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(54) **COOLING APPLIANCE HAVING AN ICE MAKER ASSEMBLY**

KÜHLGERÄT MIT EINER EISERZEUGUNGSANORDNUNG

APPAREIL DE REFROIDISSEMENT DOTÉ D'UN ENSEMBLE MACHINE À GLAÇONS

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Description

[0001] The present invention relates to a cooling appliance, in particular to a cooling appliance having an ice maker assembly.

[0002] Most of the modern cooling devices are provided with ice maker assembly. The ice maker assembly can be a manual or an automated system configured to freeze water and supply the user with ice. In manual systems, the user needs to rotate the ice mold in order to free ice produced inside the ice mold on regular intervals. The automated systems work similarly with the difference that the ice maker assembly rotates the ice mold on predetermined time intervals in order to free ice produced inside the ice mold. The ice is than stored inside a container located underneath or in close vicinity of the ice mold. A problem with the conventional automatic ice maker assemblies is the fact that the ice stored inside the container tends to stick to each other and form bridges. Another problem is the fact that the ice is sublimated after a long storage time. In order to overcome this, the cold air coming from the evaporator and the fan has to be directed towards the ice container and to the ice mold.

[0003] A prior art publication in the technical field of the present invention may be referred to as US2014165602A1 among others, the document disclosing a cooling appliance having an ice maker assembly wherein the ice mold is rotatably placed onto the ice maker assembly.

[0004] A prior art publication in the technical field of the present invention may be referred to as US2014165643A1 among others, the document disclosing a cooling appliance having an ice maker assembly wherein the ice mold is rotatably placed onto the ice maker assembly.

[0005] A prior art publication in the technical field of the present invention may be referred to as US2015362242A1 among others, the document disclosing a cooling appliance having an ice maker assembly wherein the rotation of the ice mold is limited by means of a plurality of stoppers.

[0006] A prior art publication in the technical field of the present invention may be referred to as US2969654A among others, the document disclosing an ice maker comprising an energy storing means for biasing the tray and a cam surface permitting said energy storing means to subject the tray to a jarring action to release any ice pieces remaining in said tray.

[0007] A prior art publication in the technical field of the present invention may be referred to as KR20140123755A among others, the document disclosing an ice making tray for a refrigerator to facilitate to pull an ice making tray by which a lever is coupled to be able to rotate in a support frame to support an ice tray.

[0008] An objective of the present invention is to provide an ice maker assembly wherein the ice pieces are completely removed from the ice mold which in turn increases the amount of ice delivered to the user.

[0009] Another advantageous effect provided by means of the invention is that the ice pieces are completely removed from the ice mold, thereby eliminating the possibility of overflow of water.

[0010] The present invention is disclosed in the independent claim 1.

[0011] Further embodiments are disclosed in the dependent claims. The cooling appliance according to claim 1 comprises an ice maker assembly. The ice maker assembly comprises a frame and an ice mold rotatably placed onto the frame. The ice mold includes plurality of cavities wherein the water to be frozen is filled. The frame comprises a support member wherein the support member comprises a body, and the body accommodates a first recess provided thereon. A cap is provided and placed onto the body. The cap comprises a second recess and wherein the first recess and the second recess face each other upon placing the cap onto the body such that the first recess and the second recess form a conduit. The ice mold is rotatably supported on the frame by means of a protrusion protruding from the ice mold and seating into the conduit. The protrusion is configured to rotate and slide along the conduit upon rotation of the ice mold. During initial position wherein the ice mold rests on the frame, the protrusion is seated at the lower end of the first recess. Upon rotation of the ice mold, the protrusion moves upwards inside the first recess and therefore inside the conduit and towards the second recess. The width of the first recess and the second recess are different. The protrusion passes from the first recess into second recess. In the first embodiment, the first recess has a smaller width than the second recess. In the second embodiment, the first recess has a bigger width than the second recess. In both cases, as the protrusion slides from the first recess towards the second recess, the protrusion makes a pulsed motion and hits the second recess and the cap which creates an impact. The impact, vibrates the ice mold which in turn helps the release of ice pieces formed inside the ice mold. By means of this, all ice is successfully removed from the ice mold. An advantageous effect provided by this is that the water overflow is prevented by removing all ice pieces from the ice mold. This may otherwise cause the water to cover the ice mold and the frame which will subsequently freeze, causing malfunction of the ice maker assembly.

