

(19)



(11)

EP 2 245 394 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention
of the grant of the patent:

11.01.2017 Bulletin 2017/02

(51) Int Cl.:

F25D 17/06 ^(2006.01)

(21) Application number: **08865946.1**

(86) International application number:

PCT/EP2008/066954

(22) Date of filing: **06.12.2008**

(87) International publication number:

WO 2009/083388 (09.07.2009 Gazette 2009/28)

(54) **A COOLING DEVICE**

KÜHLVORRICHTUNG

DISPOSITIF DE RÉFRIGÉRATION

(84) Designated Contracting States:

**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR
HR HU IE IS IT LI LT LU LV MC MT NL NO PL PT
RO SE SI SK TR**

(73) Proprietor: **Arçelik Anonim Sirketi**

34950 Istanbul (TR)

(30) Priority: **31.12.2007 TR 200709247**

(72) Inventor: **KOCATURK, Serdar**

34950 Istanbul (TR)

(43) Date of publication of application:

03.11.2010 Bulletin 2010/44

(56) References cited:

EP-A- 0 248 370 WO-A-2004/038312

CA-A1- 2 453 684 JP-A- 2 150 682

EP 2 245 394 B1

Note: Within nine months of the publication of the mention of the grant of the European patent in the European Patent Bulletin, any person may give notice to the European Patent Office of opposition to that patent, in accordance with the Implementing Regulations. Notice of opposition shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

Description

[0001] The present invention relates to a cooling device that comprises a crisper.

[0002] Cooling devices comprise a cooling compartment wherein foods and beverages are stored, a freezing compartment that provides foods to be stored by freezing, and a crisper that is disposed in the cooling compartment wherein foods such as vegetables and fruits are stored. The crisper is separated from the cooling compartment inner volume by a crisper cover placed thereon. Air flow between the crisper and the cooling compartment is provided to be kept at a limited level to prevent foods placed in the crisper from dehydrating by sweating. Consequently, a temperature difference occurs between the crisper and the cooling compartment inner volume albeit small. The temperature difference causes sweating on the lower surface of the lid that separates the cooling compartment inner volume and the crisper. The sweating occurred on the lower surface of the lid drops off on the foods stored in the crisper causing the foods to spoilage by adversely affecting the storage life.

[0003] In the state of the art the Great Britain Patent Application No GB862797, on the crisper cover, a protrusion is explained that enables some of the cold air to proceed over the lid and some to be directed into the crisper.

[0004] A household appliance according to preamble of the claim 1 is known from European patent application no WO2004038312.

[0005] The aim of the present invention is the realization of a cooling device wherein the humidity in crisper is controlled.

[0006] The cooling device realized in order to attain the aim of the present invention, explicated in the first claim and the respective claims thereof, comprises a fin disposed between the crisper cover and the body rear wall, resisting the flow of air passing through an opening that enables the air to pass to the compartment, wherein the crisper is disposed, thus enabling some of the air to be directed into the crisper by passing through the inlet; and comprises a guide that provides air to proceed sweeping along the lower surface of the lid by forming a set against the air that passes into the crisper through the inlet.

[0007] By means of the present invention, the cold air proceeding between the lid and the crisper cover is provided to form an air curtain along the lower surface of the lid. Thus, the hot air rising in the crisper is provided to be evacuated from crisper without contacting the lower surface of the lid by proceeding by means of this air curtain. This prevents the hot air rising from the crisper base, which is warmer than the lid, from causing sweating by condensing on the lower surface of the lid.

[0008] In another embodiment of the present invention, the cooling device comprises a second inlet and a second fin right behind the inlet and the fin in the proceeding direction of the air passing between the lid and the crisper

cover. This second fin being longer than the length of the first fin directs some or all of the air passing through the first fin to the second inlet. The air passing through the second inlet strengthens the air passing through the first inlet and provides the air to proceed along the lid up to the outlet sweeping the lower surface of the lid without spreading into the crisper.

