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(54) A REFRIGERATOR THE WATER STORAGE CONTAINER OF WHICH IS STERILIZED

KÜHLSCHRANK MIT STERILISIERTEM WASSERSPEICHERBEHÄLTER

RÉFRIGÉRATEUR DONT LE RÉSERVOIR D'EAU EST STÉRILISÉ

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Description

[0001] The present invention relates to a refrigerator that comprises a water storage container providing water to the water dispenser unit.

[0002] In refrigerators comprising water dispensers, the water received from outside is stored in a water storage container and water received from the water storage container for serving hot or cold to the user is delivered to the water dispenser. The water storage containers are disposed at the rear side of the crisper that is generally situated at the bottom side of the refrigerator body so that they can be taken out for cleaning or to be maintained easily in case of a malfunction when required. Thus, the water storage container is prevented from occupying space in the fresh food compartment that is used frequently by the user and when required, the water storage container is reached easily for cleaning and maintenance purposes by taking out the crisper. In situations wherein the water dispenser is not used for a long time, harmful organisms like bacteria can multiply in the water inside the water storage container. The harmful organisms cause unwanted smells to be formed and getting moss is observed on the water storage container walls as a result of the water waiting for a long time period. In order to avoid the mentioned problem, the water storage container is sterilized by means of a light source emitting ultraviolet (UV) light. The ultraviolet rays used for sterilizing the water storage container can dissipate into the fresh food compartment wherein the water storage container is located and can adversely affect the health of the user.

[0003] The refrigerator explained in the United States Patent No US5768905, comprises a water storage container disposed in the refrigerating compartment and storing water for the drinking water dispenser and the water storage container is sterilized by means of an UV lamp disposed above the water storage container.

[0004] The aim of the present invention is the realization of a refrigerator the water storage container of which, providing water to the water dispenser unit is sterilized by a UV light source and wherein the UV rays are prevented from harming the user.

[0005] The refrigerator realized in order to attain the aim of the present invention, explicated in the first claim and the respective claims thereof, comprises a water storage container storing water for the water dispenser and a UV light source that emits ultraviolet rays into the water storage container providing the disinfection thereof, and the water storage container is produced by joining two parts, one UV light-transparent and the other UV light-proof. The first part of the water storage container facing the UV light source transmits UV rays thus the UV rays are provided to reach inside the water storage container. The second part of the water storage container facing the side of the user does not transmit UV rays thus harming of the user is prevented.

[0006] The first part and the second part forming the water storage container, in other words the front and rear parts, are in form of a box with one side open, and are joined together from the sides by bringing the surfaces face to face. The first part is preferably produced from transparent plastic material and the second part from opaque plastic material. The first part and the second part are joined by hot plate welding or friction welding method.

[0007] In an embodiment of the present invention, the second part is produced by coating ultraviolet resistant material thereon.

[0008] In an embodiment of the present invention, the refrigerator comprises a crisper disposed on the lower part of the fresh food compartment, the UV light source disposed behind the crisper, the water storage container disposed between the UV light source and the crisper and a blue light source adjacent to the UV light source. In this embodiment, the UV light source and the blue light source are positioned adjacently, while the water storage container is sterilized by the UV light source, the vitamins and nutritional values of the foodstuffs in the crisper are preserved by the blue light source.

[0009] In another embodiment of the present invention, the UV light source, the blue light source and the elements like cables, connectors that deliver energy to these light sources are disposed on a carrier unit mounted on the rear wall of the refrigerator.

[0010] In another embodiment of the present invention, a recess is arranged on the section of the water storage container corresponding to the front of the blue light sources on the carrier unit. The blue light reaches the crisper by passing through the recess, thus the water storage container is provided not to make an obstruction in front of the blue light.

[0011] In the refrigerator of the present invention, the ultraviolet light used in disinfecting the water storage container is prevented from harming the user, furthermore the dead space behind the crisper is utilized by disposing the UV light source, the water storage container and the blue light source behind the crisper.

[0012] The refrigerator 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 refrigerator.

Figure 2 - is the perspective view of a refrigerator and a UV light source disposed in the fresh food compartment.

Figure 3 - is the perspective view of a refrigerator, crispers disposed in the fresh food compartment and a water storage container disposed behind the crispers.

Figure 4 - is the perspective view of a carrier unit having the UV light source and the blue light source disposed thereon.

Figure 5 - is the perspective view of a water storage container.

Figure 6 - is the detailed perspective view of a refrig-

erator, a water storage container disposed in the fresh food compartment and the light sources disposed behind the water storage container.

