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(54) **REFRIGERATION APPLIANCE**  
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**US-A- 3 633 375**

**EP 3 699 520 B1**

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## Description

### BACKGROUND

#### Technical Field

[0001] Embodiments of the patent relate to the technical field of household appliances, and in particular, to a refrigeration appliance.

#### Related Art

[0002] For a current frost-free refrigerator, a fan is usually used to blow cold air to each compartment of the refrigerator for refrigeration.

[0003] However, an air duct in the frost-free refrigerator usually needs to occupy space of a storage compartment, resulting in a relatively small volume of the storage compartment.

[0004] The patent documents DE 89 14 076 U1 and US 3 633 375 A disclose refrigeration appliances comprising an air duct at the back wall between liner and storage compartment.

[0005] The patent documents US 3 009 338 A, and US 3 043 114 A disclose refrigeration appliances comprising an evaporator at the back wall between liner and storage compartment.

### SUMMARY

[0006] Embodiments of the patent are intended to reduce space occupied by an air duct in a storage compartment.

[0007] To solve the foregoing technical problem, the embodiments of the patent provides a refrigeration appliance including a housing, a liner, and an air duct assembly configured to define an air duct, the liner being located inside the housing, a back wall of the liner being recessed toward the housing to form a groove, and the air duct being located in the groove.

[0008] In comparison to the prior art, technical solutions of the embodiments of the patent have the following beneficial effects.

[0009] The back wall of the liner of the refrigeration appliance is recessed in a direction toward the housing to form the groove. The air duct assembly may define one air duct, and the air duct is disposed in the groove. Because the groove is formed, on a basis of a storage compartment formed in the liner, with the back wall recessed in the direction toward the housing, space occupied by the air duct in the storage compartment can be reduced. In addition, overall consistency inside the storage compartment of the refrigeration appliance may further be improved.

[0010] Optionally, the groove includes at least one curved side wall, two ends of the curved side wall being respectively connected to the back wall of the liner and a side wall of the groove. The curved side wall is used

to guide air, so that an appearance of the storage compartment can be optimized, and integrity of the storage compartment can be improved. In addition, cold air is blown out through the curved side wall formed by the groove, to prevent air from hitting a side wall of the liner, thereby reducing air resistance and directing air forward.

[0011] The curved side wall is tangent to the back wall of the liner, so that the air resistance can further be reduced, wind field can be optimized, a cooling speed in the storage compartment can be increased, thereby facilitating cooling of food materials.

[0012] The curved side wall is tangent to the side wall of the groove, so that the air resistance can further be reduced, wind field can be optimized, a cooling speed in the storage compartment can be increased, thereby facilitating cooling of food materials.

[0013] Optionally, the groove includes a curved top wall being connected to a top wall of the liner.

[0014] Optionally, the curved top wall is tangent to the top wall of the liner.

[0015] Optionally, the air duct assembly includes a front cover plate and an air duct member, the air duct member being located between the front cover plate and a back wall of the groove.

[0016] Optionally, the front cover plate protrudes from a plane on which a notch of the groove is located.

[0017] Optionally, a distance by which the front cover plate protrudes from the plane on which the notch of the groove is located is not greater than 10 mm.

[0018] Optionally, a gap is provided between a side end of the front cover plate and the curved side wall of the groove for cold air to flow out.

### BRIEF DESCRIPTION OF THE DRAWINGS

[0019]

FIG. 1 is a schematic structural diagram of a refrigeration appliance according to an embodiment of the patent;

FIG. 2 is a cross-sectional view of FIG. 1 taken along a direction A-A;

FIG. 3 is a partial enlarged view of FIG. 2 at I;

FIG. 4 is a cross-sectional view of FIG. 1 taken along a direction B-B; and

FIG. 5 is a partial schematic structural diagram of a refrigeration appliance according to an embodiment of the patent.

