(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 3 971 497 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
23.03.2022 Bulletin 2022/12

(21) Application number: **21187571.1**

(22) Date of filing: **25.07.2021**

(51) International Patent Classification (IPC):
F25C 5/185 *(2018.01)* ***F25C 5/20*** *(2018.01)*
F25C 1/24 *(2018.01)*

(52) Cooperative Patent Classification (CPC):
F25C 5/185; F25C 5/24; F25C 1/24

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
KH MA MD TN

(30) Priority: **16.09.2020 TR 202014679**

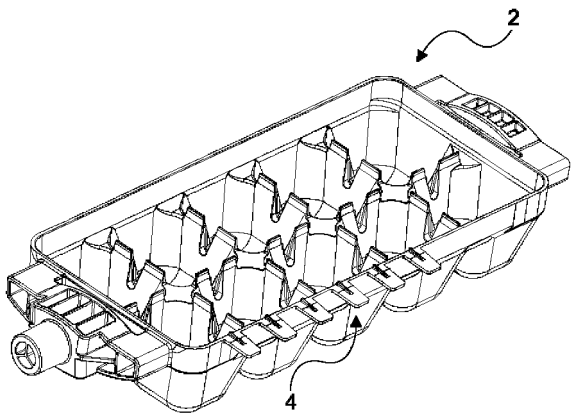
(71) Applicant: **Arçelik Anonim Sirketi**
34445 Istanbul (TR)

(72) Inventors:
- **KARAAGAC, Emre**
  34445 ISTANBUL (TR)
- **GUNDUZ, Nihat**
  34445 ISTANBUL (TR)
- **YAYLA, Sonat**
  34445 ISTANBUL (TR)
- **CENESIZ, Kaan**
  34445 ISTANBUL (TR)

(54) **AN ICE MAKING ASSEMBLY HAVING AN ICE DISTRIBUTION MEANS**

(57) Cooling appliance comprising an ice maker assembly (1); the ice maker assembly (1) comprising; an ice mold (2) including a plurality of three dimensional cavities, placed into the ice maker assembly (1) and configured to rotate about a longitudinal axis; a container (3) placed underneath the ice mold (2) and configured to store ice; a guide (4) at least partly extending longitudinally along a side on the ice mold (2), which upon rotation of the ice mold (2) is configured to contact and distribute ice inside the container (3).

Figure 2



EP 3 971 497 A1

Description

[0001] The present invention relates to an ice making assembly, in particular to an ice making assembly having an ice distribution means.

[0002] The modern cooling appliances are provided with various side functions to increase their marketability. One of these functions is automatic 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. The ice mold is filled with water and after a certain amount of time, the ice mold is rotated or twisted, thereby releasing ice stored inside the ice mold. Under normal circumstances, the ice mold is refilled until the container is filled completely with ice. The level of ice is detected by means of an ice level arm, provided in close vicinity of the ice mold. The ice level arm pivots downwards and into the container and upon contacting the ice, the movement of the ice level arm stops. As a result, the depth of the ice inside the container is measured. In conventional ice making assemblies, the ice mold and the container extends longitudinally. The ice mold is located above the container and is configured to drop ice onto the middle section of the container. As a result, ice tends to pile in the middle of the container whereas the volume close to the side walls of the container remains empty. Therefore, the ice level arm detects the ice level at the middle of the container. This causes the problem of underutilization of the container.

[0003] A prior art publication in the technical field of the present invention may be referred to as US2004237563A1 among others, the document disclosing a cooling appliance having an ice maker.

[0004] A prior art publication in the technical field of the present invention may be referred to as DE102018200079A1 among others, the document disclosing a cooling appliance having an ice maker with an ice storage container and wherein the ice mold is rotatable placed above the container.

[0005] An objective of the present invention is to provide an ice making assembly having a means to distribute the ice inside the container homogenously, therefore, increasing the effective storage capacity of the ice making assembly.

[0006] Another objective of the present invention is to decrease the volumetric capacity of the container, therefore increasing usable volume of the cooling appliance.

[0007] 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. A guide is provided on a side wall of the ice mold and extends longitudinally at least partly along the length of the ice mold. The guide, upon rotation of the ice mold contacts the ice that is stored inside the container and pushes the ice towards the empty volume closer to the edges of the container. As a result, ice is prevented to pile up in the shape of a pyramid inside the container, instead ice is stored homogeneously inside the container.

[0008] In an embodiment of the invention, the guide comprises plurality of ribs extending away from the ice mold. The wings are the means that contacts the ice stored inside the container. The length of the wings can be changed according to the physical properties of the ice making assembly.

