second hole (7b) by means of the threads (13) thereof. The flange (12) is located at the other end of the second body (11) opposite to the end inserted through the second hole (7b) and the channel (5), and rests against the second surface (6b) after a certain point, thereby preventing the second body (11) from moving upwards in the second hole (7b). In this case, by rotating the adjustment pin (10) further, the panel (4) is moved downward so as to approach the second surface (6b). Further, the supporting unit (9) is in the form of a ring and is passed through a space in the midsection to the second body (11), wherein the supporting unit (9) is located on the second body (11), between the second hole (7b) and the channel (5). The supporting unit (9) has a flexible structure and ensures that the distance between the panel (4) and the second surface (6b) and therefore the distance between the panel (4) and the door (3) is maintained.

[0016] In a preferred embodiment of the invention, the adjustment pin (10) comprises at least one slit (not shown in the figures) located at the end of the adjustment pin (10) where the flange (12) is provided. In said embodiment, the user can rotate the adjustment pin (10) by using a screwdriver so as to tighten it.

[0017] According to the present invention, there is also provided a panel group comprising the panel adjustment apparatus and the panel having at least one channel (5) on a lower surface thereof. In a preferred embodiment of the invention, the panel (4) comprises at least two channels (5) extending parallel to each other, while the panel adjustment apparatus comprises at least two brackets (8) each adapted to be mounted on the first body (2) so as to be in alignment with the second hole (7b) and the channel (5); at least two adjustments pins (10); and at least two supporting units (9). An example of said embodiment is illustrated in Figure 8.

[0018] According to the present invention, there is also provided a cooling device (S) comprising said panel group.

[0019] The panel adjustment apparatus according to the invention eliminates undesired opening between the door (3) and the panel (4), which occurs in cooling devices with panels (4), and enables said opening to be adjusted by the bracket (8) and the adjustment pin (10) and to be maintained by the supporting unit (9).

Claims

1. A panel adjustment apparatus suitable for use in a cooling device (S) which comprises at least a first body (2) with at least one inner chamber (1); at least one door (3) which is mounted on a front face of the first body (2); at least one panel (4) which is removably mounted on an upper surface of the first body (2) and has at least one channel (5) on a lower surface thereof that faces the first body (2); wherein the panel adjustment apparatus comprises:

    - at least one bracket (8) having at least a first surface (6a) and at least a second surface (6b) which are connected at a right angle of 90°, at least a first hole (7a) located on the first surface (6a) and at least a second hole (7b) located on the second surface (6b), wherein the bracket (8) is adapted to be mounted on an area of the first body (2) between the door (3) and the panel (4) through the first hole (7a) by means of a connection means;
    - at least one adjustment pin (10) having at least a second body (11), threads (13) and at least one flange (12), wherein the second body (11) is adapted to pass through the second hole (7b) and the channel (5), wherein the threads (13)

are located on the second body (11) and allow the second body (11) to move up and down in the second hole (7b) and the channel (5) when the second body (11) is rotated, wherein the flange (12) is located at an end of the second body (11) and rests against the second surface (6b) so as to prevent second body (11) from moving further in the second hole (7b); and

- at least one supporting unit (9) in the form of a ring, which is made of a flexible material, is adapted to be attached to the second body (11) so as to be located between the second hole (7b) and the channel (5), and maintains the distance between the panel (4) and the door (3).

2. A panel adjustment apparatus according to claim 1, **characterized in that** the supporting unit (9) is made of sponge.

3. A panel adjustment apparatus according to any of the claims 1 or 2, **characterized in that** the adjustment pin (10) comprises at least one slit located at the end of the adjustment pin (10) where the flange (12) is provided.

4. A panel group comprising a panel adjustment apparatus according to any of the preceding claims and said panel (4).

5. A panel group according to claim 4, **characterized in that** the panel (4) comprises at least two channels (5) extending parallel to each other; and **that** the panel adjustment apparatus comprises at least two brackets (8); at least two adjustment pins (10); and at least two supporting units (9).

