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(54) **A COOLING DEVICE**

**KÜHLVORRICHTUNG**

**DISPOSITIF DE REFROIDISSEMENT**

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(56) References cited:

**WO-A-2008/148833 DE-A1- 10 107 654**  
**DE-C1- 4 024 174 KR-A- 20000 031 579**

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## Description

[0001] The present invention relates to a cooling device wherein the cooling volume is illuminated.

[0002] In cooling devices lamps are used that illuminate the interior space, which are turned on when the door is opened so that the user can see the interior of the cooling volume better. These lamps are mounted inside the body on the side, rear or top walls of the body and illuminate the cooling volume by changing to the ON status when the door is opened. The body and all the shelves cannot be illuminated homogeneously by the lamp that is secured into the body due to the shelves and the objects placed on the shelves inside the body.

[0003] One of the embodiments in state of the art, the United States of America Patent No US5937666, a refrigerator is explained wherein illumination is maintained by a fluorescent tube mounted on the door frame.

[0004] In the state of the art Korean Patent Application No KR20000031579, a refrigerator is explained wherein illumination is maintained by a lamp disposed on the body that is activated as the door is opened, closed.

[0005] In state of the art, in the cooling devices that are illuminated by lamps secured on both the body and the door, the lamps and the on-off mechanisms that turn on, off the lamp depending on the position of the door, occupy a volume in the cooling volume when the door is closed. A cooling device according to the preamble of claim 1 is disclosed in DE 4024174 C1.

[0006] The aim of the present invention is the realization of a cooling device comprising an illumination element that does not occupy an additional space in the cooling volume when the door is closed.

[0007] The cooling device realized in order to attain the aim of the present invention is disclosed in the claim 1.

[0008] Accordingly, the illumination element does not occupy any space within the cooling volume when the door is closed by being inserted into the housing disposed on the side wall of the body with the pushing of the door and coming out of the housing when the pressure applied by the door is released. Moreover, the illumination element that is concealed inside the housing when the door is closed, depending on the motion of the door, leaves the housing when the door is opened, and thereby performs the task of illumination.

[0009] The illumination element has a height and length for providing equal amount of light to the shelves situated in the cooling volume in the region near the door on the side wall of the body. Moreover, the illumination element leaves the housing when the door is opened and illuminates the cooling volume from the front of the body towards the rear. Thus, the beams emanating from the illumination element can be transmitted by focusing inside the cooling volume.

[0010] In an embodiment of the present invention, the illumination element is mounted to the body by means of a retainer. The retainer maintains the illumination element to be fitted to the housing and to move. The retainer

is mounted inside the housing rotatable around an axis by means of pins.

[0011] In an embodiment of the present invention, an extension is provided on the door that transfers the movement of the door to the retainer. Thus, the movement of the door can be transferred to the retainer more easily and safely.

[0012] In another embodiment of the present invention, the retainer is prism shaped. The retainer protects the illumination element placed therein by surrounding and serves as a lid by covering the illumination element that enters into the housing when the door is closed and prevents a protrusion to be formed on the body. At least one surface of the retainer has an aperture and a transparent surface and the other surfaces have reflective features for directing the beams emanating from the illumination element towards the cooling volume.

[0013] By means of the present invention, the illumination element is enabled not to occupy any additional space in the body and the cooling volume is illuminated homogeneously.

[0014] 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 perspective view of a cooling device.  
Figure 2 - is the detailed view of the cooling device when the door is open.

Figure 3 - is the detailed view of the cooling device while the door changes from the closed position to the open position.

Figure 4 - is the detailed view of the cooling device when the door is open.

Figure 5 - is the exploded view of the housing and the illumination element.

Figure 6 - is the view of another embodiment not forming part of the present invention.

[0015] The elements illustrated in the figures are numbered as follows:

1. Cooling device
2. Body
3. Door
4. Housing
5. Illumination element
6. Retainer
7. Extension
8. Biasing means

[0016] The cooling device (1) comprises a body (2) wherein objects to be cooled are placed, a door (3) providing access from outside to inside of the body (2), a housing (4) disposed on the body (2) wall and an illumination element (5) that is pushed into the housing (4) by the bearing against of the door (3) part that enters into the body (2) while the door (3) is closed, and comes outside of the housing (4) towards the volume evacuated by

the door (3) in the body (2) when the door (3) is opened (Figure 1).

**[0017]** In the illumination element (5) a fluorescent tube lamp or LED can be used as the light source. The illumination element (5) is preferably configured as a tube that extends virtually along the side wall for illuminating the interior of the body (2) homogeneously. The illumination element (5) is in the active position upon leaving the housing (4) and illuminates the interior of the body (2).

**[0018]** The housing (4) is disposed on the side, top and/or bottom wall of the body (2) in the vicinity of the door (3) portion extending into the body (2) when the door (3) is closed. Thus, the illumination element (5) disposed inside the housing (4) can be moved by the door (3) (Figure 6).

