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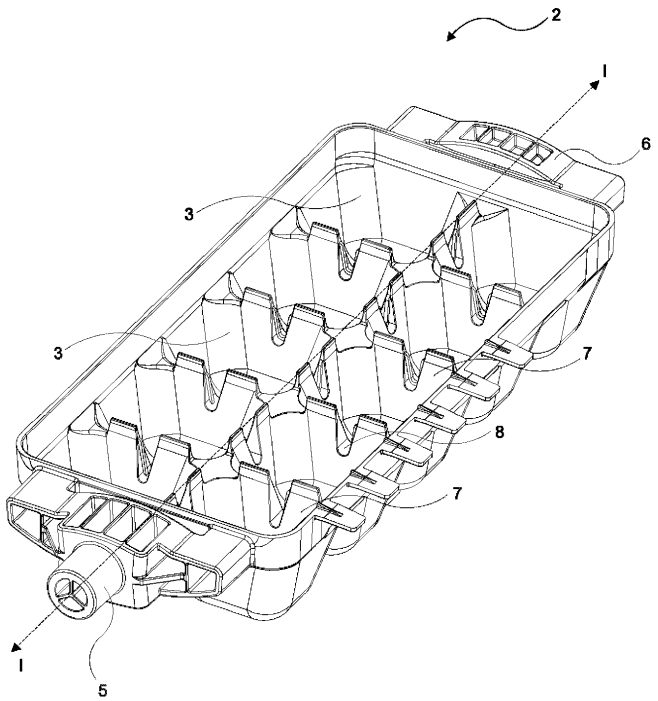
(54) **A COOLING APPLIANCE HAVING AN ICE MAKER ASSEMBLY**

(57) A cooling appliance comprising; an ice maker assembly (1); the ice maker assembly (1) comprising; an ice mold (2) placed into the ice maker assembly (1) comprising a plurality of cavities (3) into where the water to be frozen is filled, wherein the ice mold (2) is configured to be rotated around an axis (I) extending along the length ice mold (2), an agitation means (4) configured to rotate the ice mold (2) upon activation, a control unit configured to activate a water pump to direct the water into the cavities (3).

Figure 2



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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 assemblies. 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 must rotate the ice mold 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 water delivered into the ice mold accumulates in a part of the ice mold close to the water supply whereas a major portion of the ice mold remains empty. As a result of which, the ice pieces that are formed are not uniform in volume. This decreases the quality of the ice pieces formed and as a result the quality perception of the cooling appliance. Additionally, water expands as it freezes. Water accumulated in a section of the ice mold forms an ice much bigger than required which in turn may damage the operational parts of the ice maker assembly as the ice mold rotates. Another problem with the state of the art is that an ice piece formed inside the ice mold that is much smaller than the required size, tends to remain inside the ice mold even if the ice mold is rotated. This causes an accumulation of ice over time which may cause the formation of one big ice chunk completely covering the upper surface of the ice mold. This situation is especially dangerous as it will cause the water to accumulate inside the ice maker assembly in the form of an ice block which in turn will damage the ice maker assembly.

[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 WO2018041525A1 among others, the document disclosing a cooling appliance having an ice maker assembly.

[0007] An objective of the present invention is to provide an ice maker assembly having an ice mold into which the water is equally distributed.

[0008] Another objective of the present invention is to provide an ice maker assembly that is able to produce ice pieces having substantially the same volume and size.

[0009] Another objective of the present invention is to provide an ice maker assembly wherein the water leakage and formation of large ice chunks is prevented.

[0010] The method realized to achieve the aim of the present invention and disclosed in the first claim and the dependent claims comprises a cooling appliance. The cooling appliance comprises an ice maker assembly. The ice maker assembly comprises a frame and an ice mold rotatably placed onto the frame and therefore onto the ice maker assembly. The ice mold includes plurality of cavities wherein the water to be frozen is filled. The ice mold is free to rotate with respect to an axis (I) passing along the length of the ice mold. An agitation means is provided on the ice maker assembly and is configured to force the ice mold to rotate upon being activated. The cooling appliance further comprises a control unit wherein the control unit activates a water pump to direct a certain amount of water into the ice mold. A water outlet is provided above the ice mold and is in fluid communication with a water storage or water main. Upon being activation of the pump by the control unit, the water exits from the water outlet and fills into the ice mold. The amount of water is measured and controlled to prevent water overflows. At the beginning of ice making procedure, the water is introduced into the ice mold. After a certain amount of time has passed, the control unit activates the agitation means and rotates the ice mold with respect to the axis (I), thereby releasing ice pieces. The ice pieces are then stored in the container provided underneath the ice mold. Afterwards, fresh water to be frozen is introduced into the ice mold. Following this, the control unit activates the agitation means by a predetermined angle, which in turn will distribute water equally inside the cavities of the ice mold. The said angle is significantly smaller than the angle formed by rotation of the ice mold to release ice pieces. The agitation means rotates the ice mold towards a first direction and then to a second direction opposite to the first direction. By means of this, water is distributed equally among the cavities. In another preferred embodiment, the agitation means rotates the ice mold sequentially towards the first direction and then to the second direction more than once. By means of which, the water is distributed even better. As a result, ice pieces having the same shape and volume are obtained.