[0009] In this embodiment of the present invention, sizes of the inlets and the fins are adjusted so as the flow rate of the air entering into the crisper through the first inlet is greater than the flow rate of the air entering into the crisper through the second inlet. Thus, the air passing through the first inlet and being directed to the lower surface of the lid by hitting the guide proceeds sweeping the lower surface of the lid by meeting the air having lower flow rate and goes out of the crisper passing through the outlets.

[0010] In another version related to this embodiment of the present invention, the distance between the first fin and the lid is shorter than the distance between the second fin and the lid. This difference provides the air entering through the first inlet to be faster than the air entering through the second inlet, therefore providing the air, entering through the first inlet and directed to the lower surface of the lid, to be dragged contacting the lower surface of the lid by meeting the air entering through the second inlet and to leave the crisper. Furthermore, by means of this embodiment, the air entering through the first inlet is prevented from spreading by entering into the crisper.

[0011] In another embodiment of the present invention, the fins are concave-shaped. By means of this shape, speed of the air hitting the fin is provided to be least affected.

[0012] In another embodiment of the present invention, the outlets are placed on the front wall of the crisper that meets the air proceeding along the lid by sweeping the lower surface of the lid. Thus, the air proceeding by sweeping the lower surface of the lid can be evacuated out of the crisper through the outlet without spreading into the crisper.

[0013] In yet another embodiment of the present invention, the outlets are beared on the lid. Diverters are placed above these outlets just like the ones above the inlets.

[0014] By means of the present invention, sweating is prevented from occurring on the lower surface of the lid. This prevents foods stored in the crisper from spoiling by water dropping thereon because of the sweating that may occur on the lower surface of the lid and provides the storage lives of foods in the crisper to be increased.

[0015] The cooling device realized in order to attain the aim of the present invention is illustrated in the attached figures, where:

Figure 1 - is the schematic view of a cooling device and a crisper therein.

Figure 2 - is the schematic view of the crisper.

Figure 3 - is the schematic view of another embodiment of the present invention.

[0016] The elements illustrated in the figures are numbered as follows:

1. Cooling device
2. Body
3. Crisper
4. Crisper cover
5. Lid
6. Fin
7. Inlet
8. Outlet
9. Supplementary fin
10. Supplementary inlet
11. Guide
12. Diverter

[0017] The cooling device (1) comprises a body (2), wherein foods and beverages are placed, a door that separates the body (2) from the outside so as to provide sealing and allows access to the inside, a crisper (3) disposed in the body (2), a crisper cover (4) disposed on the crisper (3) separating the crisper (3) from the body (2) inner volume, a lid (5) disposed between the crisper cover (4) and the crisper (3) covering the crisper (3), one or more inlets (7) disposed on the lid (5) and allowing the air passing through the opening (A) to enter into the crisper (3), and one or more outlets (8) allowing exit of the air from the inside of the crisper (3) (Figure 1).

[0018] The cooling device (1) furthermore comprises

- at least one fin (6) disposed on the side of the inlet (7), bent in the opposite direction of the air flow partially covering the inlet (7), providing some of the air to be directed into the crisper (3) by passing through the inlet (7), and
- a guide (11) forming a set opposite the air that passes into the crisper (3) through the inlet (7) by bending so as to partially cover the underside of the inlet (7), and providing the air to be directed so as to sweep the lower surface of the lid (5) all along in the crisper (3) (Figure 2).

[0019] The air passing to the underside of the crisper cover (4) from the inside of the body (2) through the opening (A) is taken into the crisper (3) passing through the lid (5) and is provided to leave the crisper (3) sweeping the lower surface of the lid (5). In this position, by preventing sweating (condensing) from occurring on the lower surface of the lid (5), foods stored in the crisper (3) are provided not to be reached by water drops even if condensing occurs on the lid (5).

[0020] Some of the cold air reaching the volume wherein the crisper (3) is located from the body (2) through the opening (A) proceeds along the outer surface of the crisper (3) rear wall and some of the cold air reaches between

the lid (5) and the crisper cover (4). The air passing between the lid (5) and the crisper cover (4) meets the protrusion formed fin (6) extending from the lid (5) to the crisper cover (4) and passes from the inlet (7) to the inside of the crisper (3) by the direction of the fin (6). The air passing from the inlet (7) to the crisper (3) this time meets the guide (11) almost corresponding to the inlet (7) and proceeds sweeping the lower surface of the lid (5) by means of this guide (11). The air, which proceeds sweeping the lower surface of the lid (5), leaves the crisper (3) through the outlets (8) on the crisper (3).