6. A cooling device (S) comprising a panel group according to any of the claims 4 or 5.

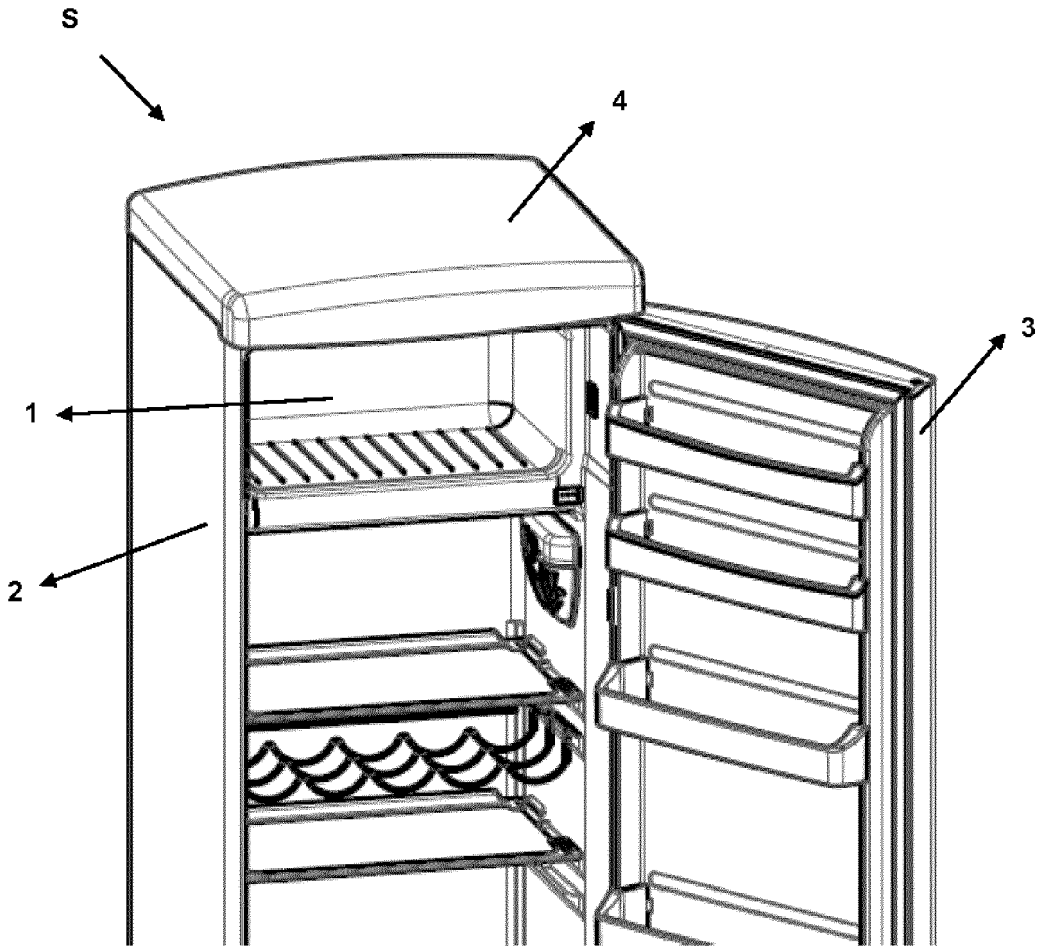


Figure – 1