[0011] In an embodiment of the invention, the ice mold comprises a first support and a second support that are used to place the ice mold onto the ice maker assembly in a rotatably manner. The said supports extend away

from the ice mold along the axis. Said supports are placed into respective recesses provided on the ice maker assembly. Said recesses comprises a wedge shaped bottom onto which the supports are placed. Upon rotation of the ice mold, the supports move along the recesses and depending on the direction of rotation, one of the said supports move upwards along the wedge provided inside the recess, meanwhile the other one of the supports move downwards along the wedge inside the other recess. As a result of which, the said supports move the respective ends of the ice mold upwards and downwards creating a tilting motion. In addition to the rotation of the ice mold, the tilt movement forces the water inside the ice mold towards the ends of the ice mold. An advantageous effect provided by means of this is that the water is distributed equally both along the length and width of the ice mold.

[0012] In an embodiment of the invention, the ice mold comprises plurality of walls that are used to divide the inner volume of the ice mold into the cavities. The wall comprises a crevice provided on an upper side of the wall to facilitate the passage of water between the adjacent cavities as the ice mold is rotated and tilted.

[0013] In an embodiment of the invention, the crevice is coated with a hydrophobic material. The hydrophobic material facilitates the passage of water between the adjacent cavities. The hydrophobic material also decreases the capillary effect caused by the narrowness of the crevices.

[0014] In an embodiment of the invention, the rotation angle of the ice mold caused by the activation of the agitation means in order to distribute water between adjacent cavities is between 1 and 20 degrees. In a preferred embodiment, the said angle is is between 1 and 15 degrees. In a further preferred embodiment, the said angle is is between 1 and 10 degrees. In a further preferred embodiment, the said angle is is between 4 and 7 degrees

[0015] By means of the present invention, the ice maker assembly divides the water among the cavities provided on the ice mold. This helps production of ice pieces having similar size and volume. Another advantageous effect is that the inner volume of the ice mold is utilized efficiently which in turn increases the amount of ice produced in a single ice making cycle.

[0016] 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 exploded view of the ice maker assembly

Figure 2 - is a perspective view of the ice mold

[0017] 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. Ice mold
3. Cavity
4. Agitation means
5. First support
6. Second support
7. Wall
8. Crevice

[0018] The present invention relates to a cooling appliance comprising; an ice maker assembly (1); the ice maker assembly (1) comprising; an ice mold (2) placed into the ice maker assembly (1) comprising a plurality of cavities (3) into where the water to be frozen is filled, wherein the ice mold (2) is configured to be rotated around an axis (I) extending along the length ice mold (2), an agitation means (4) configured to rotate the ice mold (2) upon activation, a control unit configured to activate a water pump to direct the water into the cavities (3).

[0019] The present invention further comprises the control unit that is further configured to activate the agitation means (4) so as to rotate the ice mold (2) in a first direction and a second direction opposite to the first direction by a predetermined angle after a predetermined time of activation of the water pump such that the water is distributed among the cavities (3). The control unit is configured to activate the agitation means (4) sequentially such that the ice mold (2) rotates in a first direction and in a second direction. As the ice mold (2) rotates back and forth, the water is distributed among the cavities (3) inside the ice mold (2). By means of this, water is distributed among the cavities (3) equally. By means of this invention, the ice pieces that are formed inside the cavities (3) have similar volume. Another advantageous effect provided by means of this invention is that the ice mold (2) can store a bigger amount of water which in turn will increase ice production capability of the ice maker assembly (1).

[0020] In a preferred embodiment of the invention, the ice mold (2) comprises a first support (5) and a second support (6) extending along the axis (I) via which the ice mold (2) is rotatable placed into the ice maker assembly (1) and wherein the first support (5) is configured move up and the second support (6) is configured move down relative to the ice maker assembly (1) upon rotation of the ice mold (2) in the first direction and wherein the first support (5) is configured move down and the second support (6) is configured move up relative to the ice maker assembly (1) upon rotation of the ice mold (2) in the second direction opposite to the first direction. The ice mold (2) is seated onto the ice maker assembly (1) by means of the first support (5) and the second support (6). The said supports (5,6) rotatably support the ice mold (2) on the ice maker assembly (1). The shape of the said supports (6,7) are configured such that, the first support (5) is configured move up and the second support (6) is configured move down if the agitation means (4) is activated to rotate the ice mold (2) towards the first direction. Like-

wise, the first support (5) is configured move down and the second support (6) is configured move up if the agitation means (4) is activated to rotate the ice mold (2) towards the first direction. By means of this, apart from rotation of the ice mold (2), the ice mold (2) is tilted with respect to the axis (I), which in turn ensures that the cavities (3) close to the corners of the ice mold (2) are also filled with water efficiently. By means of this, cavities (3) are filled equally, thereby increasing the quality of the ice pieces produced. Another advantageous effect is that the inner volume of the ice mold (2) is utilized efficiently, increasing ice output of the ice maker assembly (1).