[0013] The elements illustrated in the figures are numbered as follows:

1. Refrigerator
2. Body
3. Fresh food compartment
4. Freezing compartment
5. Water storage container
6. UV light source
7. First part
8. Second part
9. Crisper
10. Blue light source
11. Carrier
12. Recess

[0014] The refrigerator (1) comprises a body (2), a fresh food compartment (3), a freezing compartment (4), a water dispenser (not shown in the figures) providing hot or cold water for the user, a water storage container (5) disposed in the fresh food compartment (3) that stores water for delivering to the water dispenser, one or more than one UV light source (6) disposed in the body (2) so as to face the water storage container (5), preferably on the rear wall of the body (2) and which provides the water storage container (5) to be sterilized by emitting ultraviolet rays thereinto.

[0015] The refrigerator (1) of the present invention comprises

- a first part (7) forming the portion of the water storage container (5) facing the UV light source (6) and comprising material transmitting ultraviolet rays and
- a second part (8) forming the portion of the water storage container (5) facing inside the fresh food compartment (3), comprising material resistant to ultraviolet rays and which is joined with the first part (7) (Figure 1, Figure 5, Figure 6).

[0016] The water storage container (5) is produced by joining the first part (7) and the second part (8). The first part (7) and the second part (8) are joined to configure the water storage container (5) such that a closed and leak-proof water storage volume is formed therebetween.

[0017] The UV light source (6) is mounted on the rear wall of the body (2) so as to remain behind the water storage container (5) and the UV light source (6) emits ultraviolet light into the water storage container (5) in the front. The ultraviolet light reaches inside the water storage container (5) by passing through the first part (7), right in front of the UV light source (6), which is ultraviolet light transparent. The ultraviolet rays reaching inside the water storage container (5) do not dissipate into the fresh food compartment (3) wherein the water storage container (5) is located by means of the second part (8) produced from UV resistant material and the user is protected from harmful effects of ultraviolet light.

[0018] In an embodiment of the present invention, the first part (7) is in form of a box with one side open and is produced from transparent plastic material. The second part (8) is of identical form as the first part (7) and is produced from opaque plastic material. The first part (7) and the second part (8) are joined together, with their open sides facing each other such that a closed volume is formed therebetween and are connected by welding along their sides, all along a connection line (H), thus forming the water storage container (5).

[0019] In another embodiment of the present invention, the first part (7) and the second part (8) are joined by hot plate welding method.

[0020] In another embodiment of the present invention, the first part (7) and the second part (8) are joined by friction welding method.

[0021] In another embodiment of the present invention, the second part (8) is coated by ultraviolet resistant material.

[0022] In another embodiment of the present invention, the refrigerator (1) comprises at least one crisper (9) disposed at the lower side of the fresh food compartment (3), the UV light source (6) disposed behind the crisper (9), the water storage container (5) disposed between the UV light source (6) and the crisper (9) and one or more than one blue light source (10), disposed in the vicinity of the UV light source (6), preferably side by side with the UV light source (6), providing preservation of the vitamins and nutritional values of the foodstuffs in the crisper (9) by emitting blue light into the crisper (9) (Figure 1, Figure 3, Figure 6).

[0023] In this embodiment, the refrigerator (1) furthermore comprises a carrier (11), mounted on the rear wall of the body (2), whereon the UV light source (6), the blue light source (10) and the electrical elements like cables, connectors are connected that deliver energy to the UV light source (6) and the blue light source (10), which provides the UV light source (6) and the blue light source (10) to be held together as a single unit (Figure 4). The UV light sources (6) and the blue light sources (10), for example UV lamps and blue light lamps are arranged side by side forming different groups on the carrier (11). On one side of the carrier (11), for example on the left side, the UV light sources (6) are disposed and on the other side, for example the right side, the blue light sources (10) are disposed.

[0024] The water storage container (5) is disposed in the portion of the carrier (11) where the UV light sources (6) are located at the front, and the crisper (9) is disposed in front of the portion where the blue light sources (10) are located (Figure 6). Ultraviolet rays are emitted to the water storage container (5) by the UV light sources (6) disposed on the carrier (11), and blue light is emitted into the crisper (9) from the blue light sources (10), which is

also disposed on the carrier (11).

[0025] In a version of this embodiment, the water storage container (5) comprises a recess (12) arranged at its portion corresponding to the front of the blue light sources (10) on the carrier (11) (Figure 5, Figure 6). The water storage container (5) does not form an obstruction in front of the blue light sources (10) by means of the said recess (12), the rays emitted by the blue light sources (10) pass through the recess (12) disposed on the water storage container (5) covering the front of the carrier (11) and reach the crisper (9).