[0009] In an embodiment of the invention, the wings are aligned along the guide and are separated from each other by a gap. The length of the gap is configured to be smaller than the dimensions of ice produced. The dimensions of ice are determined by the dimensions of the cavity. By means of the gap being smaller than the dimensions of the ice, it is ensured that ice cannot slip in between the gap. Meanwhile having a gap along the guide decreases material and related costs.

[0010] In an embodiment of the invention, the guide comprises a rib that extends lengthwise along the wings. The ribs provide structural support for the wings, therefore increasing their lifetime.

[0011] In an embodiment of the invention, the guide is produced as an integral part of the ice mold. Producing said parts as a single part reduces the cost related to molds.

[0012] In an embodiment of the invention, the guide is produced as a separate part and is removable placed onto the ice mold. As a result, the user may easily replace the guide in the event of breakage of the guide.

[0013] In an embodiment of the invention, the wing is telescopic. As the ice mold starts to rotate, the wing automatically extends under the effect of gravity and sweeps a larger volume of ice. As the ice mold starts to rotate to its first orientation position, the wings contact the inner parts of the ice making assembly and are forced to be extracted.

[0014] An advantageous effect provided by means of the guide is that the volume inside the container is used to its maximum capacity. Piling of ice inside the container is prevented. This allows the manufacturer to use a smaller container thereby increasing the usable volume of the cooling appliance.

[0015] 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 view of the ice maker assembly
Figure 2 - is a side view of the ice mold
Figure 3 - is an exploded view of the ice maker assembly
Figure 4 - is a cross sectional view of the ice maker assembly along the dashed lines in Fig-1, wherein the ice mold is in the first orientation
Figure 5 - is a cross sectional view of the ice maker assembly along the dashed lines in Fig-1, wherein the ice mold is in the second orientation
Figure 6 - is a side view of the wing

[0016] 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. Guide
5. Wing
6. Rib

[0017] The present invention relates to a cooling appliance comprising an ice maker assembly (1); the ice maker assembly (1) comprising; an ice mold (2) including a plurality of three dimensional cavities, placed into the ice maker assembly (1) and configured to rotate about a longitudinal axis; a container (3) placed underneath the ice mold (2) and configured to store ice.

[0018] In the preferred embodiment of the invention, the ice maker assembly (1) comprises a guide (4) at least partly extending longitudinally along a side on the ice mold (2), which upon rotation of the ice mold (2) is configured to contact and distribute ice inside the container (3). The ice mold (2) is mainly composed of a pair of longitudinal side walls and another pair of walls that are shorter than the side wall and interconnecting the side walls. The ice mold (2) also comprises a bottom wall, thereby a defining a volume into which the water to be frozen is filled. The volume is further divided into smaller cavities by means of intermediate walls. The ice mold (2) is filled and after a predetermined time passes, the water stored will be frozen thus creating ice. The container (3) lies below the ice mold (2) and stores ice, produced by the ice making assembly (1). Ice mold (2) has two different orientations. The first orientation is during which the cavities face upwards direction and allows water to be stored in them. After the water is frozen, the ice mold (2) changes its orientation from the first orientation to the second orientation, meaning that the cavities face the container (3). During the change from the first orientation to the second orientation, the ice mold is rotated by an angle in between 145 degrees and 180 degrees. Ice that is formed inside the ice mold (2) is released by means of a motor rotating and twisting the ice mold (2). Therefore, ice is released from the said cavities and fall into the container (3). Due to the stationary location of the ice mold (2), ice tends to pile up forming a pyramidal stack inside the container (3). The guide (4) is provided along a side wall of the ice mold (2) and rotates along with the ice mold (2). During rotation, the guide (4) contacts the pile of ice inside the container (3) and pushes the top part of the ice towards the empty volume of the container (3). As a result, inner volume of the container (3) is utilized with a maximum efficiency.

[0019] In the preferred embodiment of the invention, the guide (4) comprises a plurality of wings (5). The wings (5) are in the form of protrusions that extend away from the ice mold (2). In an embodiment, the shape of the wings (5) is oval. In another embodiment, the shape of the wings (5) is rectangular. The wings (5) contact the ice stored inside the container (3) as the ice mold (2) starts to rotate. As a result, ice is distributed homogenously inside the container (3).