[0021] In an embodiment of the invention, the supports (5,6) are seated into recesses provided on the ice maker assembly (1). The bottom of the said recesses is inclined which helps the upward and downward movement of the ice mold (2) as it is forced to rotate toward the first direction and the second direction.

[0022] In a preferred embodiment of the invention, the adjacent cavities (3) are separated by a wall (7) and that the wall comprises a crevice (8) on an upper side of the wall (7) facilitating the passage of water between adjacent cavities (3). By means of the crevices (8), the water is distributed among the cavities (3) easily.

[0023] In a preferred embodiment of the invention, the crevice (8) is coated with a hydrophobic material. The crevices (8) are coated with a hydrophobic material which minimizes the capillary effect. As a result, the water is distributed among the cavities (3) equally.

[0024] In a preferred embodiment of the invention, the predetermined angle is between 1 - 20 degrees.

[0025] In a further preferred embodiment of the invention, the predetermined angle is between 1 - 15 degrees.

[0026] In a further preferred embodiment of the invention, the predetermined angle is between 1 - 10 degrees.

[0027] In a further preferred embodiment of the invention, the predetermined angle is between 4 - 7 degrees.

[0028] An advantageous effect provided by means of the invention is that the ice pieces formed inside the ice mold (2) is substantially the same size which in turn increases quality perception of the cooling appliance.

[0029] Another advantageous effect provided by means of the invention is that the water is distributed equally between the cavities (3), thereby volumetric ice production capacity of the ice mold (2) is utilized to the maximum.

[0030] Another advantageous effect provided by means of the invention is that the formation of small ice pieces due to the limited amount of water inside a cavity (3) is prevented. This prevents the sticking of small ice pieces inside the cavities (3) as the ice mold (2) is rotated to release ice pieces. As a result of this, water overflows are prevented.

Claims

1. A cooling appliance comprising;
an ice maker assembly (1); the ice maker assembly (1) comprising;
an ice mold (2) placed into the ice maker assembly (1) comprising a plurality of cavities (3) into where the water to be frozen is filled, wherein the ice mold (2) is configured to be rotated around an axis (I) extending along the length ice mold (2),
an agitation means (4) configured to rotate the ice mold (2) upon activation,
a control unit configured to activate a water pump to direct the water into the cavities (3),
characterized in that
the control unit is further configured to activate the agitation means (4) so as to rotate the ice mold (2) in a first direction and a second direction opposite to the first direction by a predetermined angle after a predetermined time of activation of the water pump such that the water is distributed among the cavities (3).

2. A cooling appliance according to claim 1, **characterized in that** the ice mold (2) comprises a first support (5) and a second support (6) extending along the axis (I) via which the ice mold (2) is rotatable placed into the ice maker assembly (1) and wherein the first support (5) is configured move up and the second support (6) is configured move down relative to the ice maker assembly (1) upon rotation of the ice mold (2) in the first direction and wherein the first support (5) is configured move down and the second support (6) is configured move up relative to the ice maker assembly (1) upon rotation of the ice mold (2) in the second direction opposite to the first direction.

3. A cooling appliance according to any preceding claim, **characterized in that** the adjacent cavities (3) are separated by a wall (7) and that the wall comprises a crevice (8) on an upper side of the wall (7) facilitating the passage of water between adjacent cavities (3).

4. A cooling appliance according to claim 3, **characterized in that** the crevice (8) is coated with a hydrophobic material.

5. A cooling appliance according to any preceding claim, **characterized in that** the predetermined angle is between 1 - 20 degrees.