[0026] In the refrigerator (1) of the present invention, the ultraviolet light used in sterilizing the water storage container (5) is prevented from harming the user. Furthermore, when the water storage container (5) and the UV light source (6) are disposed in the crisper (9) region, space is gained by connecting the UV light source (6) to a single carrier (11) together with the blue light source (10) used for the crisper (9) and the space behind the crisper (9) is utilized efficiently.

[0027] It is to be understood that the present invention is not limited by the embodiments disclosed above and a person skilled in the art can easily introduce different embodiments. These should be considered within the scope of the protection postulated by the claims of the present invention.

Claims

1. A refrigerator (1) comprising a body (2), a fresh food compartment (3), a water dispenser that provides hot or cold water for the user, a water storage container (5) disposed in the fresh food compartment (3) and that stores water for delivering to the water dispenser, one or more than one UV light source (6) disposed in the body (2) so as to face the water storage container (5), that provides the water storage container (5) to be sterilized with ultraviolet rays being emitted thereinto,
   characterized by

   - a first part (7) forming the portion of the water storage container (5) facing the UV light source (6) and comprising material transmitting ultraviolet rays and
   - a second part (8) forming the portion of the water storage container (5) facing inside the fresh food compartment (3), containing material resistant to ultraviolet rays so that the ultraviolet rays do not dissipate into the fresh food compartment, and which is joined with the first part (7).

2. A refrigerator (1) as in Claim 1, **characterized by** the first part (7) in form of a box with one side open and produced from transparent plastic material and the second part (8) that is of identical form as the first part (7) and produced from opaque plastic material.

3. A refrigerator (1) as in Claim 1 or 2, **characterized by** the first part (7) and the second part (8) that are joined by hot plate welding method.

4. A refrigerator (1) as in Claim 1 or 2, **characterized by** the first part (7) and the second part (8) that are joined by friction welding method.

5. A refrigerator (1) as in any one of the above Claims, **characterized by** the second part (8) that is coated by ultraviolet resistant material.

6. A refrigerator (1) as in any one of the above Claims, **characterized by** at least one crisper (9) disposed at the lower side of the fresh food compartment (3), the UV light source (6) disposed behind the crisper (9), the water storage container (5) disposed between the UV light source (6) and the crisper (9) and one or more than one blue light source (10), disposed in the vicinity of the UV light source (6).

7. A refrigerator (1) as in Claim 6, **characterized by** a carrier (11), mounted on the rear wall of the body (2), whereon the UV light source (6), the blue light source (10) and the electrical elements are connected, delivering energy to the UV light source (6) and the blue light source (10), which provides the UV light source (6) and the blue light source (10) to be held together as a single unit.

8. A refrigerator (1) as in Claim 6 or 7, **characterized by** the water storage container (5) comprising a recess (12) arranged at its portion corresponding to the front of the blue light sources (10).

Patentansprüche

1. Kühlschrank (1), umfassend einen Gehäusekörper (2), ein Fach für frische Lebensmittel (3), einen Wasserspender, der heißes oder kaltes Wasser für den Benutzer bereitstellt, einen Wasserspeicherbehälter (5), der im Fach für frische Lebensmittel (3) angeordnet ist und in dem Wasser zum Leiten an den Wasserspender gespeichert ist, ein oder mehrere UV-Lichtquellen (6), die im Gehäusekörper (2) angeordnet ist, derart, dass sie dem Wasserspeicherbehälter (5) zugewandt sind, und dafür sorgen, dass der Wasserspeicherbehälter (5) mit Ultraviolettstrahlen, die in ihn hinein gestrahlt werden, sterilisiert wird,
   gekennzeichnet durch

   - einen ersten Teil (7), der den Abschnitt des Wasserspeicherbehälters (5) bildet, der der UV-

Lichtquelle (6) zugewandt ist, und der Material umfasst, das Ultraviolettstrahlung durchlässt, und

- einen zweiten Teil (8), der den Abschnitt des Wasserspeicherbehälters (5) bildet, der dem Inneren des Fachs für frische Lebensmittel (3) zugewandt ist, und der Material enthält, das für Ultraviolettstrahlung undurchlässig ist, so dass die Ultraviolettstrahlung sich nicht im Fach für frische Lebensmittel (3) verteilt, und der mit dem ersten Teil (7) verbunden ist.

2. Kühlschrank (1) nach Anspruch 1, **dadurch gekennzeichnet, dass** der erste Teil (7) die Form eines Kastens mit einer offenen Seite aufweist, der aus transparentem Kunststoffmaterial hergestellt ist, und der zweite Teil (8) die gleiche Form wie der erste Teil (7) aufweist und aus einem lichtundurchlässigen Kunststoffmaterial hergestellt ist.