[0020] In the preferred embodiment of the invention, the consecutive wings (5) are separated by a gap wherein the length of the gap is equal or smaller than the smallest dimension of the cavity of the ice mold (2). The cavity of the ice mold (2) has three dimensions and forms ice according to these dimensions, these dimensions being width, height and depth. The gap is smaller than width, height and depth of the cavities. As a result, as the ice mold (2) and therefore the guide (4) starts to rotate, ice stored inside the container (2) cannot slip through the gap in between the wings (5). This helps increase the effectiveness of the guide (4), meanwhile minimizing material related costs.

[0021] In the preferred embodiment of the invention, the guide (4) comprises a rib (6) that is configured to extend lengthwise on the wings (5). The rib (6) is in the form of a linear protrusion and is provided on the surface of the wing (5). The rib (6) extends almost along the length of the wing (5) providing structural support and a robust wing (5). By means of the ribs (6), the wings (5) can withstand higher mechanical loads. As a result, breakage of the wings (5) is prevented.

[0022] In a preferred embodiment of the invention, the guide (4) is an integral part of the ice mold (2).

[0023] In an embodiment, the guide (4) is produced as a single part with the ice mold (2). As a result, mold related costs are decreased.

[0024] In a preferred embodiment of the invention, the guide (4) is removable placed onto the ice mold (2). In another embodiment, the guide (4) is produced as a single part. The guide (4), in this case, is in the shape of a comb comprising a shaft that holds the row of wings (5). The guide is slidably inserted into a slit provided on the side wall of the ice mold (2). As a result, the user may easily replace the guide (4) or the wings (5) should they get broken. Therefore, maintenance related costs are decreased.

[0025] In the preferred embodiment of the invention, the wing (5) is telescopic and is configured to lengthen

upon rotation of the ice mold (2). As the orientation of the ice mold (2) changes from the first to the second orientation, the gravity forces the wing (5) to do telescopic motion. In the opposite case, wherein the orientation of the ice mold (2) changes from the second to the first orientation, the wings (5) contact the inner parts of the ice making assembly (1) and are forced to slide into itself.

[0026] An advantageous effect provided by means of the guide (4) is that the ice stored inside container (3) are prevented to pile up, which in turn increases the efficiency of storage of ice inside the container (3). As a result, the users are provided with an ice making assembly (1) having increased ice storage capacity.

[0027] Another advantageous effect provided by means of the guide (4) is that the volume and height of the container (3) can be decreased, therefore increasing internal storage capacity of the cooling appliance.

Claims

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

   an ice mold (2) including a plurality of three dimensional cavities, placed into the ice maker assembly (1) and configured to rotate about a longitudinal axis;
   a container (3) placed underneath the ice mold (2) and configured to store ice; **characterized by**

   a guide (4) at least partly extending longitudinally along a side on the ice mold (2), which upon rotation of the ice mold (2) is configured to contact and distribute ice inside the container (3).

2. A cooling appliance according to claim 1, **characterized in that** the guide (4) comprises a plurality of wings (5).

3. A cooling appliance according to claim 2, **characterized in that** the consecutive wings (5) are separated by a gap wherein the length of the gap (d) is equal or smaller than the smallest dimension of the cavity of the ice mold (2).

4. A cooling appliance according to claims 2 to 3, **characterized in that** the guide (4) comprises a rib (6) configured to extend lengthwise on the wings (5).

5. A cooling appliance according to any preceding claim, **characterized in that** the guide (4) is an integral part of the ice mold (2).

6. A cooling appliance according to claims 1 to 5, **characterized in that** the guide (4) is removable placed onto the ice mold (2).

7. A cooling appliance according to claims 2 to 6, **characterized in that** the wing (5) is telescopic and is configured to lengthen upon rotation of the ice mold (2).