[0012] In the present invention, the conduit comprises a stepped part where the first recess and the second recess adjoin. In the first case, wherein the first recess has a smaller width than the second recess, the side walls of the second recess forms the stepped part. As the ice mold is rotated, the protrusion moves along the first recess and abuts against the side walls of the second recess. After a certain rotation angle of the ice mold, the protrusion jumps over the stepped part and hits the cap. As a result of which an impact occurs. This helps release the ice pieces from the ice mold. In the second case, wherein the first recess has a bigger width than the second recess, the protrusion simply falls from the first re-

cess into the second recess which creates the impact. This helps release the ice pieces from the ice mold. By means of the stepped part, the ice pieces are efficiently removed from the ice mold which helps reduce the aforementioned problems.

[0013] In an embodiment of the invention, the ice mold extends along a direction and the conduit extends in another direction, wherein the extension direction of the conduit is inclined with respect to the extension direction of the ice mold. The inclination facilitates the protrusion to rotate and slide from the first recess towards the second recess.

[0014] In the present invention, the conduit is in oval form. The shape of the conduit facilitates the movement of the protrusion along the conduit.

[0015] In an embodiment of the invention, the protrusion is produced integrally with the ice mold. This helps increase the life time of the ice mold and the protrusion.

[0016] In an embodiment of the invention, the ice mold is rotated by means of a motor provided on the frame. This applies to automatic ice maker assemblies.

[0017] In another embodiment of the invention, the ice mold is rotated by means of a lever provided in close vicinity of the ice maker assembly. This applies to manual ice maker assemblies.

[0018] In another embodiment of the invention, the body comprises a fixing means onto which the cap is placed and fixed on the body. The fixing means provides a rigid assembly.

[0019] In another embodiment of the invention, the body is produced as an integral part of the frame.

[0020] In another embodiment of the invention, the body is placed onto the frame by means of a recess provided thereon. The recess is configured to match the shape pf the body such that the relative motion of the body with respect to the frame is prevented.

[0021] By means of the present invention, the ice maker assembly releases all the ice pieces formed inside the ice mold upon its rotation. As a result of which, ice production capacity of the ice maker assembly is improved, meanwhile eliminating the possibility of water overflows.

[0022] The drawings are not meant to delimit the scope of protection as identified in the claims nor should they be referred to alone in an effort to interpret the scope identified in the claims without recourse to the technical disclosure in the description of the present invention.

Figure 1 - is a perspective view of the ice maker assembly

Figure 2 - is a perspective view of the ice mold

Figure 3 - is an exploded view of the ice maker assembly

Figure 4 - is a perspective view of the ice mold

Figure 5 - is a side view of the body and the protrusion along the dashed line A-A in figure 2

Figure 6 - is a perspective view of the body and the protrusion along the dashed line A-A in figure 2

Figure 7 - is a side view of the body and the protrusion along the dashed line A-A in figure 2 wherein the position of the protrusion is shown for different ice mold orientations.

Figure 8 - is a side view of the support member

Figure 9 - is a perspective view of the support member

[0023] The following numerals are assigned to different parts demonstrated in the drawings and referred to in the present detailed description of the invention:

1. Ice maker assembly
2. Frame
3. Support member
4. Body
5. First recess
6. Cap
7. Second recess
8. Conduit
9. Ice mold
10. Protrusion
11. Fixing means

[0024] The present invention relates to a cooling appliance according to claim 1 comprising; an ice maker assembly (1):
the ice maker assembly (1) comprising; a frame (2) comprising a support member (3), wherein the support member (3) comprises a body (4) accommodating a first recess (5) and a cap (6) enclosing the first recess (5), wherein the cap (6) comprises a second recess (7) seated on the first recess (5), forming a conduit (8); an ice mold (9) comprising a plurality of cavities into where the water to be frozen is filled, and a protrusion (10) seated into the conduit (8) and rotatably supporting the ice mold (9) on the frame (2), wherein the protrusion (10) is configured to slide and rotate along the conduit (8) upon rotation of the ice mold (9).

