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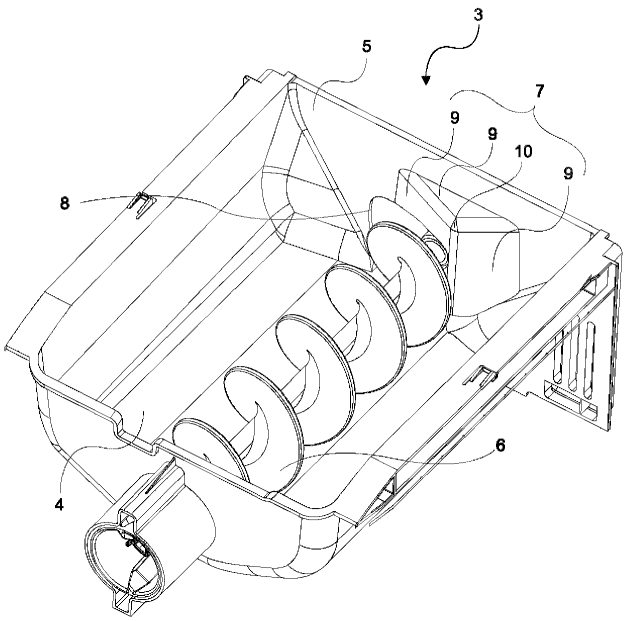
(54) **AN ICE MAKING ASSEMBLY AND A COOLING APPLIANCE HAVING THE SAME**

(57) Cooling appliance comprising an ice maker assembly (1); the ice maker assembly comprising; an ice mold (2) including plurality of cavities and configured to freeze water to produce ice pieces; a container (3) placed underneath the ice maker (2) and is configured to store the ice pieces, comprising; a bottom wall (4), a pair of side walls reciprocally extending from the bottom wall (4); a front wall (5) and a back wall configured to interconnect the said side walls; an transfer means (6) extending between the front wall (5) and the back wall which upon being rotated, is configured to transfer ice pieces towards the front wall (5), wherein the front wall (5) comprises an opening and a guide (7) configured to guide ice pieces towards the channel (8) upon activation of the transfer means (6).

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 making assembly.

[0002] The modern cooling appliances are provided with various side functions to increase their marketability. One of these functions is automated ice making assemblies. Said assemblies are generally located inside the compartment of the cooling appliances having an internal temperature lower than that of the freezing point of water. The ice making assemblies comprises an ice mold having multiple cavity used to store and freeze the water. The ice molds are located above a container that is used to store ice pieces produced by means of the ice molds. Inside the container, various means are used to transfer and move the ice pieces towards a chute provided in between the ice making assembly and the dispenser responsible for delivering the ice pieces to the user. The user activates the dispenser by pressing a button or simply by putting a glass in a designated area. Such cooling appliances come with the option and means that allows the user to change the size of the ice pieces. In some cases, wherein the user plans to use ice for preparing a cocktail, the cooling appliance delivers crushed ice pieces. On the other hand, the users generally require bigger pieces of ice to cool their drinks. When and if the user requires bigger pieces of ice, delivery of ice pieces that are crushed is unwanted and decreases the quality of the cooling appliance. Said problem is mainly caused by unintentional crushing of ice pieces inside container during activation of the transfer means and other operational parts of the cooling appliance in related to ice making.

[0003] A prior art publication in the technical field of the present invention may be referred to as US6952936B2 among others, the document disclosing a cooling appliance having an ice maker with an ice storage container wherein the said container comprises plurality of ribs utilized to guide the ice pieces.

[0004] An objective of the present invention is to provide a cooling appliance with an ice making assembly that does not crush the ice pieces unintentionally.

[0005] Another objective of the present invention is to provide a cooling appliance having an ice making assembly with improved container and transfer means life time.

[0006] 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 wherein the ice making assembly comprises an ice mold and a container located underneath the ice mold. The container is used to store ice pieces produced by the ice mold. The ice mold has an elongated shape and comprises plurality of cavities into which water is filled by means of a water feeding system. The ice mold, on predetermined time intervals, is configured to be twisted by means of a motor, therefore releasing ice pieces. The container comprises a bottom wall, two side walls vertically extending form the sides of the bottom wall, a back wall and a front wall interconnecting the side walls, thereby defining a volume into where the ice pieces are stacked. The container also comprises a transfer means that is used to move the ice pieces towards the front wall. The transfer means is activated by means of another motor. Upon activation, the transfer means starts to transfer ice pieces towards the front wall onto where an opening is provided to expel ice pieces out of the container. In addition to the part mentioned before, the container further comprises a guide provided on the front wall and in close vicinity of the opening. The guide comprises a cut out wherein the shape of the cutout is configured to match the shape of the opening. The guide is placed onto the front wall such that the opening and the cut out is aligned and forms a channel via which ice pieces are expelled upon activation of the transfer means. The guide guides the ice pieces towards the channel. By means of the guide, the ice pieces are smoothly directed towards the channel, therefore decreasing the possibility of the ice pieces being crushed between the transfer means and the front wall. This helps in providing the user with ice pieces that are intact, increasing quality of the ice pieces and therefore that of the cooling appliance.