**[0019]** The illumination element (5) going outside the housing (4) when the door (3) is open, and entering into the housing (4) when the door (3) is closed depending on the movement of the door (3), maintains the illumination element (5) not to occupy an additional space inside the body (2).

**[0020]** The cooling device (1) comprises one or more retainers (6) whereon the illumination element (5) is mounted, providing the illumination element (5) to be at least partially carried outside the housing (4), said retainer (6) comprising one or more pins for mounting the retainer (6) into the housing (4) such that a rotational axis is formed, and one or more biasing means (8) that push the retainer (6) outwards from the housing (4), maintaining the retainer (6) and the illumination element (5) connected thereto to automatically leave the housing when the force applied on the retainer (6) is released. In the preferred embodiment of the present invention, two pins situated on the same axis are provided inside the housing (4). The pins, remaining on the same axis, are fitted to the retainer (6) and the illumination element (5) is attached on the retainer(s) (6) to remain between the two opposite surfaces of the housing (4) (Figure 5).

**[0021]** In the present invention, the illumination element (5) remains inside the housing (4) disposed on the side wall of the body (2), corresponding to the portion of the door (3) extending into the body (2) when the door (3) is closed. Since the door (3) overcomes the force of the biasing means (8) when closed by applying pressure on the retainer (6), maintains the illumination element (5) to remain inside the housing (4). In this position, the illumination element (5) does not form any protrusion on the body (2). Moreover, since the housing (4) and the illumination element (5) are situated in the volume occupied by the door (3) inside the body (2) when the door (3) is closed, they do not occupy an additional volume inside the body (2) when the door (3) is closed.

**[0022]** When the door (3) is opened by the user, the force applied on the retainer (6) by the door (3) is released by the movement of the door (3) and the biasing means (8) force shows its effect by pushing the retainer (6) with the illumination element (5) thereon out of the housing (4). During opening of the door (3), the illumination ele-

ment (5) moving together with the retainer (6) goes out of the housing (4) by the force effect of the biasing means (8) and extends towards the volume evacuated by the door (3). When the door (3) is opened, the illumination element (5) has left the housing (4). The illumination element (5) is turned on by being in the active position upon leaving the housing (4) and illuminates the interior of the body (2). In this embodiment, the illumination element (5) illuminates the cooling volume from the front towards the rear of the body (2).

**[0023]** In another embodiment of the present invention, the cooling device (1) comprises an extension (7), situated on the door (3) at the portion corresponding to the retainer (6), that pushes the retainer (6) when the door (3) is closed so that the illumination element (5) remains inside the housing (4). The force applied by the extension (7) on the retainer (6) is released while the door (3) is opened. In this position, the retainer (6) starts moving from the housing (4) towards the cooling volume in proportion with the force of the biasing means (8) applied thereon. The movement of the door (3) can be more easily and safely transferred to the retainer (6) by means of the extension (7) (Figure 2, Figure 3 and Figure 4).

**[0024]** In another embodiment of the present invention, the housing (4) is situated on the wall at the side whereto the door (3) is mounted to the body (2) and is on the side close to the door (3). On the other hand, the extension (7) is at the side of the door (3) mounted to the body (2), at a point of exerting force on the retainer (6) in the housing (4) when the door (3) is open. In this embodiment, moreover the housing (4) extends parallel to the side of the body (2) from the top to the bottom of the body (2). Since the illumination element (5) placed inside the said housing (4) extends along all of the shelves disposed inside the body (2), thereby the shelves are illuminated almost homogeneously.

**[0025]** In an embodiment of the present invention, the retainer (6) is prism shaped and the illumination element (5) is disposed in the retainer (6). In this position, the retainer (6) surrounds the illumination element (5) entirely or partially. Thus, the illumination element (5) is both protected and the housing (4) is covered when the door (3) is closed. The retainer (6) is placed in the housing (4) to be rotatable from the upper and lower base by means of pins. The rotational axis formed by the pins remains within the housing (4). During the rotational movement, at least two side surfaces go out of the housing (4) and one side surface remains at least partially in the housing (4).

**[0026]** The retainer (6) comprises an aperture or at least one transparent side surface. This side surface is preferably the side surface facing the cooling volume.

**[0027]** In another version of this embodiment of the present invention, the retainer (6) comprises at least one side surface having reflective features for directing the beams emanating from the illumination element (5) into the cooling volume.

**[0028]** In another embodiment of the present invention, the retainer (6) and the illumination element (5) are fitted

into the housing (4) by means of a push-in, pop-out mechanism and moves by the help of this mechanism. By means of this embodiment, the retainer (6) and the illumination element (5) connected thereto can also be inserted into the housing (4) by the user when the door (3) is open or moved outwards from the housing (4) independently from the movement of the door (3).

**[0029]** By means of the present invention, the cooling volume is illuminated homogeneously by the illumination element (5) that does not occupy any additional space in the body (2) when the door is closed.