### DETAILED DESCRIPTION

[0020] In order to make the foregoing objective, features, and advantages of the embodiments of the patents more clearly and easier to understand, specific embodiments of the patent are described in detail below with reference to the accompanying drawings. FIG. 1 is a schematic structural diagram of a refrigeration appliance according to an embodiment of the patent. FIG. 2 is a

cross-sectional view of FIG. 1 taken along a direction A-A. FIG. 3 is a partial enlarged view of FIG. 2 at I. FIG. 4 is a cross-sectional view of FIG. 1 taken along a direction B-B. FIG. 5 is a partial schematic structural diagram of a refrigeration appliance according to an embodiment of the patent. A specific structure of the refrigeration appliance is described below with reference to FIG. 1 to FIG. 5.

**[0021]** In specific implementation, a refrigeration appliance 100 may include a housing 10, a liner 20, and an air duct assembly 30. The liner 20 is located inside the housing 10. A portion of a back wall 21 of the liner 20 is recessed toward the housing 10 to form a groove 40. The air duct assembly 30 defines an air duct 50, the air duct 50 providing a flow passage for air blown by a fan, and the air duct 50 being located in the groove 40.

**[0022]** In the embodiment of the patent, the air duct assembly 30 may include a plurality of components, where some components may be located in the groove 40, and other components may be located outside the groove 40. For example, the air duct assembly 30 includes an air duct member 32 and a front cover plate 31. The air duct member 32 is located in the groove 40, and the front cover plate 31 is located outside the groove 40.

**[0023]** The groove 40 for accommodating the air duct 50 is formed by the portion of the back wall of the liner 20 being recessed in a direction toward the housing 10, so that there is no need to occupy too much space in the storage compartment. Therefore, in comparison to the prior art in which an air duct needs to be disposed in a storage compartment, space occupied by the air duct 50 in the storage compartment can be effectively reduced. In addition, when the air duct 50 is located in the groove 40, the air duct assembly 30 configured to define the air duct 50 is at least partially located in the groove, that is, only a small portion of the components of the air duct assembly 30 may protrude from the groove 40, so that overall consistency in the storage compartment of the refrigeration appliance 100 can be improved.

**[0024]** In some embodiments, a manner in which the air duct 50 and the air duct assembly 30 provided in the embodiments of the patent are arranged is used, so that a distance between the air duct assembly 30 and the liner 20 can be shortened, a distance between a glass shelf and the air duct assembly 30 can be reduced, and a volume of the refrigeration appliance 100 can be increased.

**[0025]** In specific implementation, the groove 40 includes at least one curved side wall 41. Two ends of the curved side wall 41 are respectively connected to the back wall 21 of the liner 20 and a side wall 43 of the groove 40.

**[0026]** The groove 40 may include one curved side wall 41, or may include two curved side walls 41. A specific quantity of curved side walls 41 disposed in the groove 40 may be set according to factors such as a quantity of air outlets of the air duct assembly 30, a size or an arranging position of an air outlet of the air duct assembly 30. The disposed curved side wall 41 can guide air without needing to dispose additional air guide components,

so that a quantity of components of the refrigeration appliance 100 can be reduced, and a structure of the refrigeration appliance 100 can be simplified. In addition, because the structure of the refrigeration appliance 100 is simplified, installation steps can be reduced, and costs of refrigeration appliance 100 can be reduced.

**[0027]** In the patent, the curved side wall 41 is tangent to the back wall 21 of the liner 20. When the fan operates, because the curved side wall 41 is tangent to the back wall 21 of the liner 20, air can be prevented from hitting a side wall of the liner 20, so that air resistance is reduced and air can be directed forward. In this way, air may be guided to a front end of the liner 20, that is, a region that is of the liner 20 and that is close to a door of a refrigerator, to optimize a wind field, thereby increasing a cooling speed in the storage compartment, and facilitating cooling of food materials. A direction of arrows in FIG. 2 and FIG. 4 is an approximate direction of cold air.