[0025] In the present invention, the width of the first recess (5) and the second recess (7) are different. The ice maker assembly (1) of the cooling appliance comprises the frame (2) onto which the ice mold (9) is rotatably placed. The frame (2) further comprises the support member (3) wherein the support member (3) comprises the body (4) and the cap (6). The body (4) and the cap (6) each comprises the first recess (5) and the second recess (7) respectively. The said recesses (5,7) are configured to face each other, upon placing the cap (6) onto the body (4) and defines the conduit (8). The ice mold (9) comprises cavities wherein the water to be frozen is filled. The ice mold (9) has an elongated form and extends along a direction. The ice mold (9) further comprises the protrusion (10) via which the ice mold (9) is rotatably placed onto the frame (2). The protrusion (10) moves inside the conduit (8) upon rotation of the ice mold (9). The protrusion (10) makes a rotational and sliding movement inside the conduit (8) and moves towards the cap (6). First of all, the protrusion (10) moves along the first

recess (5) and then passes to the second recess (7). The first recess (5) and the second recess (7) have different widths. Therefore, as the protrusion (10) passes from the first recess (5) to the second recess (7), two possibilities exist. In the first case, wherein the width of the first recess (5) is greater than the second recess (7), the protrusion (10) abuts against the side walls of the second recess (7). Afterwards, the protrusion (10) rotates around the side walls of the second recess (7) and falls into the second recess (7), the impact of which releases ice pieces formed inside the ice mold (9). In the second case, wherein the width of the second recess (7) is greater than the first recess (5), the protrusion falls into the second recess (7), the impact of which releases ice pieces formed inside the ice mold (9). By means of the said recesses (5,7) having different widths, all the ice formed inside the ice mold (9) is removed from the ice mold (9) by the vibration of the impact. Another advantageous effect is that the water overflow from the ice mold (9) due to remaining ice pieces is prevented.

[0026] In the present invention, the conduit (8) comprises a stepped part formed by convergence of the first recess (5) and the second recess (7) and that the protrusion (10) is configured to impact the cap (6) by jumping over the stepped part of the conduit (8) upon rotation of the ice mold (9) to facilitate the release of the ice pieces.

[0027] In the preferred embodiment of the invention, the extension direction of the conduit (8) is inclined with respect to the extension direction of the ice mold (9). The ice pieces are released upon rotation of the ice mold (9) and during release, the ice mold (9) faces sideways. By providing the conduit (8) inclined, the impact direction of the protrusion (10) will be perpendicular to the extension direction of the ice mold (9) during release of ice pieces. This helps improve the efficiency of the impact and therefore that of the ice releasing process.

[0028] In the present invention, the conduit (8) is in oval shape. The oval shape helps the protrusion (10) to reach the second recess (7) easier, thereby improving the efficiency of the ice release. In the preferred embodiment of the invention, the protrusion (10) is integral with the ice mold (9). By providing the protrusion (10) integral with the ice mold (9) helps increase structural strength of the ice maker assembly (1).

[0029] Another advantageous effect is that the vibration caused by the impact is transferred to the ice mold (9) at a higher rate.

[0030] In the preferred embodiment of the invention, the ice mold (9) is rotated by means of a motor provided on the frame (2). The motor is provided on the frame (2) and is configured to rotate the ice mold (9). This particular embodiment is especially advantageous to be used at automatic ice making assemblies. It is to be understood that same impact to release ice pieces can also be achieved by a lever mechanism, that is manually actuated by a user.

[0031] In the preferred embodiment of the invention, the body (4) comprises at least a fixing means (11) onto which the cap (6) is placed. The body (4) comprises a fixing means (11) preferably in the form of a lug onto which the cap (6) is placed.