3. Kühlschrank (1) nach Anspruch 1 oder 2, **dadurch gekennzeichnet, dass** der erste Teil (7) und der zweite Teil (8) durch ein Heißkeilschweißverfahren miteinander verbunden sind.

4. Kühlschrank (1) nach Anspruch 1 oder 2, **dadurch gekennzeichnet, dass** der erste Teil (7) und der zweite Teil (8) durch ein Reibschweißverfahren miteinander verbunden sind.

5. Kühlschrank (1) nach einem der vorangehenden Ansprüche, **dadurch gekennzeichnet, dass** der zweite Teil (8) mit einem für UV-Strahlung undurchlässigen Material beschichtet ist.

6. Kühlschrank (1) nach einem der vorangehenden Ansprüche, **gekennzeichnet durch** wenigstens ein Frischhaltefach (9), das auf der unteren Seite des Fachs für frische Lebensmittel (3) angeordnet ist, wobei die UV-Lichtquelle (6) hinter dem Frischhaltefach (9) angeordnet ist, der Wasserspeicherbehälter (5) zwischen der UV-Lichtquelle (6) und dem Frischhaltefach (9) angeordnet ist, wobei eine oder mehrere Blaulichtquellen (10) in der Nähe der UV-Lichtquelle (6) angeordnet sind.

7. Kühlschrank (1) nach Anspruch 6, **gekennzeichnet durch** einen Träger (11), der an der Rückseitenwand des Gehäusekörpers (2) angebracht ist und mit dem die UV-Lichtquelle (6), die Blaulichtquelle (10) und die elektrischen Elemente verbunden sind, und der die UV-Lichtquelle (6) und die Blaulichtquelle (10) mit Energie versorgt und dafür sorgt, dass die UV-Lichtquelle (6) und die Blaulichtquelle (10) als eine einzelne Einheit zusammengehalten werden.

8. Kühlschrank (1) nach Anspruch 6 oder 7, **dadurch gekennzeichnet, dass** der Wasserspeicherbehälter (5) eine Vertiefung (12) aufweist, die an seinem Abschnitt angeordnet ist, der der Vorderseite der Blaulichtquellen (10) entspricht.

Revendications

1. Un réfrigérateur (1) comprenant un corps (2), un compartiment d'aliments frais (3), un distributeur d'eau qui fournit l'eau chaude ou froide pour l'utilisateur, une réserve d'eau (5) disposée dans le compartiment d'aliments frais (3) et qui garde l'eau pour livrer au distributeur d'eau, une ou plusieurs source de lumière UV (6) qui sont disposées dans le corps (2) de manière à faire face à la réserve d'eau (5) et qui permettent la stérilisation de la réserve d'eau (5) avec les rayons UV qui y sont émis,
caractérisé par

   - une première partie (7) qui forme la section de la réserve d'eau (5) faisant face à la source de lumière UV (6) et qui comprend un matériau transmettant les rayons UV et
   - une deuxième partie (8) qui forme la section de la réserve d'eau (5) faisant face à l'intérieur du compartiment d'aliments frais (3), qui contient un matériau résistant aux rayons UV de telle sorte que les rayons UV ne se dissipent pas dans le compartiment d'aliments frais (3) et qui est jointe avec la première partie (7).

2. Un réfrigérateur (1) selon la Revendication 1, **caractérisé par** la première partie (7) qui est en forme d'un boîtier ouvert à un côté et qui est produite d'un matériau plastique transparent, et la deuxième partie (8) qui est de forme identique à celle de la première partie (7) et qui est produite d'un matériau plastique opaque.

3. Un réfrigérateur (1) selon la Revendication 1 ou 2, **caractérisé par** la première partie (7) et la deuxième partie (8) qui sont jointes par le procédé de soudage par plaque chauffante.

4. Un réfrigérateur (1) selon la Revendication 1 ou 2, **caractérisé par** la première partie (7) et la deuxième partie (8) qui sont jointes par le procédé de soudage par friction.

5. Un réfrigérateur (1) selon l'une quelconque des revendications précédentes, **caractérisé par** la deuxième partie (8) qui est revêtue avec un matériau résistant aux rayons UV.

6. Un réfrigérateur (1) selon l'une quelconque des revendications précédentes, **caractérisé par** au moins un bac à légumes (9) qui est disposé au côté inférieur du compartiment d'aliments frais (3), la

source de lumière UV (6) qui est disposée derrière le bac à légumes (9), la réserve d'eau (5) qui est disposée entre la source de lumière UV (6) et le bac à légumes (9) et une ou plusieurs source de lumière bleue (10) disposées au voisinage de la source de lumière UV (6).