**[0028]** In the patent, the curved side wall 41 is tangent to the side wall 43 of the groove 40, and air can be guided out along the curved side wall 41 and in a direction in which the curved side wall 41 is tangent to the side wall 43 of the groove 40, to reduce the wind resistance, so that the air resistance can further be reduced, and the cooling speed in the storage compartment can be increased.

**[0029]** Referring to FIG. 3, in specific implementation, the groove 40 may further include a curved top wall 42. The curved top wall 42 is connected to a top wall 22 of the liner 20.

**[0030]** In an embodiment of the patent, the curved top wall 42 is tangent to the top wall 22 of the liner 20, and cold air flowing out from the curved top wall 42 can be guided out from the curved top wall 42 and in a direction in which the curved top wall 42 is tangent to the top wall 22 of the liner 20, so that the air resistance can further be reduced, the wind field can be optimized, the cooling speed in the storage compartment can be increased, thereby facilitating the cooling of food materials.

**[0031]** The curved side wall 41 or the curved top wall 42 is used to guide air, so that an appearance of the storage compartment can be optimized, and integrity of the storage compartment is improved. In addition, cold air is blown out through a curved surface presented by the groove 40, to prevent the air from hitting the side wall of the liner 20, thereby reducing the air resistance and directing air forward.

**[0032]** Still referring to FIG. 2 to FIG. 4, in specific implementation, the air duct assembly 30 includes the front cover plate 31 and the air duct member 32. The air duct member 32 is located between the front cover plate 31 and a back wall 45 of the groove 40.

**[0033]** A gap is provided between a side end 31a of the front cover plate 31 and the curved side wall 41 of the groove 40 for cold air to flow out. The air duct member 32 is provided with an air outlet. When the fan operates, cold air is blown out through the air outlet, and under guidance of the curved side wall 41 or the curved top wall

42, cold air flows out through the gap between the side end 31a of the front cover plate 31 and the curved side wall 41 of the groove 40 and enters the storage compartment, and then returns to the air duct assembly 30 through a return air inlet disposed at bottom of the liner 20, so that a cycle is completed.

**[0034]** In specific implementation, several air outlets may be disposed at one side of the air duct member 32, or several air outlets may be disposed at two sides of the air duct member 32, or several air outlets may be disposed at a top of the air duct member 32, or air outlets may be disposed at two sides and the top of the air duct member 32.

**[0035]** In one embodiment of the patent, in order to improve strength of the front cover plate 31, several stiffeners 311 are disposed on the front cover plate 31.

**[0036]** In one embodiment of the patent, the air duct member 32 is located in the groove 40, and the front cover plate 31 is located outside the groove 40. It may be understood that the front cover plate 31 may also be disposed in the groove 40 according to an actual application requirement.

**[0037]** In specific implementation, the front cover plate 31 may protrude from a plane on which a notch of the groove 40 is located, so that overall consistency in the storage compartment of the refrigeration appliance 100 can be improved, thereby achieving a better overall effect of the storage compartment.

**[0038]** In one embodiment of the patent, the front cover plate 31 may be connected to the curved side wall 41 of the groove 40. For example, a hook is disposed on the front cover plate 31, a slot corresponding to the hook is disposed on the curved side wall 41, and the front cover plate 31 is engaged with the curved side wall 41. In another embodiment of the utility model, the front cover plate 31 is connected to the side wall 43 of the groove 40.

**[0039]** In the embodiment of the patent, a distance d by which the front cover plate 31 protrudes from the plane on which the notch of the groove 40 is located is not greater than 10 mm. For example, the distance by which the front cover plate 31 protrudes from the plane on which the notch of the groove 40 is located is 5 mm.

**[0040]** It may be understood that, in practical application, the distance d by which the front cover plate 31 protrudes from the plane on which the notch of the groove 40 is located may be set based on an actual size, refrigerating capacity, and the like of the storage compartment of the refrigeration appliance 100.