[0032] In a preferred embodiment of the invention, the body (4) is integral with the frame (2). This helps increase the life time of the ice maker assembly (1).

[0033] In another preferred embodiment of the invention, the body (4) is form fittingly placed onto a recess provided on the frame (2) that is configured to eliminate relative motion of the body (4) with respect to the frame (2) upon rotation of the ice mold (9). By providing the body (4) as a separate part, convenience in maintenance of the ice maker assembly is provided for the user. In such case, the user may simply remove the broken body (4) part and replace it with a new one.

[0034] An advantageous effect provided by means of the invention is that the ice pieces formed inside the ice mold (9) is completely removed.

[0035] Another advantageous effect provided by means of the invention is that the ice is totally removed from ice mold (9) which eliminates the possibility of overflowing upon filling the ice mold (9) with water again.

Claims

1. A cooling appliance comprising an ice maker assembly (1); the ice maker assembly (1) comprising

   a frame (2) comprising a support member (3), wherein the support member (3) comprises a body (4) accommodating a first recess (5) and a cap (6) placed onto the body (4) and enclosing the first recess (5), wherein the cap (6) comprises a second recess (7) and wherein the first recess (5) and the second recess (7) face each other upon placing the cap (6) onto the body (4) such that the first recess (5) and the second recess (7) form a conduit (8); wherein the ice maker assembly (1) is further provided with an ice mold (9) comprising a plurality of cavities into where the water to be frozen is filled, and a protrusion (10) seated into the conduit (8) and rotatably supporting the ice mold (9) on the frame (2), wherein the protrusion (10) is configured to slide and rotate along the conduit (8) upon rotation of the ice mold (9);

   characterized in that

   the width of the first recess (5) and the second recess (7) are different such that one of the first recess (5) and the second recess (7) is in the form of a semicircle and the other one is in the form of a half ellipse facing each other to form the conduit (8) in an oval shape and such that the conduit (8) comprises a stepped part formed by convergence of the first recess (5) and the second recess (7), wherein the protrusion (10) is configured to impact the cap (6) by

jumping over the stepped part of the conduit (8) upon rotation of the ice mold (9) to facilitate the release of the ice pieces.

2. A cooling appliance according to claim 1, **characterized in that** the extension direction of the conduit (8) is inclined with respect to the extension direction of the ice mold (9).

3. A cooling appliance according to claim 1 or 2, **characterized in that** the protrusion (10) is integral with the ice mold (9).

4. A cooling appliance according to any preceeding claim, **characterized in that** the ice mold (9) is rotated by means of a motor provided on the frame (2).

5. A cooling appliance according to any preceeding claim, **characterized in that** the body (4) comprises at least a fixing means (11) onto which the cap (6) is placed.

6. A cooling appliance according to any preceeding claim, **characterized in that the** body (4) is integral with the frame (2).

7. A cooling appliance according to claims 1 to 4, **characterized in that** the body (4) is form fittingly placed onto a recess provided on the frame (2) that is configured to eliminate relative motion of the body (4) with respect to the frame (2) upon rotation of the ice mold (9).