## Claims

1. A cooling device (1) that comprises a body (2) wherein objects to be cooled are placed, and a door (3) providing access from outside to inside of the body (2), wherein a housing (4) is disposed on the body (2) wall, and wherein an illumination element (5) is pushed into the housing (4) by bearing against a door part that goes into the body (2) while the door (3) is closed, and comes out of the housing (4) towards the volume evacuated by the door (3) in the body (2) when the door (3) is opened, **characterized in that** the housing (4) extends parallel to the side of the body (2) from a top towards a bottom of the body (2) and the illumination element (5) is placed inside said housing (4), the illumination element (5) having a height and length that provides an equal amount of light to shelves situated in a cooling volume in a region near the door (3) on a side wall of the body (2) wherein the illumination element (5) illuminates the cooling volume from a front towards a rear of the body (2).
2. A cooling device (1) as in Claim 1, **characterized in that** said housing (4) is disposed on the side wall of the body (2) at the vicinity wherein the portion of the door extends into the body (2) when the door (3) is closed.
3. A cooling device (1) as in Claims 1 or 2, **characterized by** one or more retainers (6) whereon the illumination element (5) is mounted, providing the illumination element (5) to be at least partially carried outside the housing (4), said retainer (6) comprising one or more pins for mounting the retainer (6) into the housing (4) such that a rotational axis is formed, and one or more biasing means (8) that push the retainer (6) outwards from the housing (4) maintaining the retainer (6) and the illumination element (5) connected thereto to automatically leave the housing when a force applied on the retainer (6) is released.
4. A cooling device (1) as in any one of the above claims, **characterized in that** the illumination element (5) illuminates the cooling volume from the front

towards the rear of the body (2).

5. A cooling device (1) as in any one of the above claims, **characterized by** an extension (7), situated on the door (3) at the portion corresponding to the retainer (6), said extension (7) pushes the retainer (6) when the door (3) is closed so that the illumination element (5) remains inside the housing (4).
6. A cooling device (1) as in Claim 5, **characterized in that** said housing (4) is situated at a side where the door (3) is mounted on the body (2), on the side of the body (2) close to the door (3) and the extension (7) is disposed at the side of the door (3) at a point for exerting force on the retainer (6) in the housing (4) when the door (3) is open.
7. A cooling device (1) as in any one of the above claims, **characterized by** a retainer (6) that comprises an aperture or at least one transparent side wall.
8. A cooling device (1) as in Claim 7, **characterized in that** said retainer (6) comprises at least one side wall having reflective features for directing the beams emanating from the illumination element (5) to an inside of the cooling volume.
9. A cooling device (1) as in any one of the above claims, **characterized by** a push-in, pop-out mechanism for mounting the illumination element (5) into the housing (4).
10. A cooling device (1) as in any one of the above claims, **characterized by** an illumination element (5) that illuminates the interior of the body (2) by being in an active position upon leaving the housing (4).

## Patentansprüche

1. Ein Kühlgerät (1) bestehend aus einem Körper (2), wo Gegenstände für Abkühlen hingelegt werden, und einer Tür (3), die den Zugang zum Körper (2) von außen nach innen versorgt, wo ein Gehäuse (4) angeordnet ist auf der Körper (2) wand, und wo ein Beleuchtungselement (5) hingeschoben ist in das Gehäuse (4) durch den Zusammendruck gegen den Türeinteil, der in den Körper (2) hingeht, als die Tür (3) geschlossen ist, und kommt aus dem Gehäuse (4) heraus zum Volumen hin evakuiert von der Tür (3) im Körper (2), wenn die Tür (3) geöffnet ist, **dadurch gekennzeichnet, daß** sich das Gehäuse (4) parallel erstreckt zur Seite des Körpers (2) von einer Spitze zum Fuß des Körpers (2) und das Beleuchtungselement (5) ist hingelegt in das besagte Gehäuse (4), das Beleuchtungselement (5) besitzt eine Höhe und Länge, das eine gleiche Lichtmenge an Regale versorgt, hingesetzt in ein Kühlvolumen in

einer Region nahe zur Tür (3) auf einer Seitenwand des Körpers (2), wo das Kühlvolumen von einer Vorne zum Hintern des Körpers (2) beleuchtet wird.