**[0041]** To seal the air duct assembly 30 to prevent cold air from leaking out from other locations except the air outlet, in one embodiment of the patent, the air duct assembly 30 further includes a rear cover plate 33. The rear cover plate 33 is located between the air duct member 32 and the back wall 45 of the groove 40, and the rear cover plate 33 may be fixed to the back wall 45 of the groove 40. In another embodiment of the patent, the air duct assembly 30 includes a seal, the seal being located between the air duct member 32 and the back wall 45 of

the groove 40.

## Claims

1. A refrigeration appliance (100) comprising a housing (10), a liner (20), and an air duct assembly (30) configured to define an air duct (50), wherein
  - the liner (20) is located inside the housing (10), a back wall (21) of the liner (20) being recessed toward the housing (10) to form a groove (40); and
  - the air duct (50) is located in the groove (40), wherein the groove (40) comprises at least one curved side wall (41), two ends of the curved side wall (41) being respectively connected to the back wall (21) of the liner (20) and a side wall (43) of the groove (40), **characterized in that** the curved side wall (41) is tangent to the back wall (21) of the liner (20), and the curved side wall (41) is tangent to the side wall (43) of the groove (40).
2. The refrigeration appliance (100) according to claim 1, **characterized in that** the groove (40) comprises a curved top wall (42) being connected to a top wall (22) of the liner (20).
3. The refrigeration appliance (100) according to claim 2, **characterized in that** the curved top wall (42) is tangent to the top wall (22) of the liner (20).
4. The refrigeration appliance (100) according to any previous claim, **characterized in that** the air duct assembly (30) comprises a front cover plate (31) and an air duct member (32), the air duct member (32) being located between the front cover plate (31) and a back wall (45) of the groove (40).
5. The refrigeration appliance (100) according to claim 4, **characterized in that** the front cover plate (31) protrudes from a plane on which a notch of the groove (40) is located.
6. The refrigeration appliance (100) according to claim 5, **characterized in that** a distance by which the front cover plate (31) protrudes from the plane on which the notch of the groove (40) is located is not greater than 10 mm.
7. The refrigeration appliance (100) according to any of claims 4 to 6, **characterized in that** a gap is provided between a side end (31a) of the front cover plate (31) and the curved side wall (41) of the groove (40) for cold air to flow out.

## Patentansprüche

1. Kühlgerät (100) mit einem Gehäuse (10), einem Kühlgutbehälter (20) und einer Luftführungsbau-  
gruppe (30), die so konfiguriert ist, dass sie eine Luft-  
führung (50) definiert, wobei

sich der Kühlgutbehälter (20) in dem Gehäuse  
(10) befindet, wobei eine Rückwand (21) des  
Kühlgutbehälters (20) so zum Gehäuse (10) hin  
vertieft ist, dass eine Nut (40) entsteht, und  
sich die Luftführung (50) in der Nut (40) befindet,  
wobei die Nut (40) mindestens eine gekrümmte  
Seitenwand (41) umfasst, wobei zwei Enden der  
gekrümmten Seitenwand (41) mit der Rück-  
wand (21) des Kühlgutbehälters (20) bezie-  
hungsweise einer Seitenwand (43) der Nut (40)  
verbunden sind,

**dadurch gekennzeichnet, dass**

die gekrümmte Seitenwand (41) die Rückwand  
(21) des Kühlgutbehälters (20) und die Seiten-  
wand (43) der Nut (40) berührt.