[0007] In an embodiment of the invention, the guide forms a flush surface with the front wall. In order to facilitate movement of the ice pieces inside the container, a container having curved lines is required. By means of the said flush surface, a curved and a continuous front wall to guide surface is achieved. This helps decrease the possibility of bridge formation among the ice pieces as well as ice pieces getting stuck and crushed between transfer means and the guide.

[0008] In an embodiment of the invention, the guide is in the form of a polygon and protrudes towards the transfer means. Polygons have plurality of surface which helps decrease the possibility of ice pieces getting stuck between the transfer means and the guide.

[0009] In an embodiment of the invention, the guide comprises plurality of planar surfaces. The normal vectors of said surfaces point different directions. Meaning that each surface faces a different direction than the rest. Additionally, each surface is configured to be engaged with at least a neighboring surface along a linear line. The guide comprises an apex point where at least some of the said linear lines converge.

[0010] In an embodiment of the invention, the transfer means comprises a shaft. The shaft is fixed onto a motor from one end and penetrates the guide from the other end. The transfer means penetrates and is seated into the guide which helps create structural integrity.

[0011] In an embodiment of the invention, the angle between the surfaces of the guide and the front wall is an acute angle. This creates a curved line along the length of the front wall and helps to transfer ice pieces towards the channel in an easy manner.

[0012] In an embodiment of the invention, the guide is produced as an integral part of the front wall. This helps

create structural integrity for the container. Another advantageous effect is that the mold related costs are decreased.

[0013] In an embodiment of the invention, the guide is removable placed onto the front wall.

[0014] In an embodiment of the invention, the guide comprises plurality of protrusions that are linear in shape and extend away from the apex on the surfaces. The protrusions help guide the ice pieces towards the channel and towards the volume of the container when and if the transfer means is activated.

[0015] By means of the present invention, the ice pieces are prevented from getting stuck and in turn crushed between the transfer means and the front wall which in turn increases the size and therefore the quality of the ice pieces received by the user.

[0016] Another advantageous effect provided by means of this invention is that the mechanical stress caused by ice pieces being stuck in between the transfer means and the front wall during operation of the motor that activates the transfer means is minimized. The guide will simply divert the ice pieces towards the channel decreasing the stress on the said parts.

[0017] 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 side cross sectional view of the ice maker assembly
Figure 2 - is a side view of the container
Figure 3 - is a side view of the container with the transfer means being removed

[0018] 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. Container
4. Bottom wall
5. Front wall
6. Transfer means
7. Guide
8. Channel
9. Surface
10. Apex

[0019] The present invention relates to a cooling appliance comprising an ice maker assembly (1) wherein the ice maker assembly (1) comprises an ice mold (2) including plurality of cavities and configured to freeze water to produce ice pieces; a container (3) placed underneath the ice maker (2) and is configured to store the ice pieces, comprising; a bottom wall (4), a pair of side walls reciprocally extending from the bottom wall (4); a front wall (5) and a back wall configured to interconnect the said side walls; an transfer means (6) extending between the front wall (5) and the back wall which upon being activated, is configured to transfer ice pieces towards the front wall (5), wherein the front wall (5) comprises an opening.