Patentansprüche

1. Ein Kühlgerät umfasst eine Eismaschineneinheit (1); die Eismaschineneinheit (1) umfasst einen Rahmen (2), der ein Stützelement (3) umfasst, wobei das Stützelement (3) einen Körper (4), der eine erste Aussparung (5) aufnimmt, und eine Kappe (6) umfasst, die auf dem Körper (4) platziert ist und die erste Aussparung (5) umschließt, wobei die Kappe (6) eine zweite Aussparung (7) aufweist und wobei die erste Aussparung (5) und die zweite Aussparung (7) beim Aufsetzen der Kappe (6) auf den Körper (4) einander gegenüberliegen, so dass die erste Aussparung (5) und die zweite Aussparung (7) einen Kanal (8) bilden; wobei die Eismaschineneinheit (1) ferner mit einer Eisform (9) versehen ist, die eine Vielzahl von Hohlräumen umfasst, in die das zu gefrierende Wasser eingefüllt wird, und einem Vorsprung (10), der in dem Kanal (8) sitzt und die Eisform (9) drehbar auf dem Rahmen (2) trägt, wobei der Vorsprung (10) so konfiguriert ist, dass er bei Drehung der Eisform (9) entlang des Kanals (8) gleitet und sich dreht;
gekennzeichnet ist es dadurch,
dass die Breite der ersten Aussparung (5) und der zweiten Aussparung (7) unterschiedlich ist, so dass eine der ersten Aussparung (5) und der zweiten Aussparung (7) die Form eines Halbkreises und die andere die Form einer halben Ellipse hat, die einander gegenüberliegen, um den Kanal (8) in einer ovalen Form zu bilden, und so dass der Kanal (8) einen abgestuften Teil umfasst, der durch das Zusammenlaufen der ersten Aussparung (5) und der zweiten Aussparung (7) gebildet wird, wobei der Vorsprung (10) so konfiguriert ist, dass er auf die Kappe (6) aufprallt, indem er bei der Drehung der Eisform (9) über den abgestuften Teil des Kanals (8) springt, um die Freigabe der Eisstücke zu erleichtern.

2. Ein Kühlgerät, wie in Anspruch 1 aufgeführt, **ist dadurch gekennzeichnet, dass** die Erstreckungsrichtung des Kanals (8) in Bezug auf die Erstreckungsrichtung der Eisform (9) geneigt ist.

3. Ein Kühlgerät, wie in Anspruch 1 oder 2 aufgeführt, **ist dadurch gekennzeichnet, dass** der Vorsprung (10) fest mit der Eisform (9) verbunden ist.

4. Ein Kühlgerät, wie in einem der vorherigen Ansprüchen aufgeführt, **ist dadurch gekennzeichnet, dass** die Eisform (9) mittels eines am Rahmen (2) vorgesehenen Motors gedreht wird.

5. Ein Kühlgerät, wie in einem der vorherigen Ansprüchen aufgeführt, **ist dadurch gekennzeichnet, dass** der Körper (4) mindestens ein Befestigungsmittel (11) aufweist, auf das die Kappe (6) aufgesetzt wird.

6. Ein Kühlgerät, wie in einem der vorherigen Ansprüchen aufgeführt, **ist dadurch gekennzeichnet, dass** der Körper (4) mit dem Rahmen (2) einstückig ist.

7. Ein Kühlgerät, wie in Anspruch 1 bis 4 aufgeführt, **ist dadurch gekennzeichnet, dass** der Körper (4) formschlüssig auf eine am Rahmen (2) vorgesehene Aussparung aufgesetzt ist, die so konfiguriert ist, dass eine Relativbewegung des Körpers (4) in Bezug auf den Rahmen (2) bei Drehung der Eisform (9) verhindert wird.

Revendications

1. Un appareil de refroidissement comprenant une machine à glaçons (1), comprenant un cadre (2) comprenant un élément de support (3) ; l'ensemble machine à glaçons (1) comprend un cadre (2) comprenant un élément de support (3), dans lequel l'élément de support (3) comprend un corps (4) accueillant une première cavité (5) et un capuchon (6) placé sur le

corps (4) et enfermant la première cavité (5), dans lequel le capuchon (6) comprend une seconde cavité (7) et dans lequel la première cavité (5) et la seconde cavité (7) se font face lorsque le capuchon (6) est placé sur le corps (4) de sorte que la première cavité (5) et la seconde cavité (7) forment un conduit (8) ; dans lequel l'ensemble de la machine à glaçons (1) est en outre pourvu de d'un moule à glace (9) comprenant une pluralité de cavités dans lesquelles l'eau à congeler est remplie, et d'une protubérance (10) insérée dans le conduit (8) et supportant de manière rotative le moule à glace (9) sur le cadre (2), dans lequel la protubérance (10) est configurée pour glisser et tourner le long du conduit (8) lors de la rotation du moule à glace (9) ; **caractérisé en ce que** la largeur de la première cavité (5) et de la seconde cavité (7) est différente de sorte que l'une de la première cavité (5) et de la seconde cavité (7) est en forme de demi-cercle et l'autre en forme de demi-ellipse se faisant face pour former le conduit (8) en forme ovale et de sorte que le conduit (8) comprend une partie étagée formée par la convergence de la première cavité (5) et la seconde cavité (7) dans laquelle la protubérance (10) est configurée pour impacter le bouchon (6) en sautant par-dessus la partie étagée du conduit (8) lors de la rotation du moule à glace (9) afin de faciliter la libération des morceaux de glace.