2. Kühlgerät (100) nach Anspruch 1, **dadurch gekenn-  
zeichnet, dass** die Nut (40) eine gekrümmte obere  
Wand (42) umfasst, die mit einer oberen Wand (22)  
des Kühlgutbehälters (20) verbunden ist.
3. Kühlgerät (100) nach Anspruch 2, **dadurch gekenn-  
zeichnet, dass** die gekrümmte obere Wand (42) die  
obere Wand (22) des Kühlgutbehälters (20) berührt.
4. Kühlgerät (100) nach einem der vorhergehenden  
Ansprüche, **dadurch gekennzeichnet, dass** die  
Luftführungsbau-  
gruppe (30) eine vordere Abdeck-  
platte (31) und ein Luftführungselement (32) um-  
fasst, wobei sich das Luftführungselement (32) zwi-  
schen der vorderen Abdeckplatte (31) und einer  
Rückwand (45) der Nut (40) befindet.
5. Kühlgerät (100) nach Anspruch 4, **dadurch gekenn-  
zeichnet, dass** die vordere Abdeckplatte (31) von  
einer Ebene vorsteht, in der sich eine Kerbe der Nut  
(40) befindet.
6. Kühlgerät (100) nach Anspruch 5, **dadurch gekenn-  
zeichnet, dass** ein Abstand, um den die vordere Ab-  
deckplatte (31) von der Ebene vorsteht, in der sich  
die Kerbe der Nut (40) befindet, maximal 10 mm be-  
trägt.
7. Kühlgerät (100) nach einem der Ansprüche 4 bis 6,  
**dadurch gekennzeichnet, dass** sich zwischen ei-  
nem seitlichen Ende (31a) der vorderen Abdeckplat-  
te (31) und der gekrümmten Seitenwand (41) der  
Nut (40) ein Spalt befindet, durch den kalte Luft he-  
rausströmen kann.

## Revendications

1. Appareil de réfrigération (100) comprenant un bâti  
(10), un revêtement (20) et un assemblage de con-  
duit d'air (30) configuré afin de définir un conduit d'air  
(50), dans lequel le revêtement (20) est situé à l'in-  
térieur du bâti (10), une paroi arrière (21) du revête-  
ment (20) étant en retrait en direction du bâti (10)  
pour former une gorge (40) ; et le conduit d'air (50)  
est situé dans la gorge (40), dans lequel la gorge  
(40) comprend au moins une paroi latérale courbée  
(41), deux extrémités de la paroi latérale courbée  
(41) étant respectivement reliées à la paroi arrière  
(21) du revêtement (20) et à une paroi latérale (43)  
de la gorge (40), **caractérisé en ce que** la paroi  
latérale courbée (41) est tangente à la paroi arrière  
(21) du revêtement (20) et la paroi latérale courbée  
(41) est tangente à la paroi latérale (43) de la gorge  
(40).
2. Appareil de réfrigération (100) selon la revendication  
1, **caractérisé en ce que** la gorge (40) comprend  
une paroi supérieure courbée (42) reliée à une paroi  
supérieure (22) du revêtement (20).
3. Appareil de réfrigération (100) selon la revendication  
2, **caractérisé en ce que** la paroi supérieure cour-  
bée (42) est tangente à la paroi supérieure (22) du  
revêtement (20).
4. Appareil de réfrigération (100) selon l'une quelcon-  
que des revendications précédentes, **caractérisé  
en ce que** l'assemblage de conduit d'air (30) com-  
prend un couvercle avant (31) et un élément de con-  
duit d'air (32), l'élément de conduit d'air (32) étant  
situé entre le couvercle avant (31) et une paroi arrière  
(45) de la gorge (40).
5. Appareil de réfrigération (100) selon la revendication  
4, **caractérisé en ce que** le couvercle avant (31) fait  
saillie d'un plan dans lequel une encoche de la rai-  
nure (40) se trouve.
6. Appareil de réfrigération (100) selon la revendication  
5, **caractérisé en ce qu'**une distance dont le cou-  
vercle avant (31) fait saillie du plan dans lequel l'en-  
coche de la rainure (40) se trouve n'excède pas 10  
mm.
7. Appareil de réfrigération (100) selon l'une quelcon-  
que des revendications 4 à 6, **caractérisé en ce  
qu'**un espacement est prévu entre une extrémité la-  
térale (31a) du couvercle avant (31) et la paroi laté-  
rale courbée (41) de la rainure (40) pour l'écoule-  
ment de l'air froid.