[0020] In the preferred embodiment of the invention, the cooling appliance comprises a guide (7) provided on the front wall (5), and comprising a cutout in line with the opening, forming a channel (8), and wherein the guide (7) is configured to guide ice pieces towards the channel (8) upon activation of the transfer means (6). The ice maker assembly (1) comprises at least one ice mold (2). The ice mold (2) comprises plurality of cavity filled by water by means of a water transfer means. The ice maker assembly (1) also comprises a motor that is utilized to twist the ice mold (2), forcing the ice pieces out of the ice mold (2) and into the container (3). The container (3) is in the form of an open top box and comprises; the bottom wall, two side walls, the front wall (5) and the back wall defining a storage volume. The transfer means (6) is placed inside the container (3) and longitudinally extends in between the front wall (5) and the back wall. The transfer means (6) is activated by means of a secondary motor and upon being activated, starts to transfer ice pieces stored inside the container (3) towards the front wall (5). In an embodiment, the transfer means (6) is an auger. The front wall (5) comprises the opening wherein the opening transfers the ice pieces out of the container (3). The ice pieces are then transmitted to an ice dispenser provided on a door of the cooling appliance The guide (7) is provided on the front wall (5) and comprises the cutout. The guide (7) is provided on the front wall (5) such that the cutout and the opening are configured to be in line with each other, therefore forming the channel (8) for ice pieces that are transferred by means of the transfer means (6) to be transferred out of the container (3). The guide (7) at least partly surrounds the opening and therefore the channel (8) and is utilized to guide the ice pieces towards the channel (8). By means of the guide (7), the ice pieces are prevented from getting stuck and crushed between the front wall (5) and the transfer means (6). This helps obtaining larger ice pieces and at the same time, mechanical stress on the transfer means (6) and the front wall (5) is significantly decreased, which in turn increases life time of the ice maker assembly (1).

[0021] In the preferred embodiment of the invention, the guide (7) is configured to form a continuous surface with the front wall (5). By means of providing a continuous surface between the guide (7) and the front wall (5), ice pieces are prevented to jam in between an otherwise indented surface. Having a continuous surface also increases the flow of ice through the channel (8), increasing ice out take.

[0022] In the preferred embodiment of the invention, the guide (7) is in the form a polygon, protruding towards the transfer means (6). The guide (7) having a polygon geometry helps deflect the ice pieces sideways upon ac-

tivation of the transfer means (6). The ones that are deflected towards the channel (8) are then transmitted to the consumer. The rest remain inside the container (3) and are stored for future use. The guide (7) having polygonal form helps increase the ice out take of the ice maker assembly (1).

[0023] In the preferred embodiment of the invention, the guide (7) comprises a plurality of surfaces (9) having normal vectors pointing different directions, wherein each surface (9) is configured to be engaged with at least a neighboring surface (9) along a linear line and to converge at an apex (10). By means of plurality of surfaces (9) having normal vectors pointing different directions, the ice pieces are prevented to get stuck on the surfaces (9) and instead the ice pieces are deflected according to the directions of the normal vectors. The apex (10) has a convex geometry and further decreases the possibility of ice pieces getting stuck in between the guide (7) and the transfer means (6).

[0024] In the preferred embodiment of the invention, the transfer means (6) is configured to penetrate the guide (7). The transfer means (6) penetrates the guide (7) in close vicinity of the apex (10). By means of which, ice pieces are further prevented from getting crushed in between the guide (7) and the transfer means (6).

[0025] In the preferred embodiment of the invention, the surfaces (9) and the front wall (5) form an acute angle in-between. The angle between the front wall (5) and the surfaces (9) lies in the range of 5 degrees to 30 degrees.

[0026] In the preferred embodiment of the invention, the guide (7) is integral with the front wall (5). By producing the guide (7) integral with the front wall (5) provides a robust structure. Another advantageous effect provided by means of producing the guide (7) integral with the front wall (5) is that the mold related costs are decreased.

[0027] In the preferred embodiment of the invention, the guide (7) is removable placed on to the front wall (5). By means of producing guide (7) as a separate part, allows the user to replace a broken guide (7) easily, therefore decreasing maintenance related costs.

[0028] In the preferred embodiment of the invention, the surfaces (9) comprise plurality of linear protrusions pointing away from the apex (10). Each surface (9) comprises plurality of linear protrusions, starting in close vicinity of the apex (10) and stretch out as the distance to the apex (10) increases.

[0029] An advantageous effect provided by means of the invention is that the ice pieces stored inside container (3) are prevented to get stuck in between the transfer means (6) and the front wall (5) upon activation of the transfer means (6) by means of the guide (7). This prevents the ice pieces from getting crushed, thus increasing the quality and size of ice pieces.

[0030] Another advantageous effect provided by means of the ice pieces being prevented to get stuck in between the transfer means (6) and the front wall (5) is that the load on the motor activating the transfer means (6) is decreased, which in turn helps increase life time of the motor.

[0031] Another advantageous effect provided by means of the ice pieces being prevented to get stuck in between the transfer means (6) and the front wall (5) is that the mechanical stress on the transfer means (6) and the front wall (5) is decreased. This helps reduce structural cracks on the transfer means (6) and the front wall (5) increasing life time of the said parts.