2. Un appareil de refroidissement selon la déclaration 1, **caractérisé en ce que** la direction d'extension du conduit (8) est inclinée par rapport à la direction d'extension du moule à glace (9).

3. Un appareil de refroidissement selon la déclaration 1 ou 2, **caractérisé en ce que** la protubérance (10) est solidaire du moule à glace (9).

4. Un appareil de refroidissement selon toute déclaration précédente, **caractérisé en ce que** le moule à glace (9) est mis en rotation au moyen d'un moteur prévu sur le cadre (2).

5. Un appareil de refroidissement selon toute déclaration précédente, **caractérisé en ce que** le corps (4) comprend au moins un moyen de fixation (11) sur lequel le capuchon (6) est placé.

6. Un appareil de refroidissement selon l'une quelconque des déclarations précédentes, **caractérisé en ce que le** corps (4) est solidaire du cadre (2).

7. Un appareil de refroidissement selon les déclarations 1 à 4, **caractérisé en ce que** le corps (4) est placé de manière ajustée sur une cavité prévue sur le cadre (2) qui est configurée pour éliminer le mouvement relatif du corps (4) par rapport au cadre (2) lors de la rotation du moule à glace (9).

Figure 1

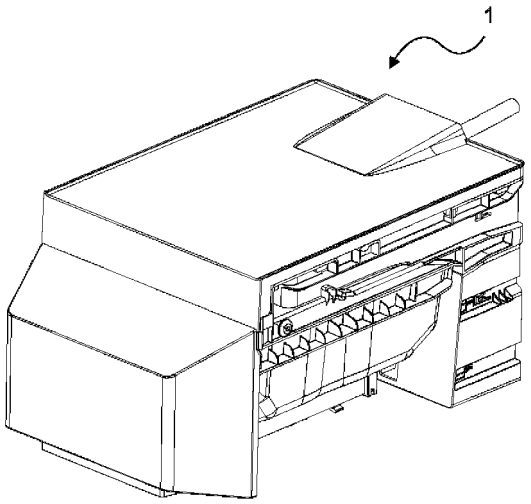


Figure 2

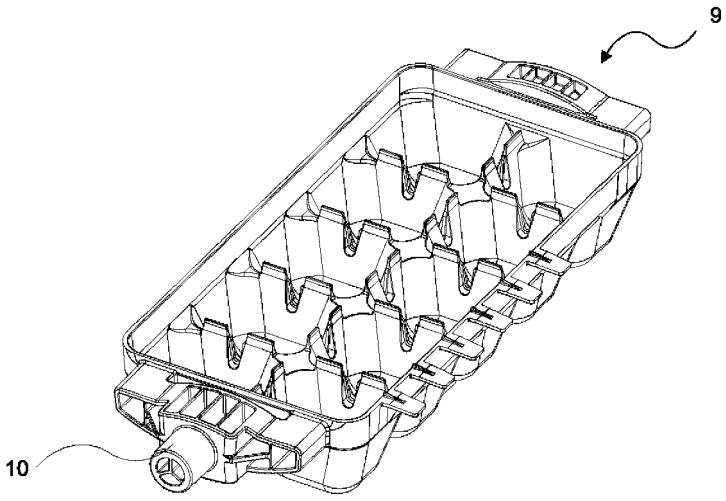


Figure 3

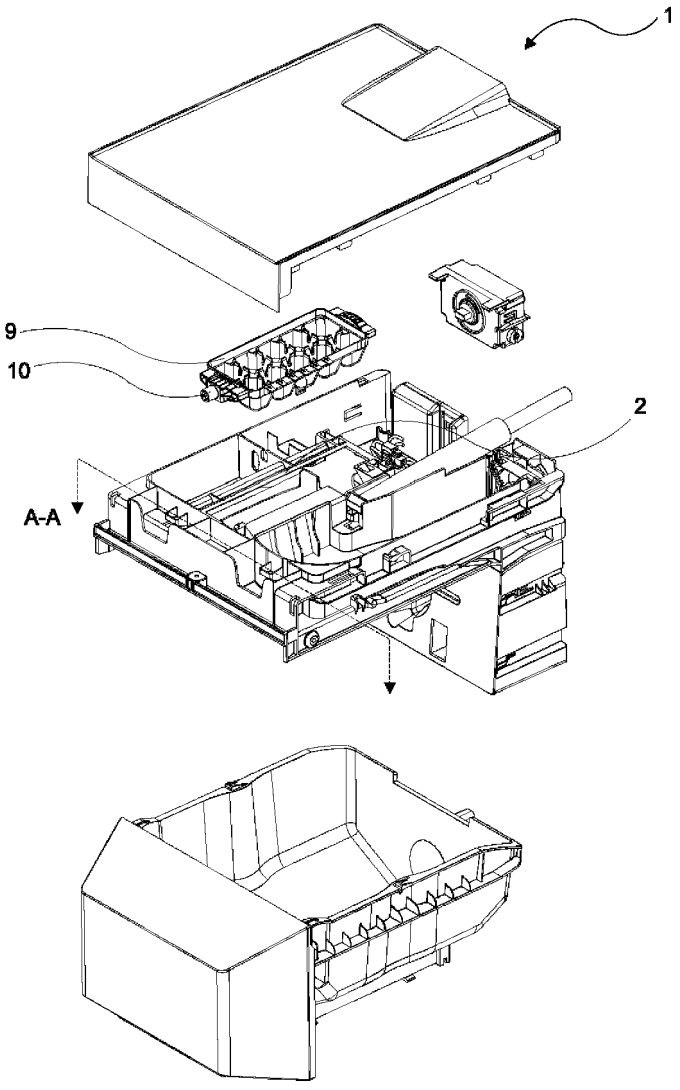


Figure 4

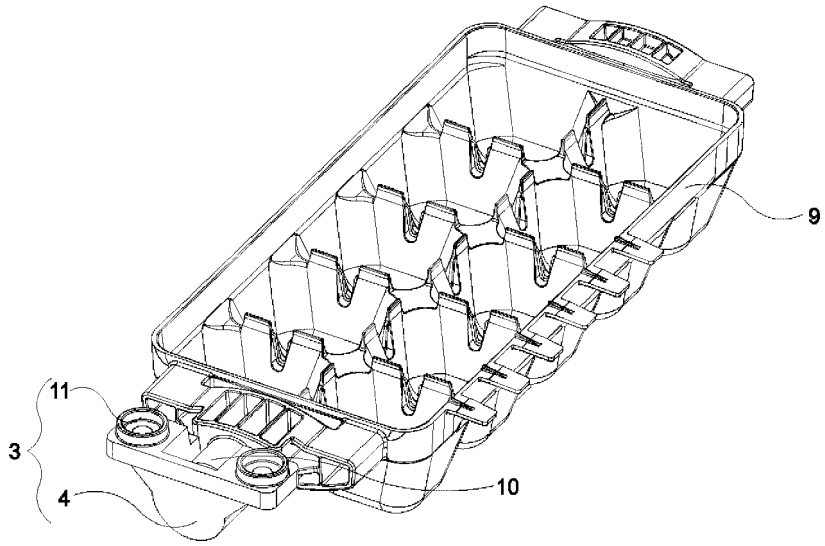


Figure 5

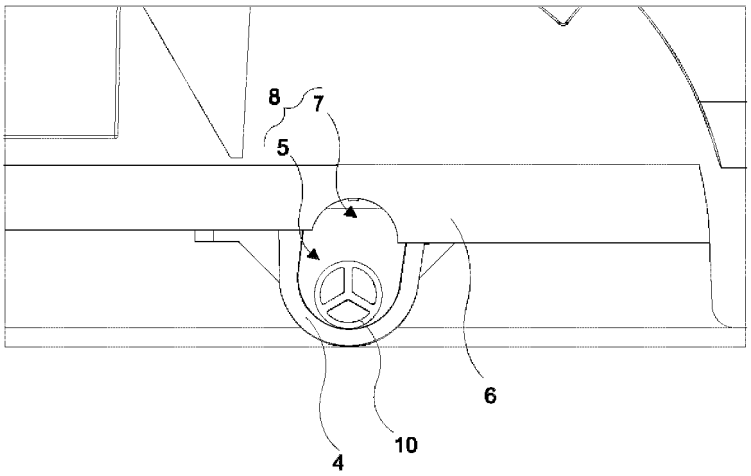


Figure 6

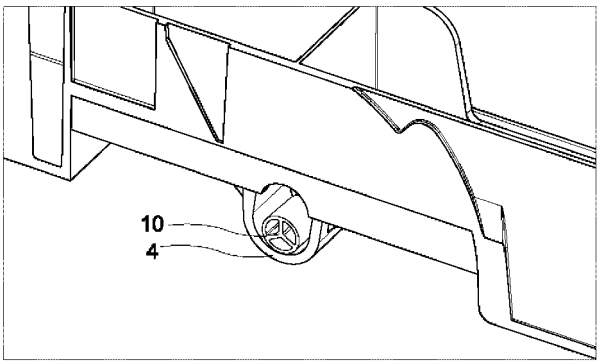


Figure 7

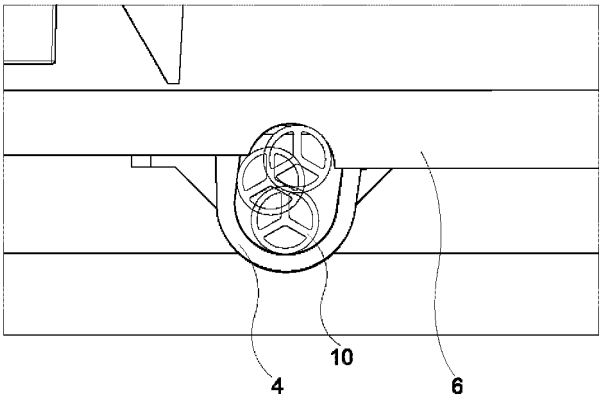


Figure 8

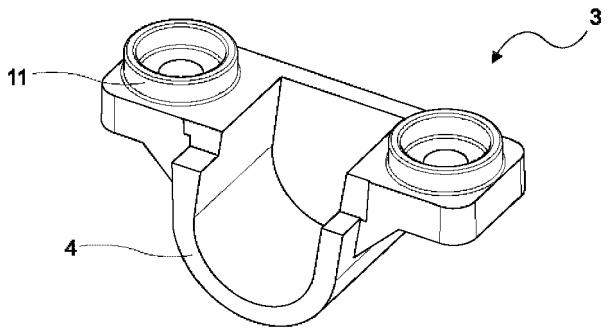
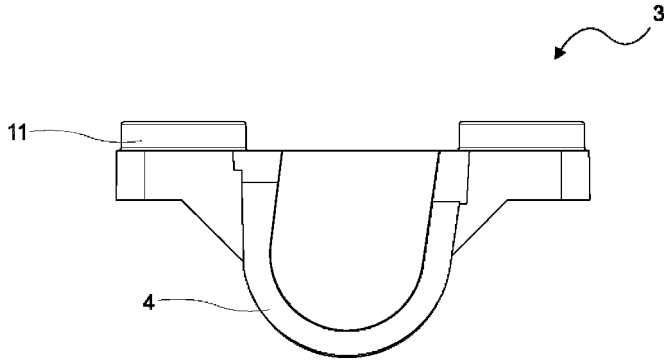


Figure 9



REFERENCES CITED IN THE DESCRIPTION

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