[0021] The cold air, which proceeds sweeping the lower surface of the lid (5), serves as an air curtain preventing the hot air in the crisper (3) from contacting the lid (5). Thus, the hot air rising because of the crisper (3) base being warmer than the temperature of the lid (5), and causing sweating on the lower surface of the lid (5) while contacting there is provided to be evacuated out of the crisper (3) with the cold air that proceeds sweeping the lower surface of the lid (5).

[0022] In an embodiment of the present invention, the fin (6) and the inlet (7) are disposed along the rear side of the lid (5). Thus, the air directed into the crisper (3) is provided to sweep all the lower surface of the lid (5). In this embodiment, the fin (6) is a single piece.

[0023] In another version related to this embodiment, the fin (6) consists of several pieces arranged at certain intervals along the rear side of the lid (5).

[0024] In another embodiment of the present invention, the fin (6) is concave-shaped bent in the opposite direction of the air flow, partially covering the inlet (7). By means of this shape, speed of the air passing between the lid (5) and the crisper cover (4) is provided to be directed to the inlet (7) being least affected.

[0025] In yet another embodiment of the present invention, the guide (11) is preferably concave-shaped same as the fin (6). Thus, the air entering into the crisper (3) through the inlet (7) is directed to the lower surface of the lid (5), speed of which being least affected.

[0026] In another embodiment of the present invention, the cooling device (1) comprises a supplementary inlet (10) and a supplementary fin (9) right behind the inlet (7) and the fin (6) in the proceeding direction of the air passing between the lid (5) and the crisper cover (4). This supplementary fin (9) is longer than the length of the fin (6) directs some or all of the air passing through the first fin to the supplementary inlet (10). The air passing through the supplementary inlet (10) strengthens the air passing through the first inlet (7) and provides the air to proceed along the lid (5) up to the outlet (8) sweeping the lower surface of the lid (5) without spreading into the crisper (3) (Figure 2).

[0027] In this embodiment of the present invention, sizes of the inlet (7), supplementary inlet (10), fin (6) and supplementary fin (9) are adjusted so as the flow rate of the air entering into the crisper (3) through the inlet (7) is greater -preferably two times- than the flow rate of the air entering into the crisper (3) through the supplementary

inlet (10). Thus, the air passing through the first inlet (7) and directed to the lower surface of the lid (5) by hitting the guide (11) proceeds sweeping the lower surface of the lid (5) by meeting the air having lower flow rate and goes out of the crisper (3) passing through the outlets (8). Consequently, sweating is prevented from occurring on the lower surface of the lid (5).

[0028] In this embodiment of the present invention, the distance of the fin (6) and supplementary fin (9) end points to the lid (5) is adjusted to be two times of said distance. Therefore, the flow rate of the air entering into the crisper (3) through the inlet (7) is two times greater than the flow rate of the air entering into the crisper (3) through the supplementary inlet (10).

[0029] In another embodiment of the present invention, the outlets (8) are beared on the front wall of the crisper (3) that is disposed in the flow direction of the air flowing by sweeping the lower surface of the lid (5). Thus, the air that proceeds sweeping the lower surface of the lid (5) is provided to leave the crisper (3) without spreading into the crisper (3).

[0030] In yet another embodiment of the present invention, the outlets (8) are disposed on the lid (5), wherein diverters (12) are disposed above these outlets (8), extending so as to remove the air that leaves the crisper (3) from between the crisper cover (4) and the lid (5). In another version related to this embodiment of the present invention, the diverters (12) above the outlets (8) are shaped same as the fins (6) above the inlet (7) (Figure 3).

[0031] With the present invention, an air curtain is formed between the lid (5) and the hot air in the crisper (3), and by means of this air curtain, sweating is prevented from occurring on the lower surface of the lid (5). Since drop of water on the foods in the crisper (3) is prevented, storage lives of the foods stored in the crisper (3) are increased.