Claims

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

   an ice mold (2) including plurality of cavities and configured to freeze water to produce ice pieces;
   a container (3) placed underneath the ice maker (2) and is configured to store the ice pieces, comprising;
   a bottom wall (4), a pair of side walls reciprocally extending from the bottom wall (4); a front wall (5) and a back wall configured to interconnect the said side walls;
   an transfer means (6) extending between the front wall (5) and the back wall which upon being activated, is configured to transfer ice pieces towards the front wall (5), wherein the front wall (5) comprises an opening,
   characterized by
   a guide (7) provided on the front wall (5), and comprising a cutout in line with the opening, forming a channel (8), and wherein the guide (7) is configured to guide ice pieces towards the channel (8) upon activation of the transfer means (6).

2. A cooling appliance according to claim 1, **characterized in that** the guide (7) is configured to form a continuous surface with the front wall (5).

3. A cooling appliance according to any preceding claim, **characterized in that** the guide (7) is in the form a polygon, protruding towards the transfer means (6).

4. A cooling appliance according to any preceding claim, **characterized in that** the guide (7) comprises a plurality of surfaces (9) having normal vectors pointing different directions, wherein each surface (9) is configured to be engaged with at least a neighboring surface (9) along a linear line and to converge at an apex (10).

5. A cooling appliance according to any preceding claim, **characterized in that** the transfer means (6) is configured to penetrate the guide (7).

6. A cooling appliance according to claims 4 to 5, **characterized in that** the surfaces (9) and the front wall (5) form an acute angle in-between.

7. A cooling appliance according to any preceding claim, **characterized in that** the guide (7) is integral with the front wall (5).

8. A cooling appliance according to claims 1 to 7, **characterized in that** the guide (7) is removable placed on to the front wall (5).

9. A cooling appliance according to claims 4 to 8, **characterized in that** the surfaces (9) comprise plurality of linear protrusions pointing away from the apex (10).