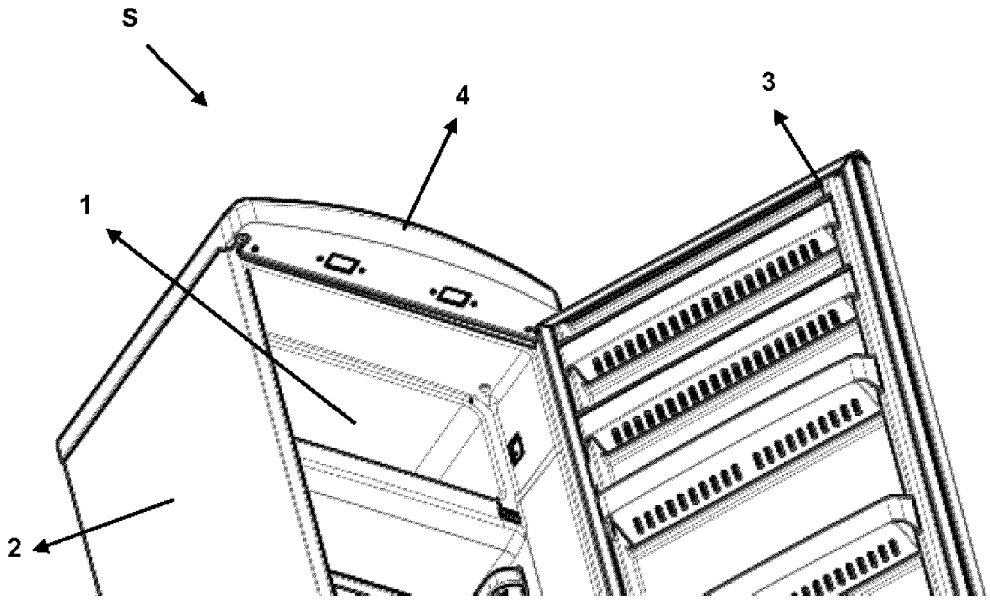


Figure – 2

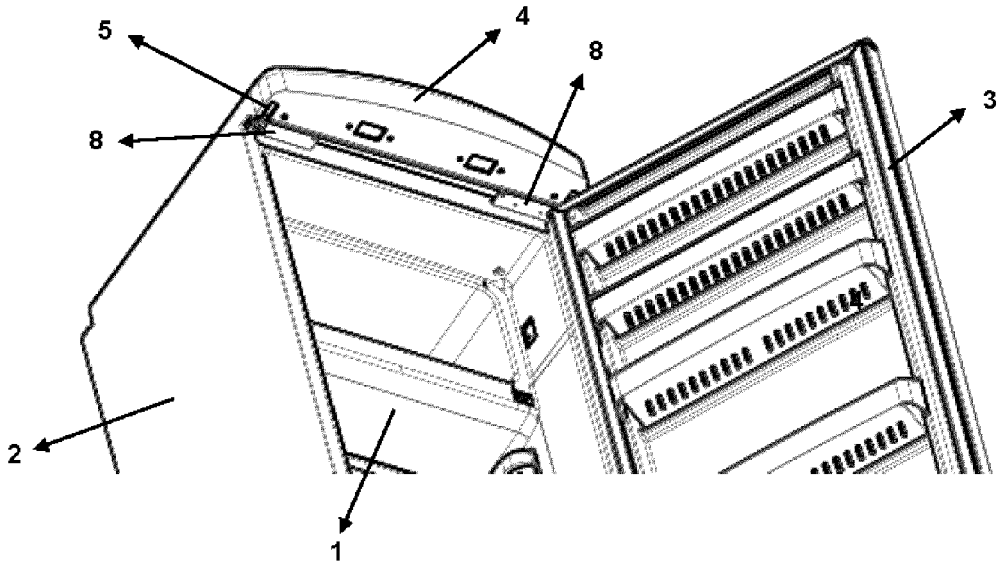


Figure – 3

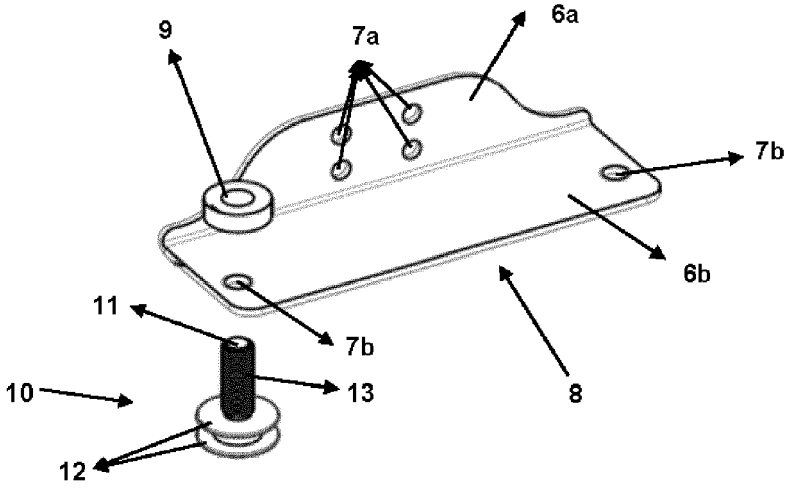