Claims

1. A cooling device (1) comprising a body (2), wherein foods and beverages are placed, a door that separates the body (2) from the outside so as to provide sealing and allows access to the inside, a crisper (3) disposed in the body (2), a crisper cover (4) disposed on the crisper (3) separating the crisper (3) from a body (2) inner volume, a lid (5) disposed between the crisper cover (4) and the crisper (3) covering the crisper (3), one or more inlets (7) disposed on the lid (5) and allowing air passing through an opening (A) to enter into the crisper (3), and one or more outlets (8) allowing exit of the air from the inside of the crisper (3), said lid (5) having at least one fin (6) disposed on the side of the inlet (7), bent in the opposite direction of the air flow partially covering the inlet (7), providing some of the air to be directed into the crisper (3) by passing through the inlet (7), said crisper being **characterized by a**

guide (11) forming a set opposite the air that passes into the crisper (3) through the inlet (7) by bending so as to partially cover the underside of the inlet (7), and providing the air to be directed so as to sweep the lower surface of the lid (5) all along in the crisper (3).

2. A cooling device (1) as in Claim 1, **characterized by** a single-piece fin (6) extending along the rear side of the lid (5).

3. A cooling device (1) as in Claim 1, **characterized by** a fin (6) that consists of several pieces arranged at certain intervals along the rear side of the lid (5).

4. A cooling device (1) as in Claim 1, 2 or 3, **characterized by** a protrusion formed fin (6) extending from the lid (5) to the crisper cover (4).

5. A cooling device (1) as in Claim 1, 2, 3 or 4, **characterized by** a concave-shaped fin (6).

6. A cooling device (1) as in Claim 1, **characterized by** a guide (11), shaped same as the fin (6).

7. A cooling device (1) as in Claim 1, **characterized by** a concave-shaped guide (11).

8. A cooling device (1) as in Claim 1, **characterized by** a supplementary inlet (10) and a supplementary fin (9) right behind the inlet (7) and the fin (6) in the proceeding direction of the air passing between the lid (5) and the crisper cover (4).

9. A cooling device (1) as in Claim 7, **characterized by** a supplementary fin (9) being longer than the length of the fin (6) so as to direct some or all of the air pass through the fin (6) to the supplementary inlet (10).

10. A cooling device (1) as in Claim 7 or 8, **characterized by** an inlet (7), a supplementary inlet (10) and a fin (6), a supplementary fin (9), sizes of which are adjusted so as the flow rate of the air entering into the crisper (3) through the inlet (7) is greater than the flow rate of the air entering into the crisper (3) through the supplementary inlet (10).

11. A cooling device (1) as in any one of the above claims, **characterized by** an outlet (8) placed on the front wall of the crisper (3) that is disposed in the flow direction of the air flowing by sweeping the lower surface of the lid (5).