2. Ein Kühlgerät (1) nach Anspruch 1, **dadurch gekennzeichnet, daß** das besagte Gehäuse (4) angeordnet ist auf der Seitenwand des Körpers (2) in der Nähe, wo sich der Türeil (3) erstreckt in den Körper (2) wenn die Tür (3) geschlossen ist. 5
3. Ein Kühlgerät (1) nach den Ansprüche 1 oder 2, **dadurch gekennzeichnet, daß** auf eine oder mehrere Halterungen (6) das Beleuchtungselement (5) einmontiert wird, wobei sichergestellt wird, daß das Beleuchtungselement (5) mindestens teilweise getragen wird außerhalb des Gehäuse (4), besagte Halterung (6) beinhaltet eine oder mehrere Nadeln für Montierung der Halterung (6) in das Gehäuse (4), so daß eine Rotationsachse gebildet ist, und eine oder mehrere Spannungsmittel (8), die die Halterung (6) eindrücken nach außen vom Gehäuse (4), das die Halterung (6) und das Beleuchtungselement (5) versorgt, das hierher verbunden ist, um automatisch das Gehäuse zu verlassen, wenn eine Kraft, die auf die Halterung (6) ausgeübt ist, freigelassen wird. 10 15 20 25
4. Ein Kühlgerät (1) nach den vorhergehenden Ansprüche, **dadurch gekennzeichnet, daß** das Beleuchtungselement (5) das Kühlvolumen von der Vorne bis zum Hintern des Körpers (2) beleuchtet. 30
5. Ein Kühlgerät (1) nach den vorhergehenden Ansprüche, **dadurch gekennzeichnet, daß** eine Verlängerung (7), hingelegt auf die Tür (3) an einem Teil, der zur Halterung (6) entspricht, besagte Verlängerung (7) bedrückt die Halterung (6), wenn die Tür (3) geschlossen ist, so daß das Beleuchtungselement (5) im Innern des Gehäuse (4) zurückbleibt. 35 40
6. Ein Kühlgerät (1) nach Anspruch 5, **dadurch gekennzeichnet, daß** das besagte Gehäuse (4) an eine Seite hingelegt ist, wo die Tür (3) auf den Körper (2) einmontiert ist, auf der Seite des Körpers (2) nahe zur Tür (3) und die Verlängerung (7) ist angeordnet an der Seite der Tür (3) an einem Punkt für Ausübung der Kraft auf die Halterung (6) im Gehäuse (4), wenn die Tür (3) offen ist. 45
7. Ein Kühlgerät (1) nach den vorhergehenden Ansprüche, **dadurch gekennzeichnet, daß** eine Halterung (6) beinhaltet eine Öffnung oder mindestens eine durchsichtige Seitenwand. 50
8. Ein Kühlgerät (1) nach Anspruch 7, **dadurch gekennzeichnet, daß** die besagte Halterung (6) beinhaltet mindestens eine Seitenwand mit reflektierenden Merkmale für Lenkung der Strahlen, die vom 55

Beleuchtungselement (5) zum Innern des Kühlvolumens ausströmen.

9. Ein Kühlgerät (1) nach den vorhergehenden Ansprüche, **dadurch gekennzeichnet, daß** ein Einklemmungs-, Hinausspringmechanismus für die Montierung des Beleuchtungselements (5) zum Gehäuse (4) ist. 5
10. Ein Kühlgerät (1) nach den vorhergehenden Ansprüche, **dadurch gekennzeichnet, daß** ein Beleuchtungselement (5) den Inneren des Körpers (2) beleuchtet, durch Vorhandensein in einer aktiven Position nach Verlassung des Gehäuse (4). 10 15

## Revendications

1. Dispositif de refroidissement (1) qui comprend un corps (2) dans lequel des objets à refroidir sont placés, et une porte (3) donnant un accès de l'extérieur vers l'intérieur du corps (2), dans lequel un logement (4) est disposé sur le corps (2), et dans lequel un élément d'éclairage (5) est poussé dans le logement (4) en s'appuyant contre une partie de porte qui pénètre dans le corps (2) pendant que la porte (3) est fermée et sort du logement (4) vers le volume évacué par la porte (3) dans le corps (2) lorsque la porte (3) est ouverte, **caractérisé en ce que** le logement (4) s'étend parallèlement au côté du corps (2) à partir d'un vers le haut vers le bas du corps (2) et l'élément d'éclairage (5) est placé à l'intérieur dudit logement (4), l'élément d'éclairage (5) ayant une hauteur et une longueur qui fournissent une quantité égale de lumière sur étagères située dans un refroidissement volume dans une région située près de la porte (3) sur une paroi latérale du corps (2), qui éclaire le volume de refroidissement d'un avant vers l'arrière du corps (2). 20 25 30 35 40
2. Dispositif de refroidissement (1) selon la revendication 1, **caractérisé en ce que** ledit logement (4) est disposé sur la paroi latérale du corps (2) au voisinage où la partie de la porte (3) s'étend dans le corps (2) lorsque la porte (3) est fermée. 45
3. Dispositif de refroidissement (1) selon la revendication 1 ou 2, **caractérisé par** un ou plusieurs éléments de retenue (6) sur lesquels est monté l'élément d'éclairage (5), en prévoyant au moins partiellement l'élément d'éclairage (5) à l'extérieur du logement (4), ledit élément de retenue (6) comprenant une ou plusieurs broches pour monter le dispositif de retenue (6) dans le logement (4) de sorte qu'un axe de rotation est formé et un ou plusieurs moyens de sollicitation (8) qui poussent l'élément de retenue (6) vers l'extérieur à partir du logement (4) en maintenant l'élément de retenue (6) et l'élément d'éclairage 50 55

(5) relié à celui-ci pour quitter automatiquement le logement lorsqu'une force appliquée sur l'élément de retenue (6) est relâché.