7. Un réfrigérateur (1) selon la Revendication 6, **caractérisé par** un support (11) qui est monté sur la paroi arrière du corps (2), sur lequel la source de lumière UV (6), la source de lumière bleue (10) et les éléments électriques sont reliés, qui fournit de l'énergie à la source de lumière UV (6) et à la source de lumière bleue (10) et qui assure que la source de lumière UV (6) et la source de lumière bleue (10) sont maintenues ensemble comme une seule unité.

8. Un réfrigérateur (1) selon la Revendication 6 ou 7, **caractérisé par** la réserve d'eau (5) qui comprend un évidement (12) disposée à sa partie correspondant à l'avant de la source de lumière bleue (10).

Figure 1

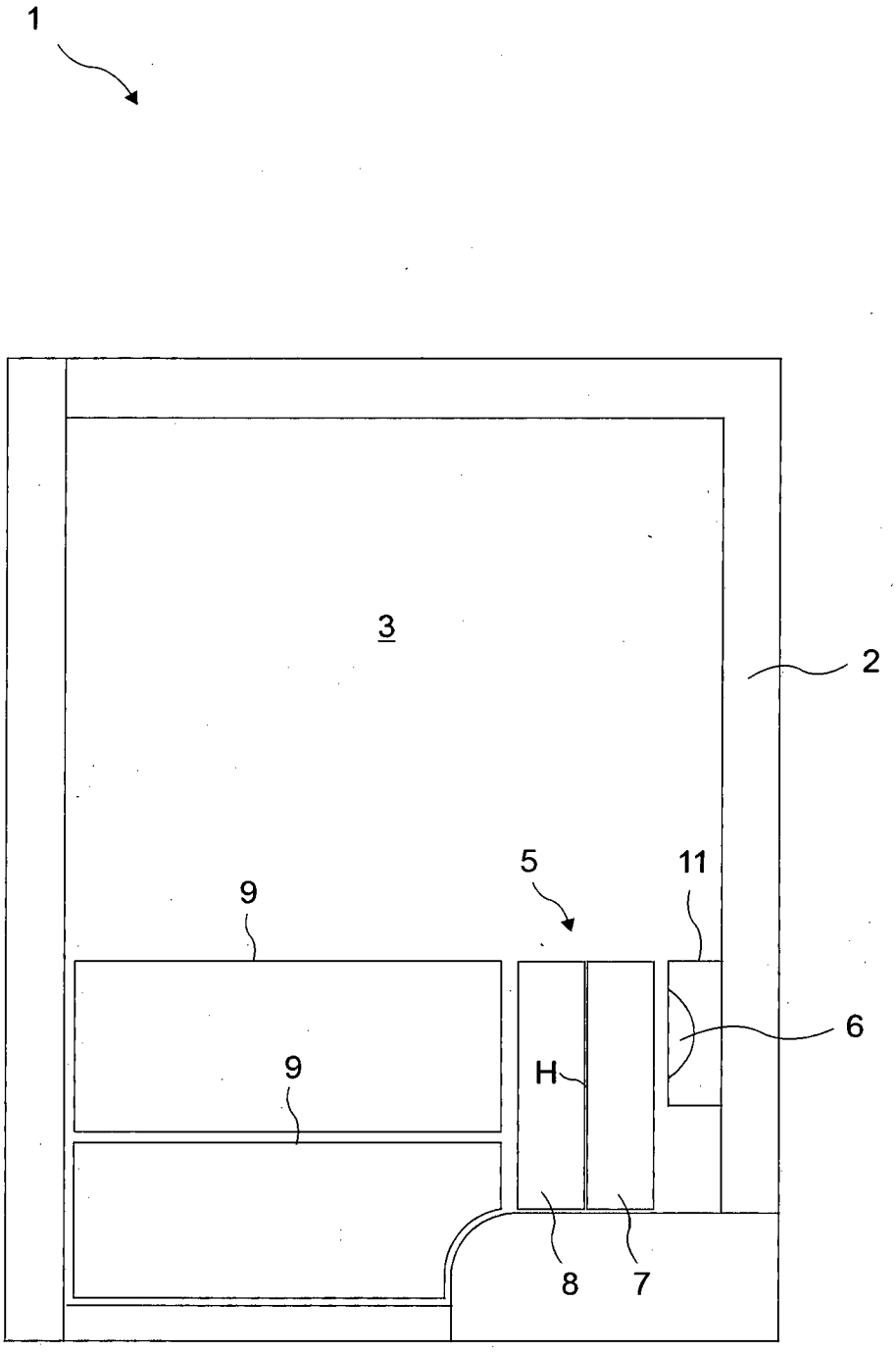


Figure 2

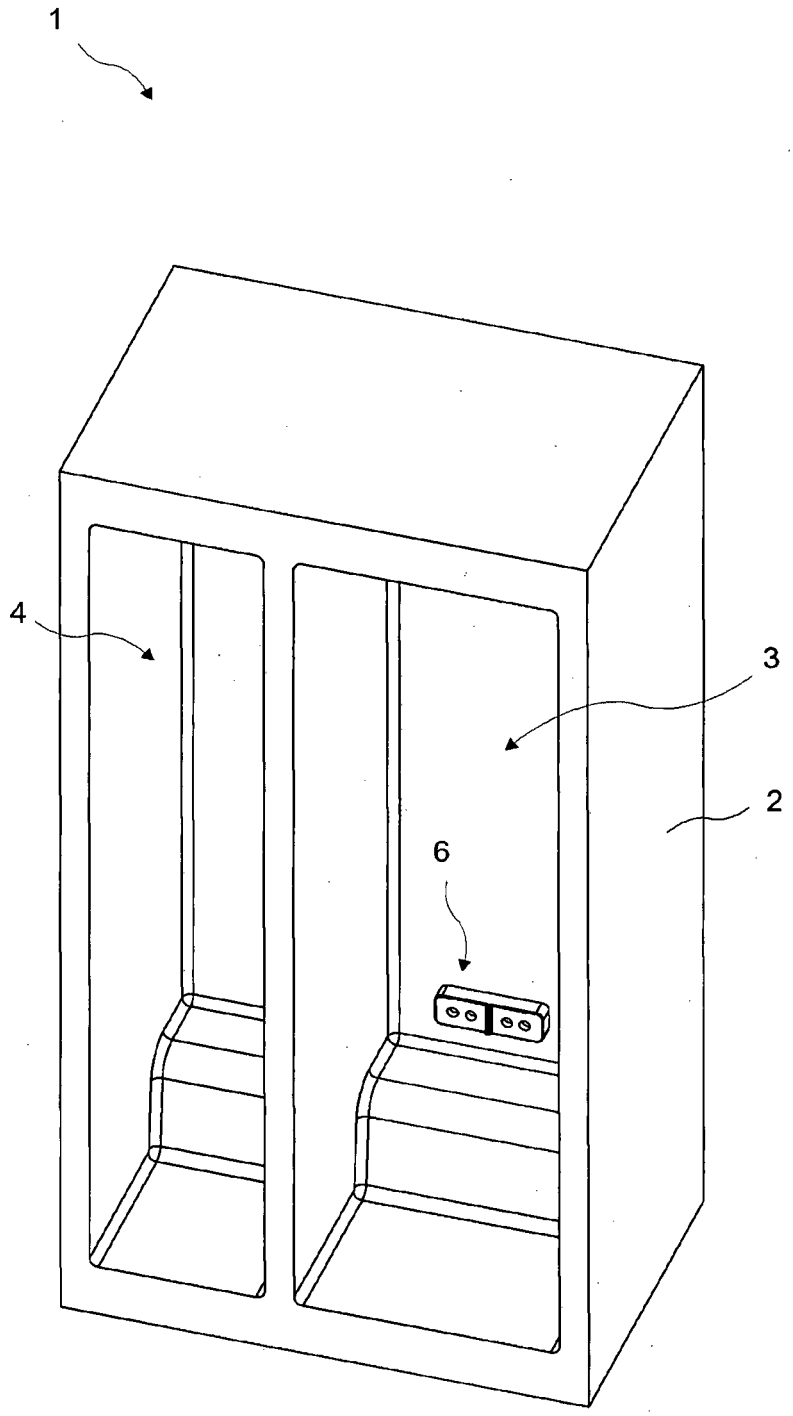


Figure 3