12. A cooling device (1) as in any one of the above claims, **characterized by** an outlet (8) disposed on the lid (5).

Patentansprüche

1. Kühlvorrichtung (1), **umfassend** einen Gehäusekörper (2), in den Lebensmittel und Getränke gegeben werden, eine Tür, die den Gehäusekörper (2) vom Äußeren trennt, um eine Abdichtung bereitzustellen und Zugriff auf das Innere zu bieten, ein Frischhaltefach (3), das im Gehäusekörper (2) angeordnet ist, eine Frischhaltefachabdeckung (4), die am Frischhaltefach (3) angeordnet ist und das Frischhaltefach (3) von einem Innenvolumen des Gehäusekörpers (2) trennt, einen Deckel (5), der zwischen der Frischhaltefachabdeckung (4) und dem Frischhaltefach (3) angeordnet ist und das Frischhaltefach (3) abdeckt, einen oder mehrere Einlässe (7), die am Deckel (5) angeordnet sind und Luft durch eine Öffnung (A) in das Frischhaltefach (3) einlassen, und einen oder mehrere Auslässe (8), die Luft aus dem Inneren des Frischhaltefachs (3) austreten lassen, wobei der Deckel (5) wenigstens eine Lamelle (6) aufweist, die auf beiden Seiten des Einlasses (7) angeordnet und in entgegengesetzter Richtung zum Luftstrom gebogen ist und den Einlass (7) teilweise abdeckt und dafür sorgt, dass Luft in das Frischhaltefach (3) geleitet wird, indem sie durch den Einlass (7) tritt, wobei das Frischhaltefach (3) durch eine Führung (11) gekennzeichnet ist, die einen Satz entgegengesetzt zur Luft bildet, die durch den Einlass (7) in das Frischhaltefach (3) tritt, indem sie sich derart biegt, dass sie die Unterseite des Einlasses (7) teilweise bedeckt, und dafür sorgt, dass die Luft so gelenkt wird, dass sie am gesamten Frischhaltefach (3) entlang über die Unterseite des Deckels (5) streicht.
2. Kühlvorrichtung (1) nach Anspruch 1, **gekennzeichnet durch** eine einstückige Lamelle (6), die sich an der Rückseite des Deckels (5) erstreckt.
3. Kühlvorrichtung (1) nach Anspruch 1, **gekennzeichnet durch** eine Lamelle (6), die aus mehreren Teilen besteht, die in bestimmten Intervallen an der Rückseite des Deckels (5) angeordnet sind.
4. Kühlvorrichtung (1) nach Anspruch 1, 2 oder 3, **gekennzeichnet durch** eine vorspringend gebildete Lamelle (6), die sich von der Deckel (5) zur Frischhaltefachabdeckung (4) erstreckt.
5. Kühlvorrichtung (1) nach Anspruch 1, 2, 3 oder 4, **gekennzeichnet durch** eine konkav geformte Lamelle (6).
6. Kühlvorrichtung (1) nach Anspruch 1, **gekennzeichnet durch** eine Führung (11), die ebenso wie die Lamelle (6) geformt ist.
7. Kühlvorrichtung (1) nach Anspruch 1, **gekennzeichnet durch** eine konkav geformte Führung (11).
8. Kühlvorrichtung (1) nach Anspruch 1, **gekennzeichnet durch** einen Ergänzungseinlass (10) und eine Ergänzungslamelle (9) unmittelbar hinter dem Einlass (7) und der Lamelle (6) in der Strömungsrichtung der Luft, die zwischen dem Deckel (5) und dem Frischhaltefachabdeckung (4) hindurchtritt.
9. Kühlvorrichtung (1) nach Anspruch 7, **dadurch gekennzeichnet, dass** eine Ergänzungslamelle (9) länger als die Lamelle (6) ist, derart, dass ein Teil oder die Gesamtheit der Luftströmung durch die Lamelle (6) an den Ergänzungseinlass (10) gelenkt wird.
10. Kühlvorrichtung (1) nach Anspruch 7 oder 8, **gekennzeichnet durch** einen Einlass (7), einen Ergänzungseinlass (10) und eine Lamelle (6), eine Ergänzungslamelle (9), deren Größen derart angepasst ist, dass die Strömungsrate der Luft, die **durch** den Einlass (7) in das Frischhaltefach (3) eintritt, größer als die Strömungsrate der Luft ist, die **durch** den Ergänzungseinlass (10) in das Frischhaltefach (3) eintritt.
11. Kühlvorrichtung (1) nach einem der vorangehenden Ansprüche, **gekennzeichnet durch** einen Auslass (8), der an der Stirnwand des Frischhaltefachs (3) angeordnet ist und in der Strömungsrichtung der Luft angeordnet ist, die über die Unterseite des Deckels (5) streichend strömt.
12. Kühlvorrichtung (1) nach einem der vorangehenden Ansprüche, **gekennzeichnet durch** einen Auslass (8), der am Deckel (5) angeordnet ist.