4. Dispositif de refroidissement (1) selon l'une quelconque des revendications précédentes, **caractérisé en ce que** l'élément d'éclairage (5) illumine le volume de refroidissement de l'avant vers l'arrière du corps (2). 5  
10
5. Dispositif de refroidissement (1) selon l'une quelconque des revendications précédentes, **caractérisé par** une extension (7) située sur la porte (3) à la partie correspondant à l'élément de retenue (6), ladite extension (7) pousse l'élément de retenue (6) lorsque la porte (3) est fermée de sorte que l'élément d'éclairage (5) reste à l'intérieur du logement (4). 15
6. Dispositif de refroidissement (1) selon la revendication 5, **caractérisé en ce que** ledit logement (4) est situé sur un côté où la porte (3) est montée sur le corps (2), sur le côté du corps (2) près de la porte (3) et l'extension (7) est disposée sur le côté de la porte (3) en un point pour exercer une force sur l'élément de retenue (6) dans le logement (4) lorsque la porte (3) est ouverte. 20  
25
7. Dispositif de refroidissement (1) selon l'une quelconque des revendications précédentes, **caractérisé par** un élément de retenue (6) qui comprend une ouverture ou au moins une paroi latérale transparente. 30
8. Dispositif de refroidissement (1) selon la revendication 7, **caractérisé en ce que** ledit élément de retenue (6) comprend au moins une paroi latérale ayant des caractéristiques réfléchissantes pour diriger les faisceaux émanant de l'élément d'éclairage (5) vers un intérieur du volume de refroidissement. 35  
40
9. Dispositif de refroidissement (1) selon l'une quelconque des revendications précédentes, **caractérisé par** un mécanisme de mise en place, d'enfoncement pour le montage de l'élément d'éclairage (5) dans le logement (4). 45
10. Dispositif de refroidissement (1) selon l'une quelconque des revendications précédentes, **caractérisé par** un élément d'éclairage (5) qui illumine l'intérieur du corps (2) en position active en sortant du logement (4). 50