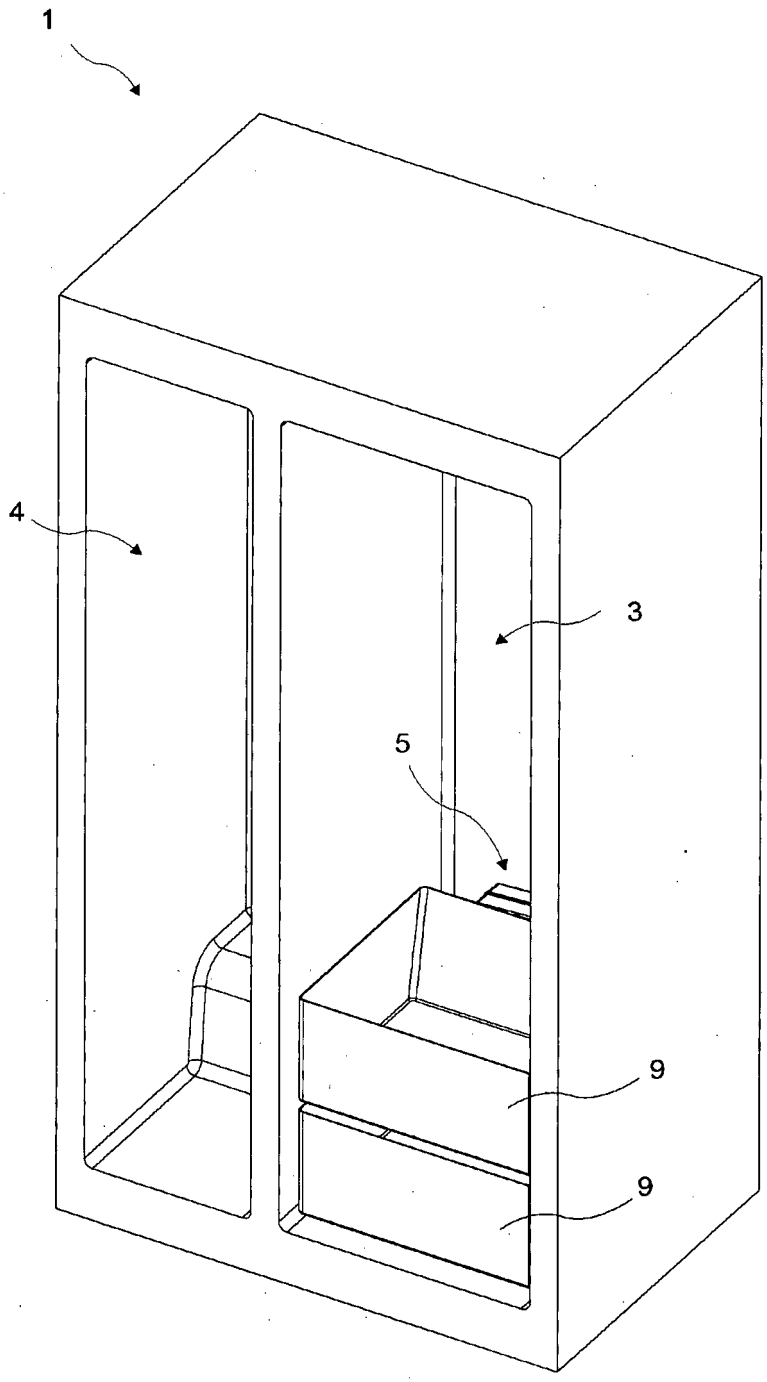


Figure 4

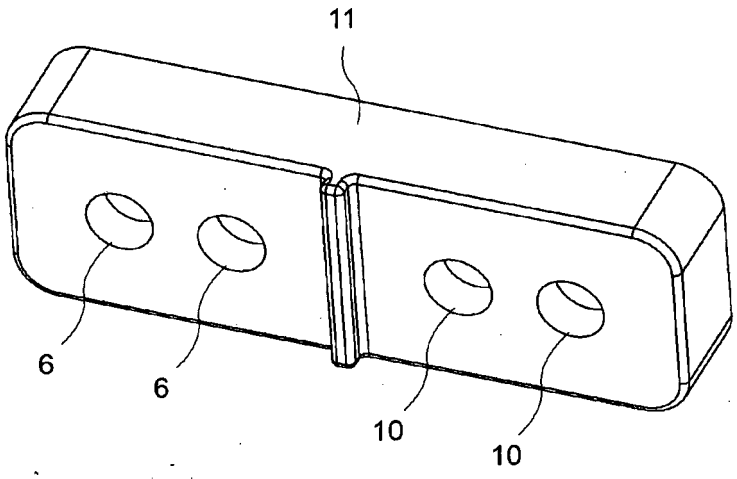


Figure 5

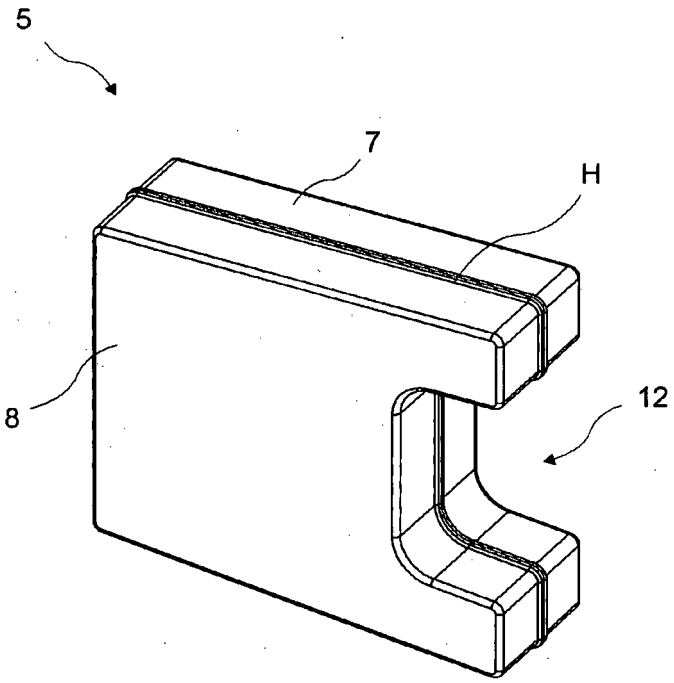
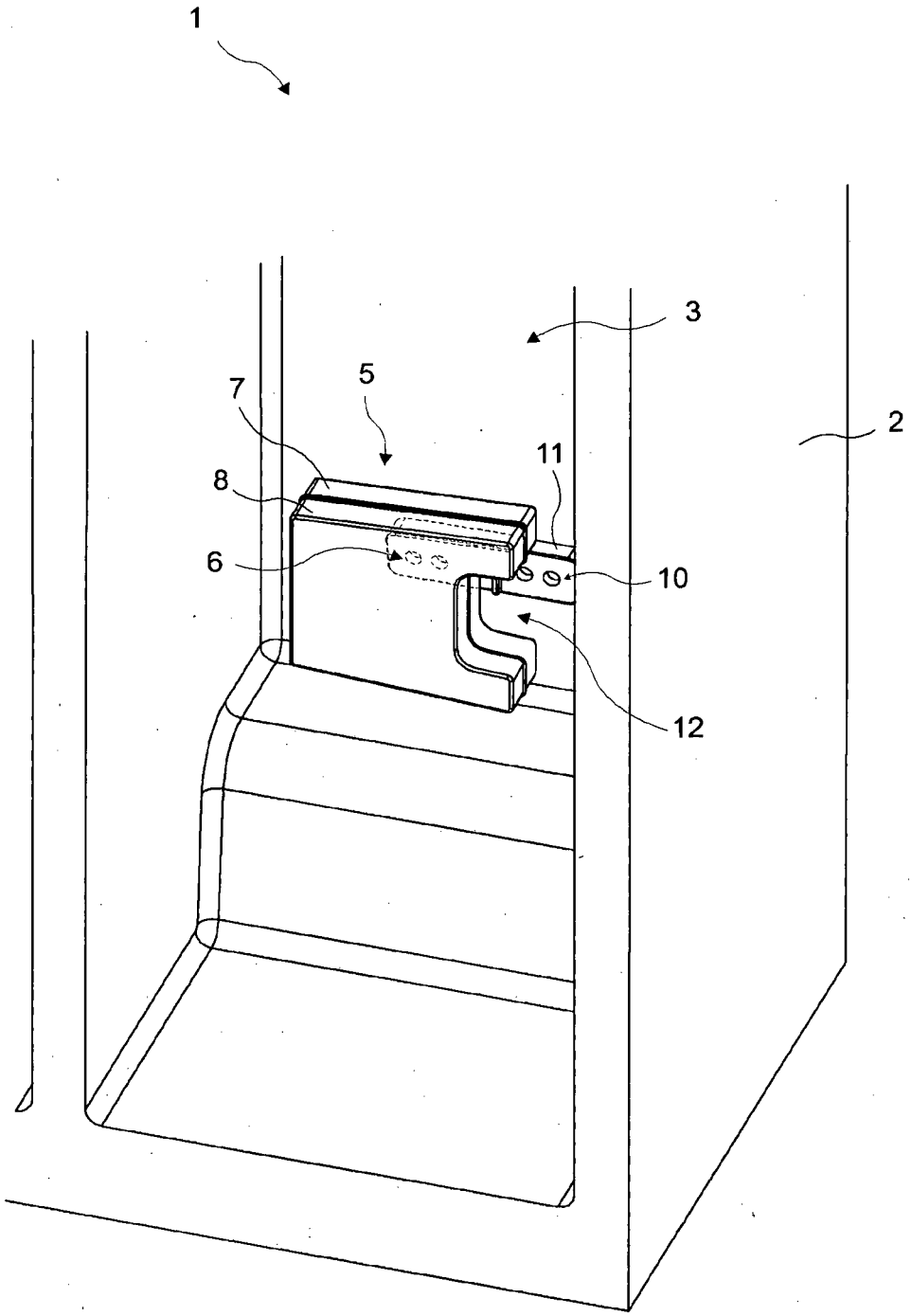


Figure 6



REFERENCES CITED IN THE DESCRIPTION

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