Figure 1

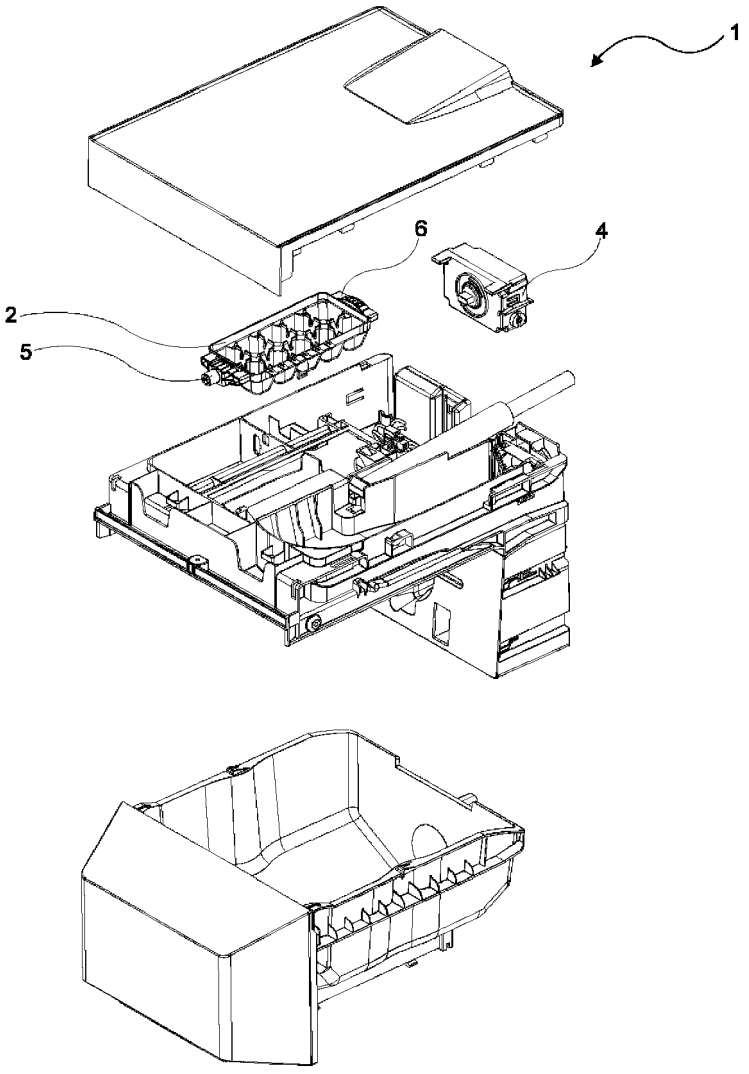
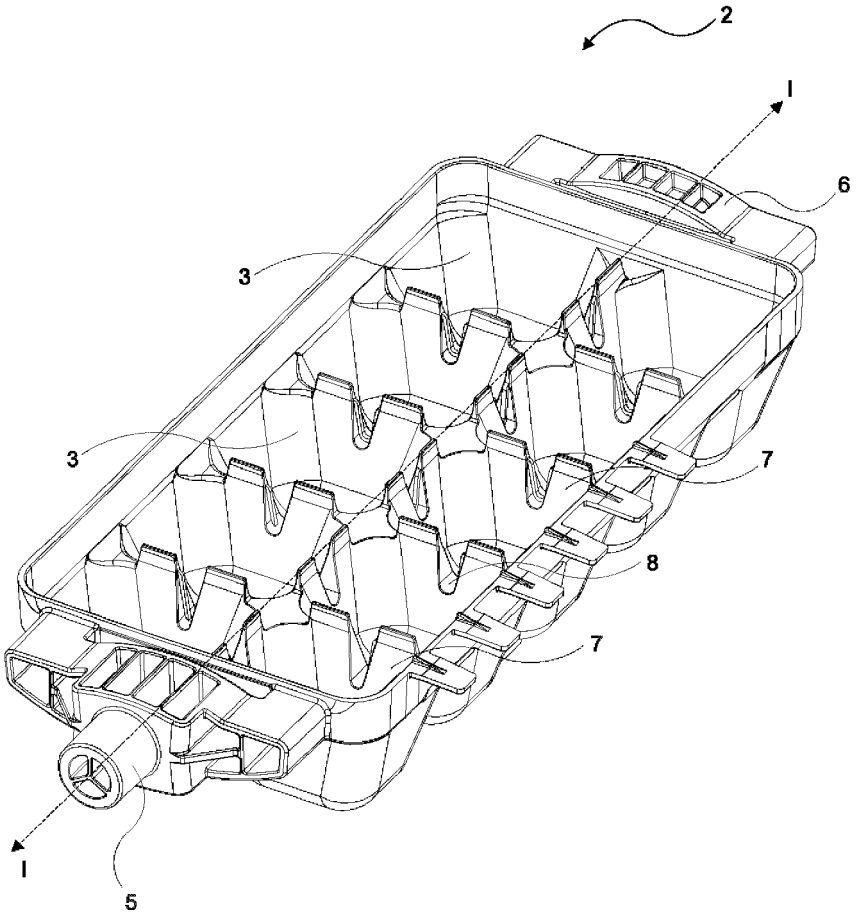


Figure 2



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Application Number
EP 21 21 7711

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	13 May 2022	Kuljis, Bruno

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