Revendications

1. Un dispositif de refroidissement (1) **comprenant** un corps (2) dans lequel les aliments et les boissons sont placés, une porte qui sépare le corps (2) et l'environnement extérieur de manière à assurer l'étanchéité et permet l'accès à l'intérieur, un bac à légumes (3) qui est disposé dans le corps (2), un couvercle du bac à légumes (4) qui est disposé sur le bac à légumes (3) et qui sépare le bac à légumes (3) et un volume intérieur du corps (2), un couvercle (5) qui est disposé entre le couvercle du bac à légumes (4) et le bac à légumes (3) et qui recouvre le bac à légumes (3), une ou plusieurs entrées (7) qui sont arrangées sur le couvercle (5) et qui permettent à l'air passant à travers une ouverture (A) d'entrer dans le bac à légumes (3), et une ou plusieurs sorties (8) qui permet la sortie de l'air à partir de l'intérieur du bac à légumes (3), ledit couvercle (5) présentant au moins une ailette (6) qui est disposée sur le côté de l'entrée (7), qui est pliée dans la direction opposée à l'écoulement d'air à recouvrir partiellement l'entrée

- (7) et qui permet à une partie de l'air d'être dirigée dans le bac à légumes (3) en passant à travers l'entrée (7), ledit bac à légumes (3) étant **caractérisé par** un guide (11) qui forme une barrière contre l'air entrant dans le bac à légumes (3) à travers l'entrée (7) en se pliant de manière à recouvrir partiellement le côté inférieur de l'entrée (7) et qui permet à l'air d'être dirigé de manière à balayer la surface inférieure du couvercle (5) d'un bout à l'autre dans le bac à légumes (3). 5
2. Un dispositif de refroidissement (1) selon la Revendication 1, **caractérisé par** une ailette monopièce (6) qui s'étend le long du côté arrière du couvercle (5). 10 15
3. Un dispositif de refroidissement (1) selon la Revendication 1, **caractérisé par** une ailette (6) qui se compose de plusieurs pièces disposées à certains intervalles le long du côté arrière du couvercle (5). 20
4. Un dispositif de refroidissement (1) selon la Revendication 1, 2 ou 3, **caractérisé par** une ailette en forme de protubérance (6) qui s'étend à partir du couvercle (5) au couvercle du bac à légumes (4). 25
5. Un dispositif de refroidissement (1) selon la Revendication 1, 2, 3 ou 4, **caractérisé par** une ailette concave (6). 30
6. Un dispositif de refroidissement (1) selon la Revendication 1, **caractérisé par** un guide (11) qui est formé comme l'ailette (6). 35
7. Un dispositif de refroidissement (1) selon la Revendication 1, **caractérisé par** un guide concave (11). 40
8. Un dispositif de refroidissement (1) selon la Revendication 1, **caractérisé par** une entrée supplémentaire (10) et une ailette supplémentaire (9) juste derrière l'entrée (7) et l'ailette (6) dans la direction de l'écoulement de l'air passant entre le couvercle (5) et le couvercle du bac à légumes (4). 45
9. Un dispositif de refroidissement (1) selon la Revendication 7, **caractérisé par** une ailette supplémentaire (9) qui est plus longue que l'ailette (6) de manière à diriger une partie ou la totalité de l'air passant à travers l'ailette (6) à l'entrée supplémentaire (10). 50
10. Un dispositif de refroidissement (1) selon la Revendication 7 ou 8, **caractérisé par** une entrée (7), une entrée supplémentaire (10) et une ailette (6), une ailette supplémentaire (9), dont les dimensions sont ajustées de telle sorte que le débit de l'air entrant dans le bac à légumes (3) à travers l'entrée (7) est supérieur au débit de l'air entrant dans le bac à légumes (3) à travers l'entrée supplémentaire (10). 55
11. Un dispositif de refroidissement (1) selon l'une quelconque des revendications précédentes, **caractérisé par** une sortie (8) qui est arrangée sur la paroi avant du bac à légumes (3) et qui est positionnée dans la direction de l'écoulement de l'air écoulant en balayant la surface inférieure du couvercle (5).
12. Un dispositif de refroidissement (1) selon l'une quelconque des revendications précédentes, **caractérisé par** une sortie (8) qui est arrangée sur le couvercle (5).