55

Figure 1

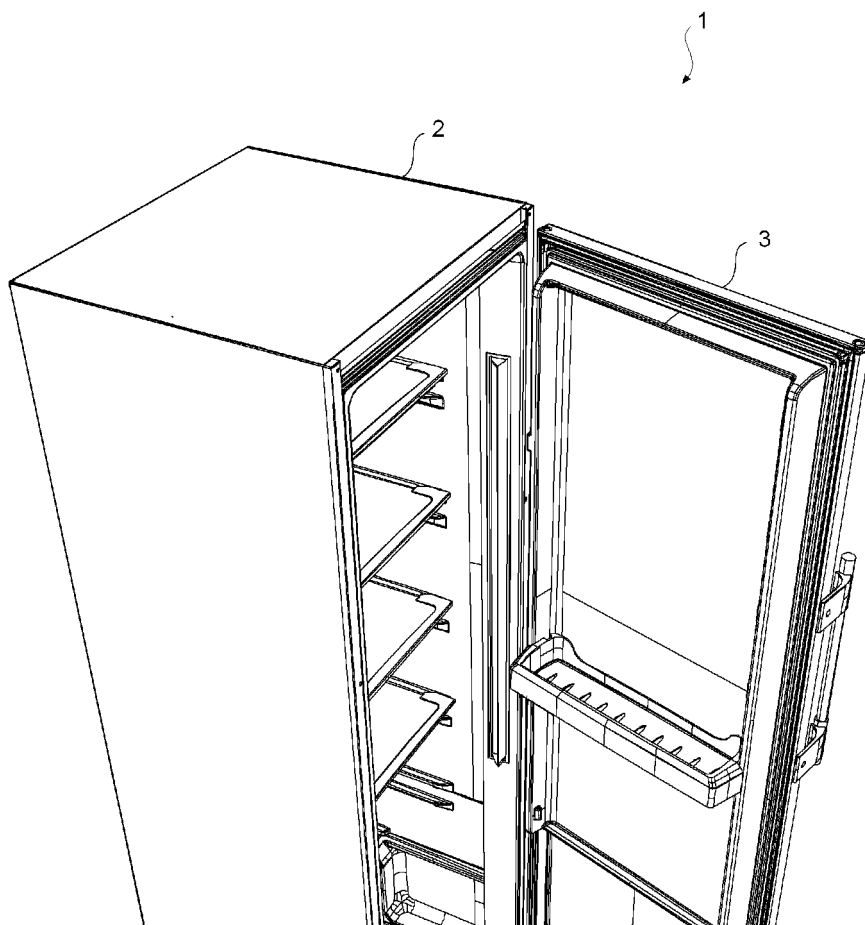


Figure 2

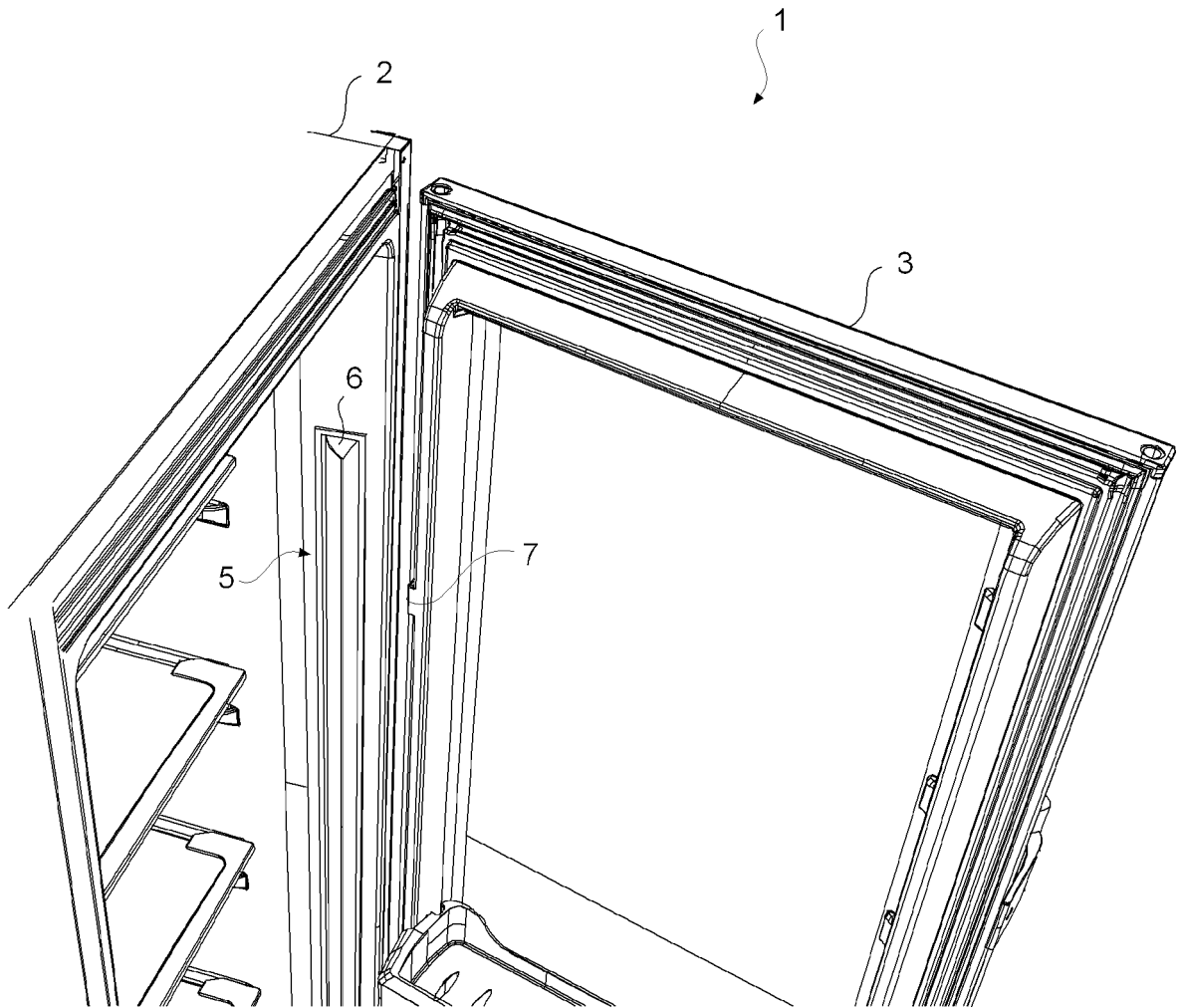


Figure 3

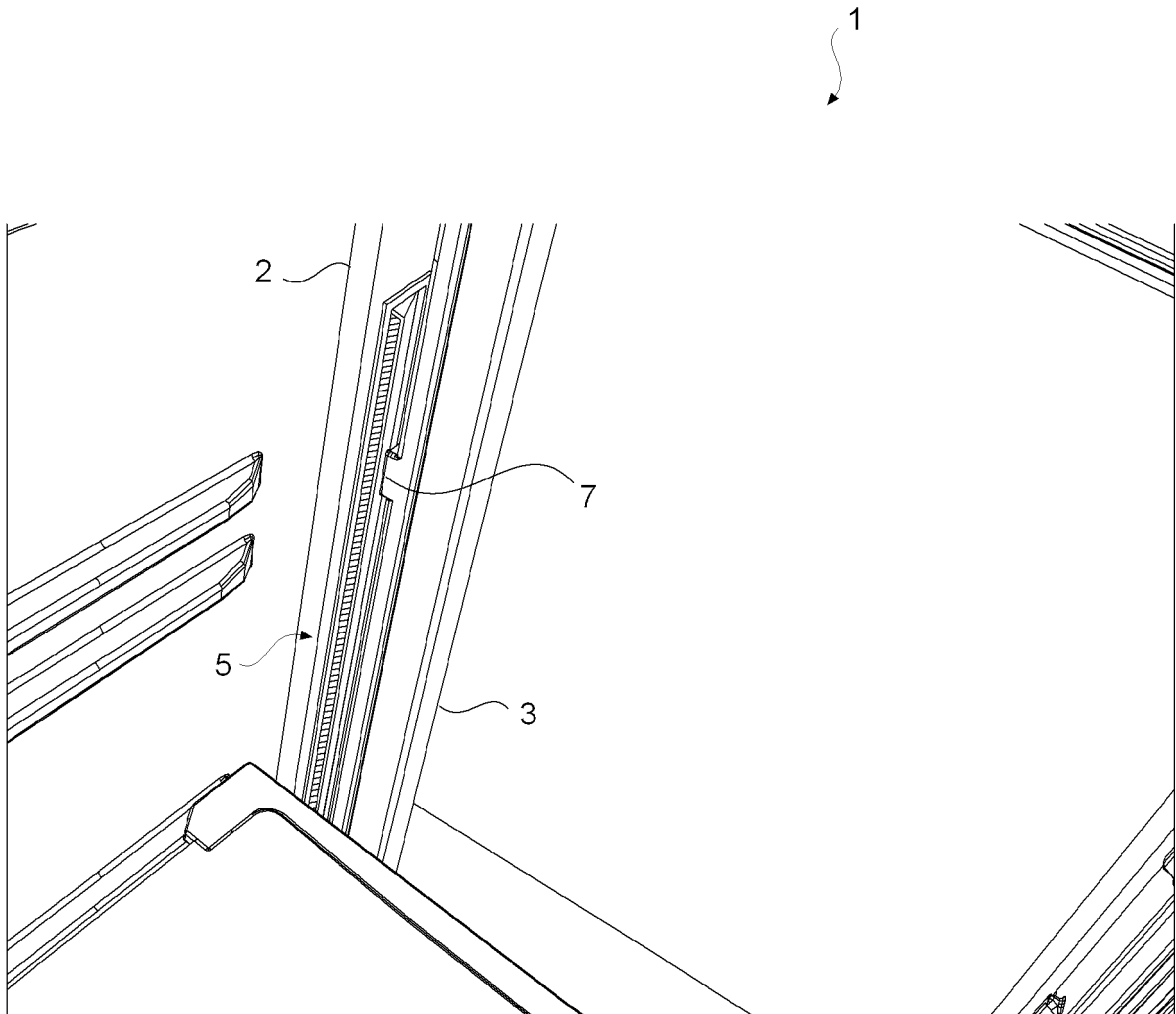


Figure 4