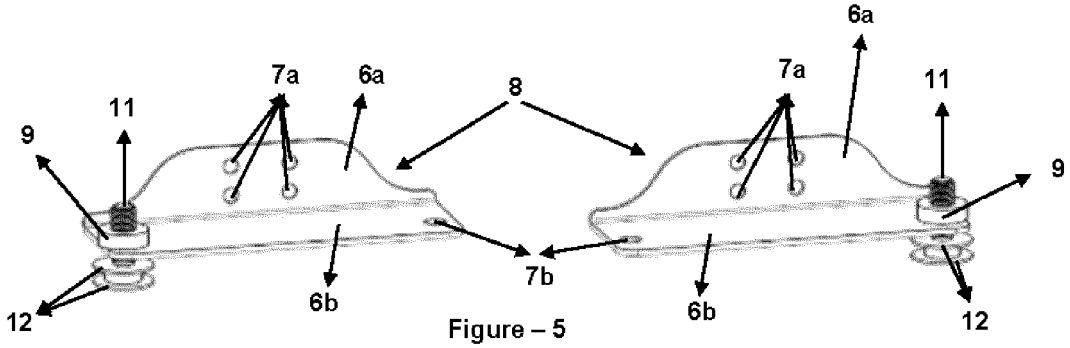


Figure – 4



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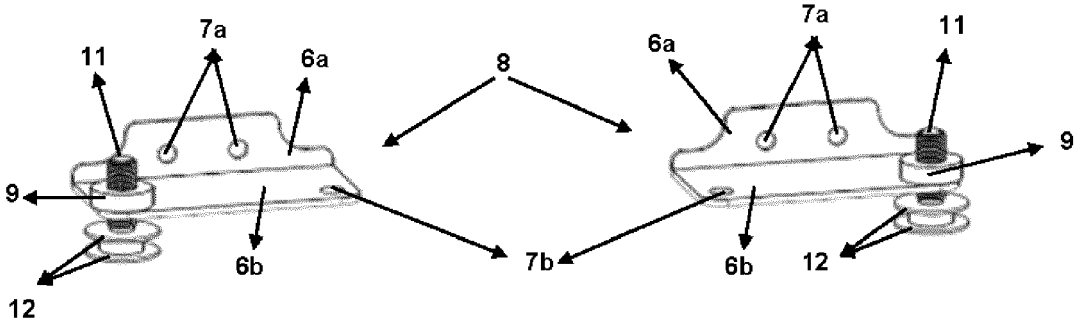