Figure 1

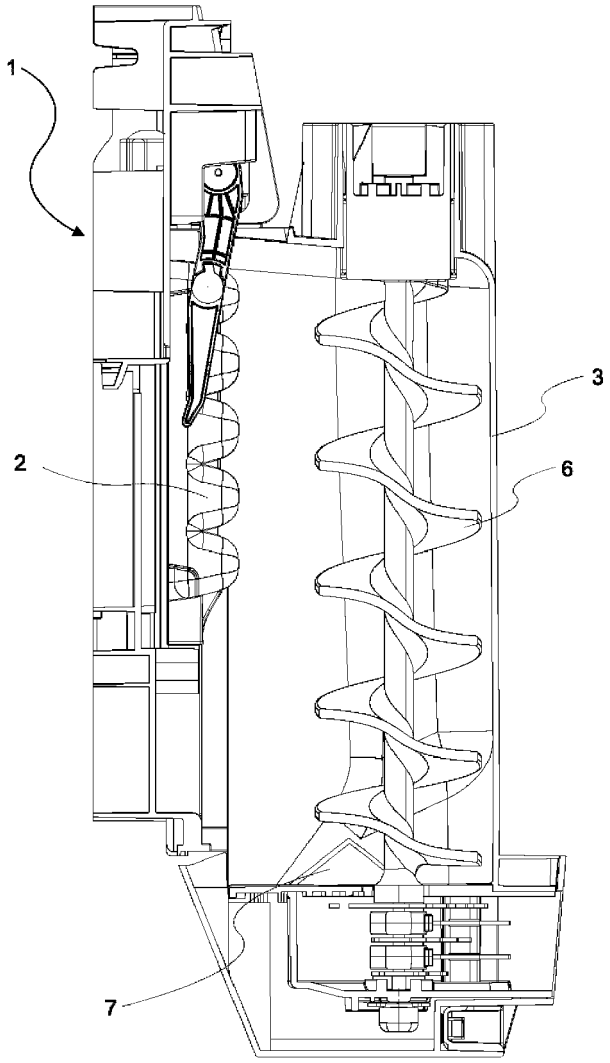


Figure 2

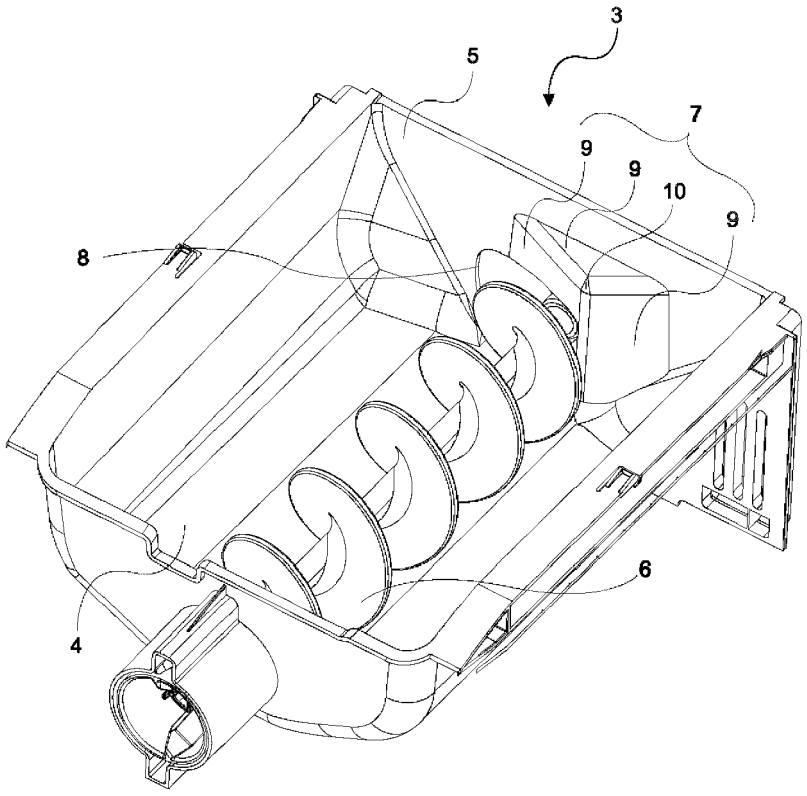
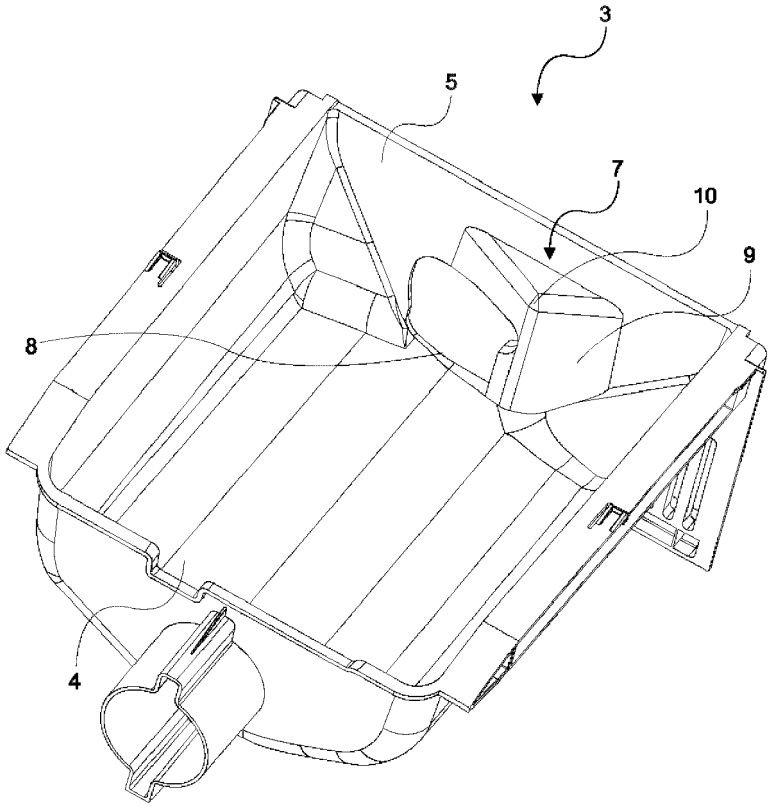


Figure 3



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EUROPEAN SEARCH REPORT

Application Number
EP 21 18 7572

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 2011/126576 A1 (JEONG KYUNG HAN [KR]) 2 June 2011 (2011-06-02) * abstract; figures 1-3 * * paragraphs [0054], [0077], [0079] *	1-9	INV. F25C5/20 ADD. F25C5/182
X	US 2019/204001 A1 (SCALF ERIC [US]) 4 July 2019 (2019-07-04) * abstract; figures 17, 19 *	1-4,7	

TECHNICAL FIELDS SEARCHED (IPC)
F25C

1 The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	12 January 2022	Yousufi, Stefanie

CATEGORY OF CITED DOCUMENTS

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EPO FORM 1503 03.82 (P04C01)

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12-01-2022

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2011126576 A1	02-06-2011	KR 20110060323 A	08-06-2011
		US 2011126576 A1	02-06-2011
US 2019204001 A1	04-07-2019	NONE	

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- US 6952936 B2 **[0003]**