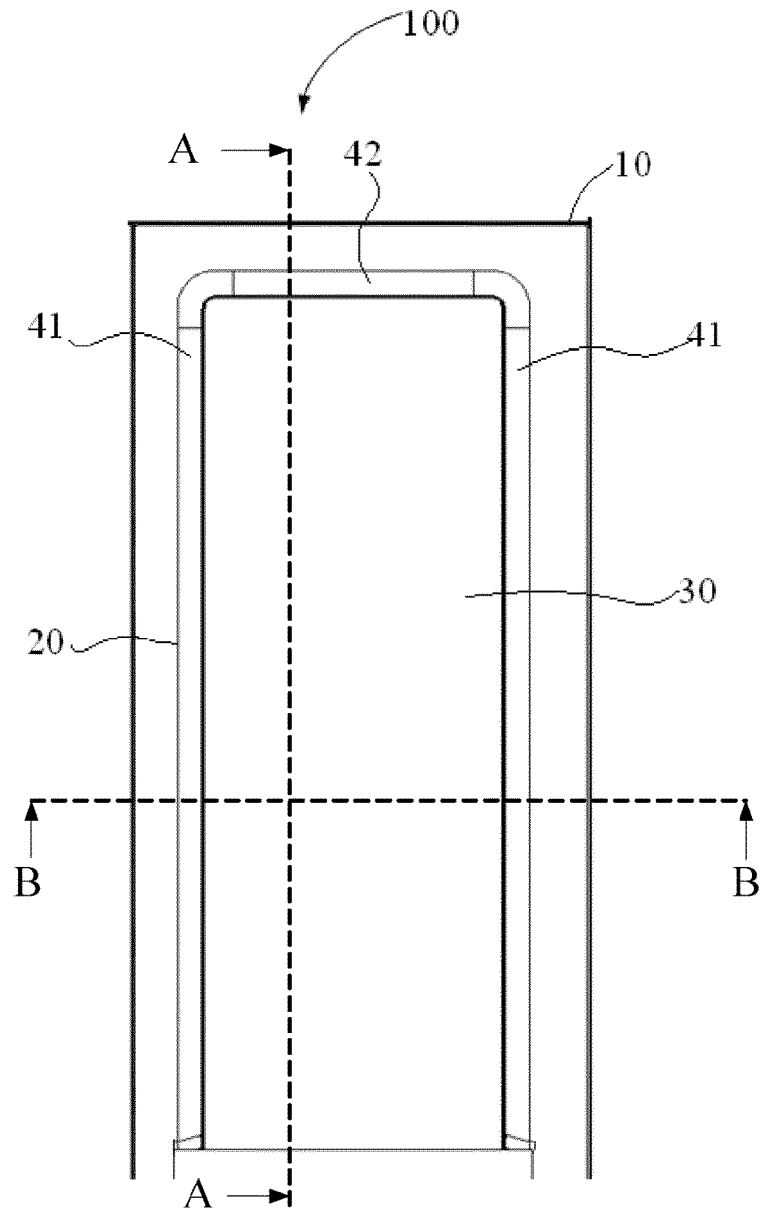


FIG. 1

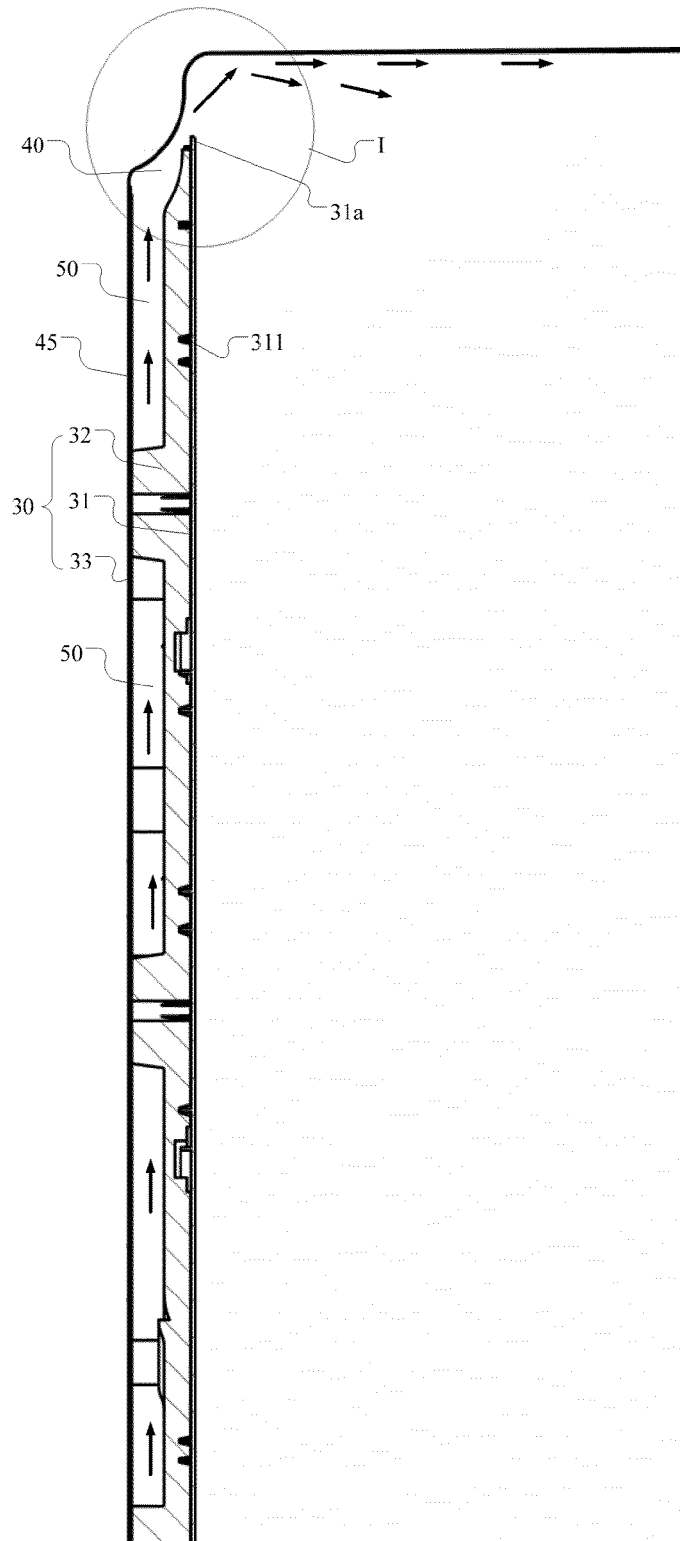


FIG. 2