Figure – 6

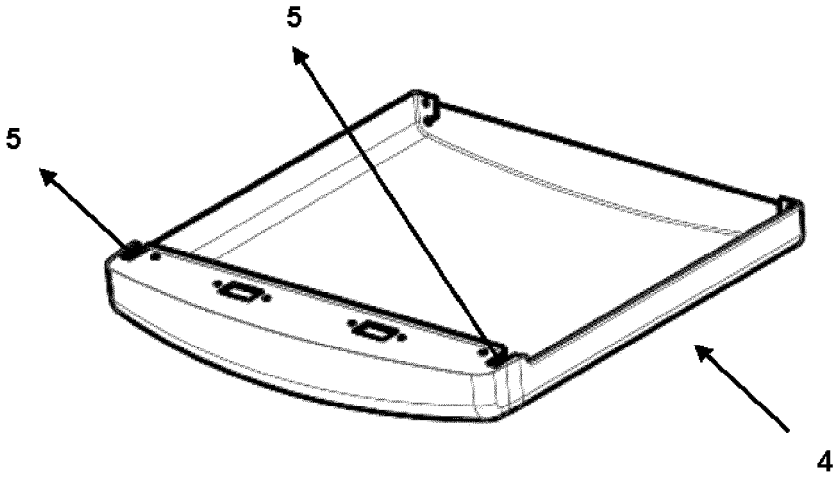

Figure – 7

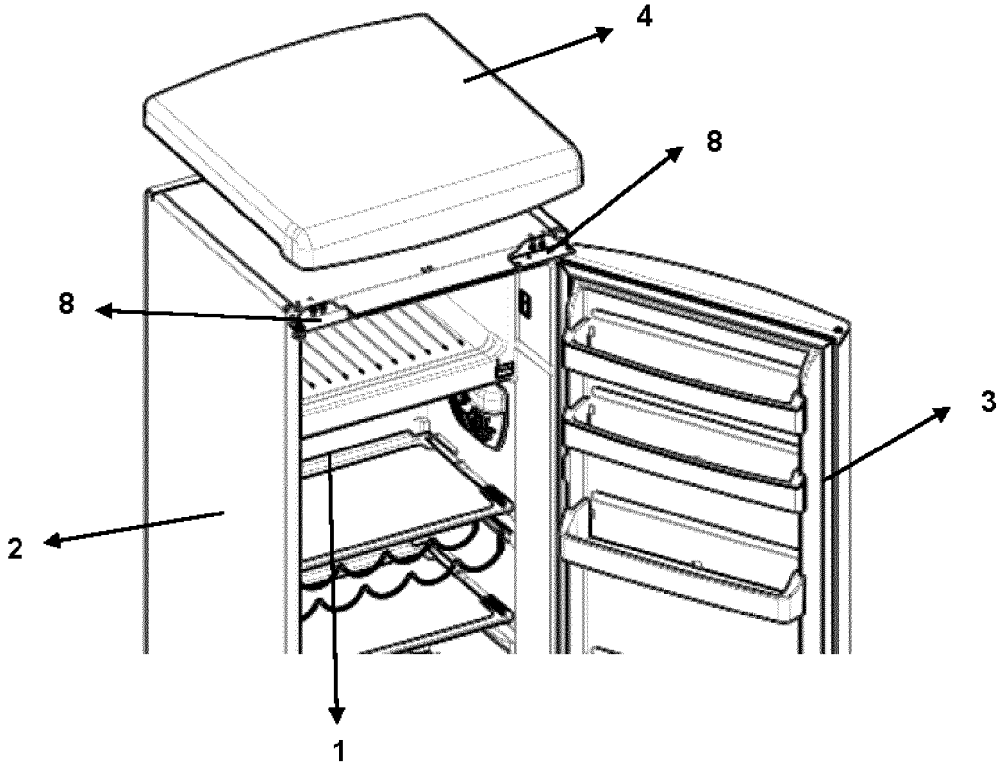

Figure – 8

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EUROPEAN SEARCH REPORT

Application Number
EP 20 21 7180

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	EP 0 769 667 A2 (AEG HAUSGERAETE GMBH [DE]) 23 April 1997 (1997-04-23) * column 1, line 53 - line 59; claim 5 * -----	1-6	INV. F25D23/06
X	JP 2000 342398 A (SANDEN CORP) 12 December 2000 (2000-12-12) * figures 2,5 * -----	1-6	
T	JP H10 323249 A (HOSHIZAKI ELECTRIC CO LTD) 8 December 1998 (1998-12-08) * figures 2,5 * -----		
			TECHNICAL FIELDS SEARCHED (IPC) F25D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	11 May 2021	Kuljis, Bruno

CATEGORY OF CITED DOCUMENTS

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11-05-2021

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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