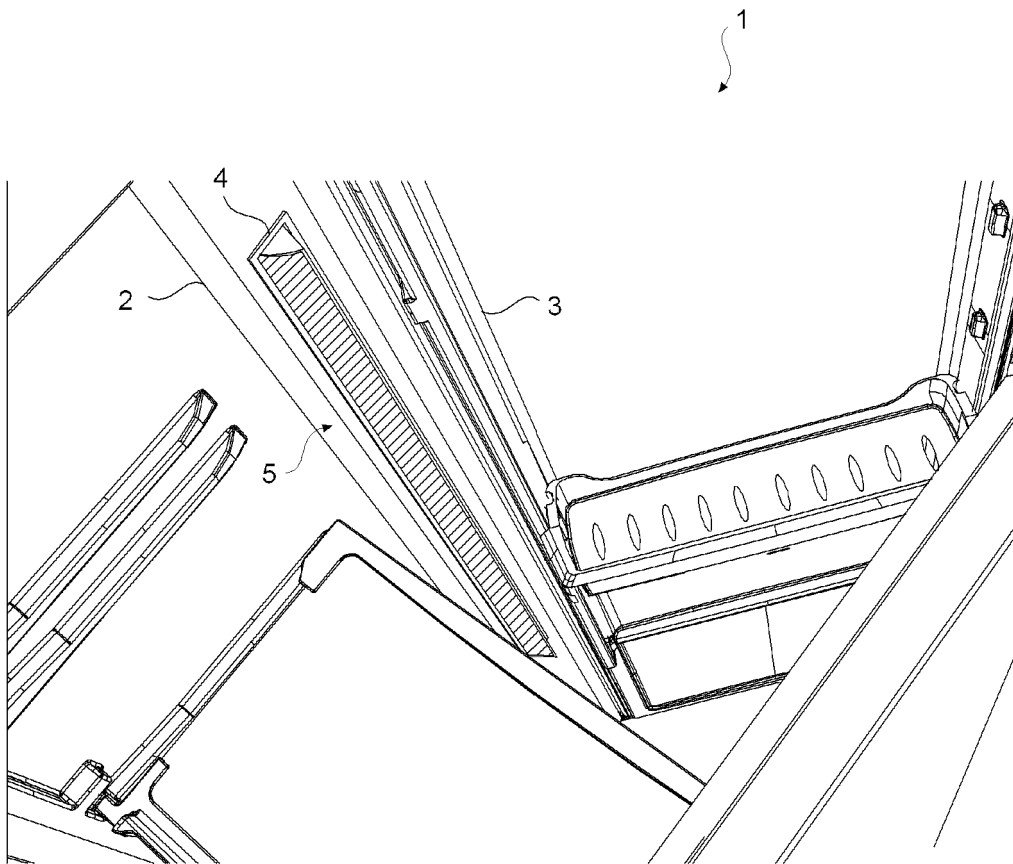


Figure 5

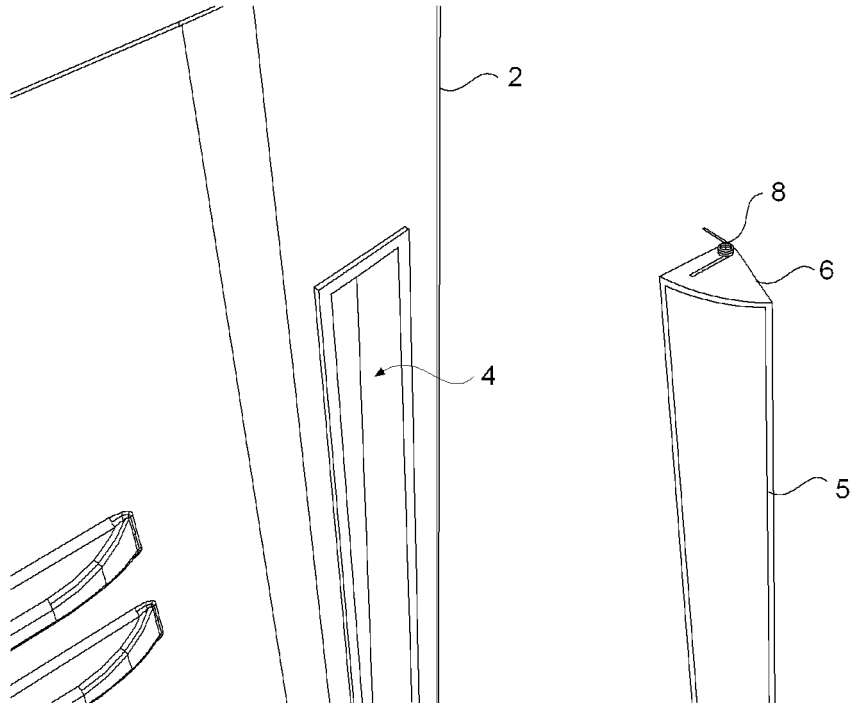
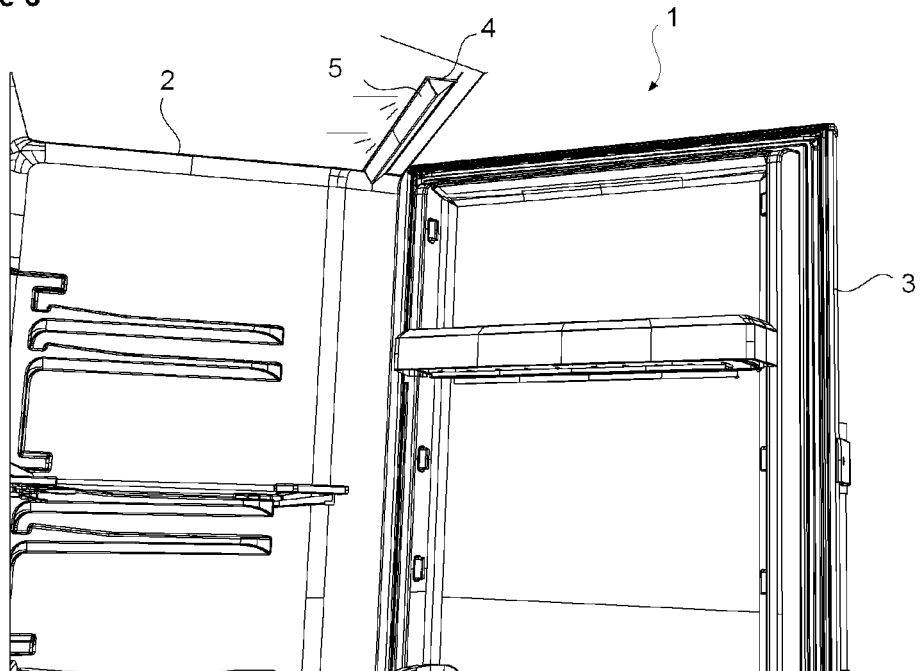


Figure 6



**REFERENCES CITED IN THE DESCRIPTION**

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**Patent documents cited in the description**

- US 5937666 A [0003]
- KR 20000031579 [0004]
- DE 4024174 C1 [0005]