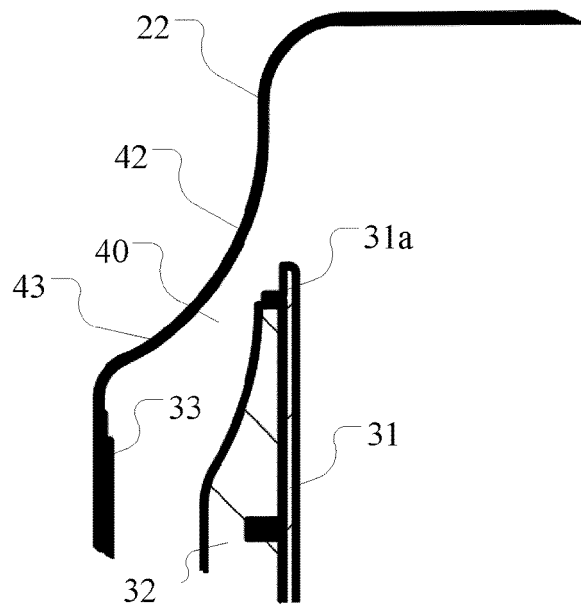


FIG. 3

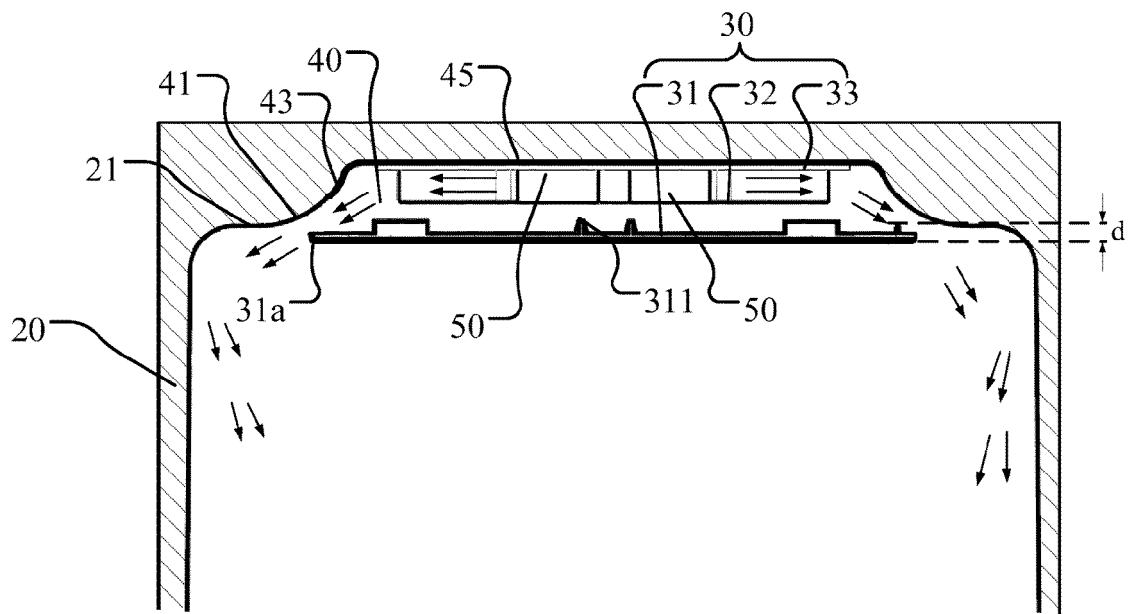


FIG. 4

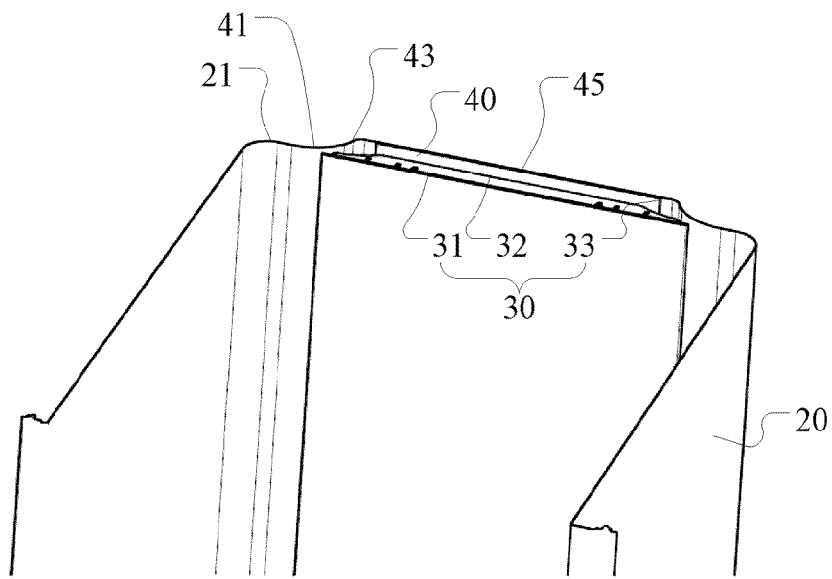


FIG. 5

**REFERENCES CITED IN THE DESCRIPTION**

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