Figure 1

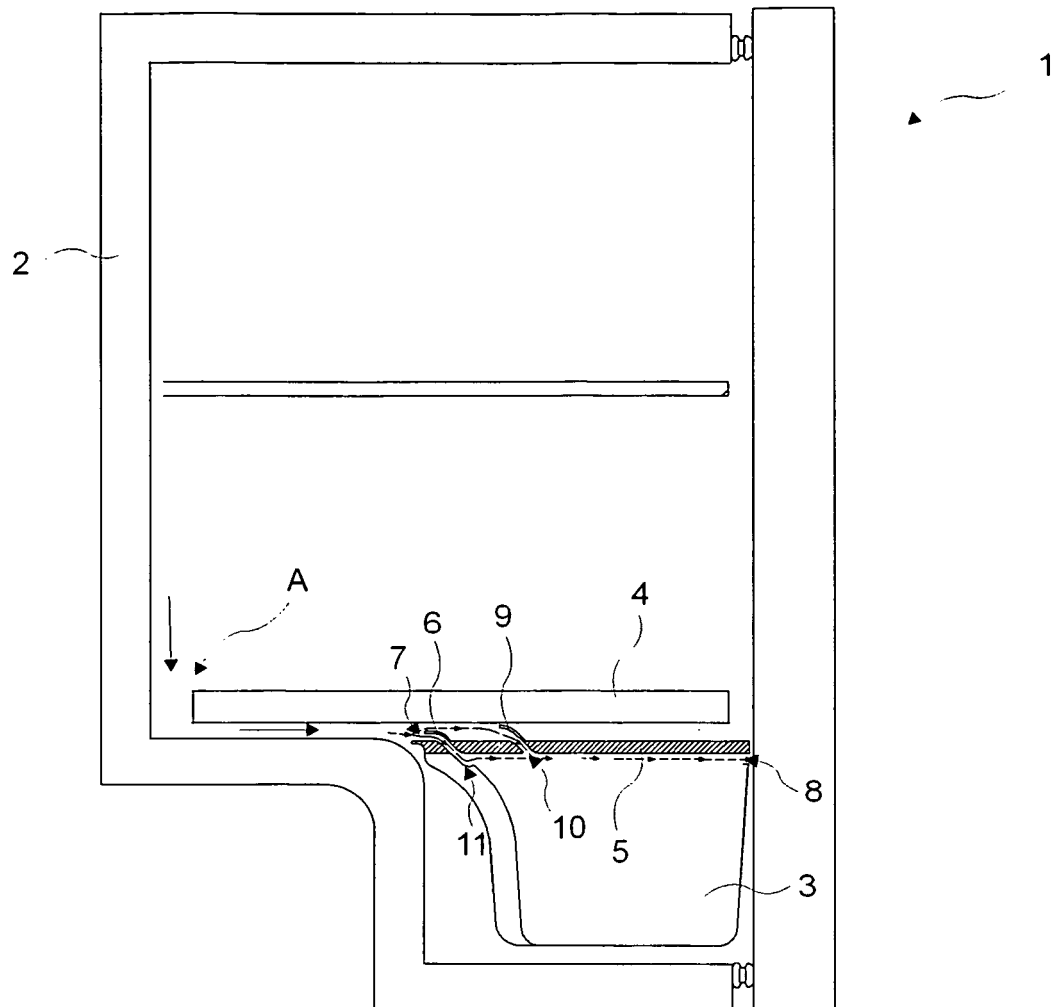


Figure 2

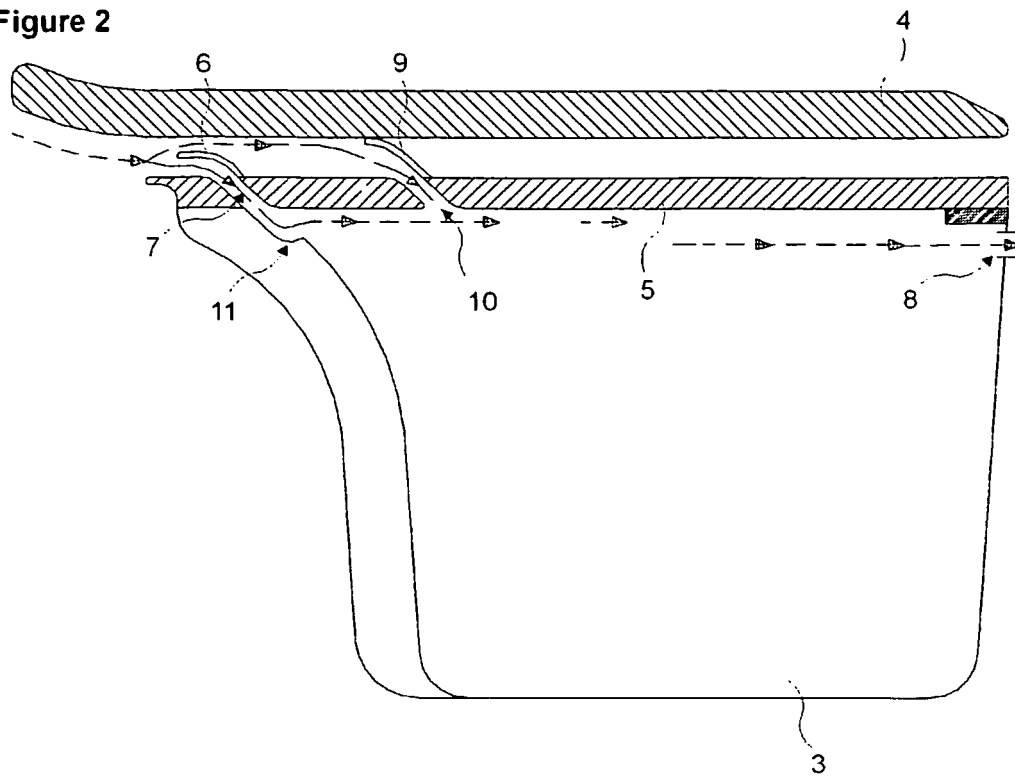
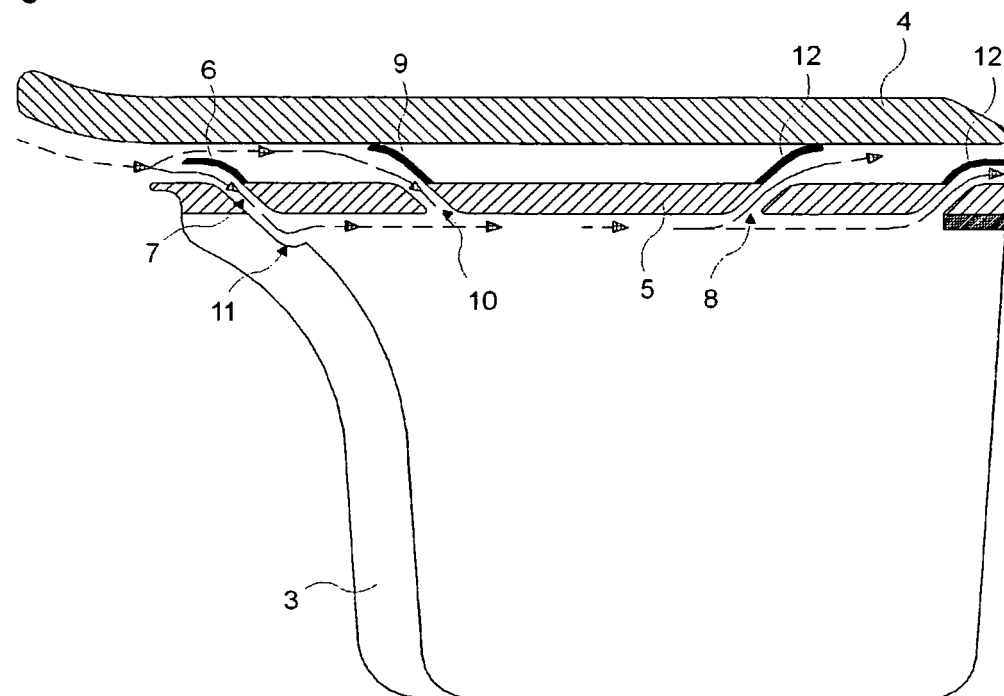


Figure 3



REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- GB 862797 A [0003]
- WO 2004038312 A [0004]