Figure 1

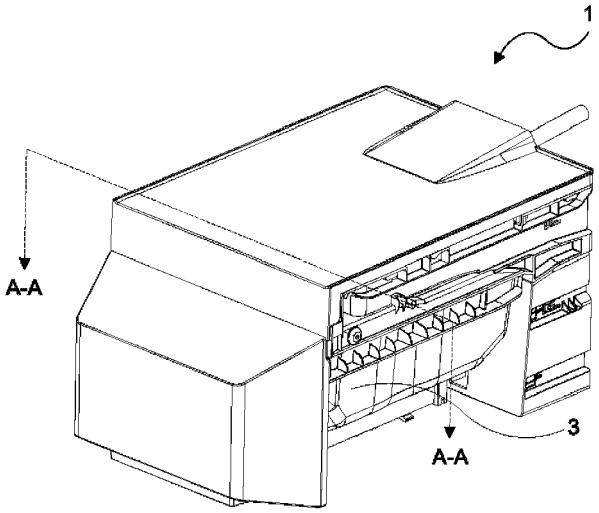


Figure 2

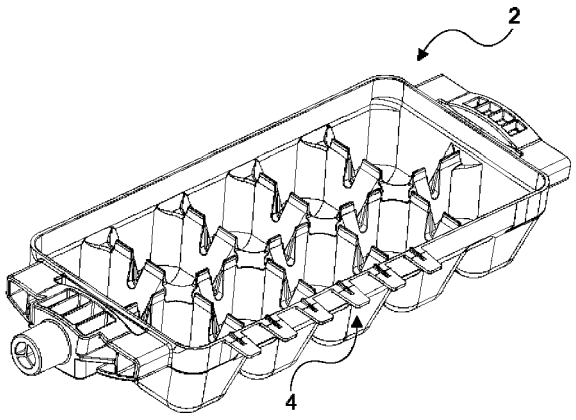


Figure 3

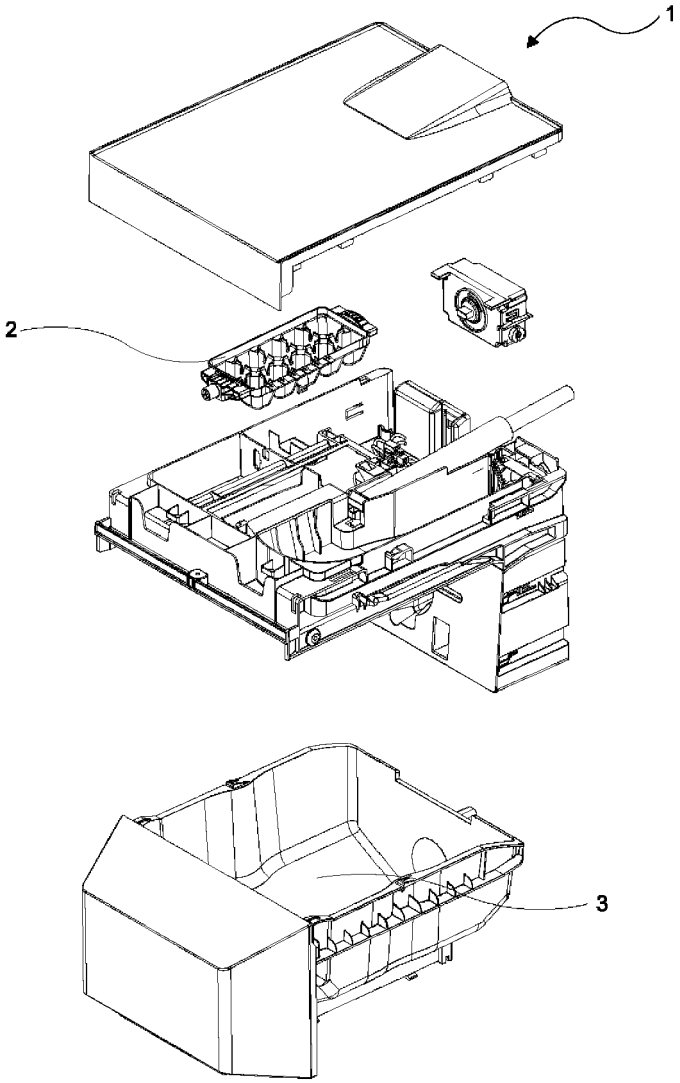


Figure 4

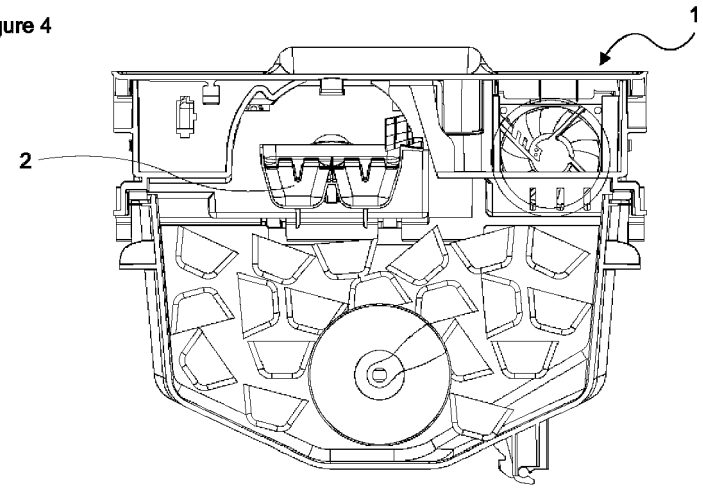


Figure 5

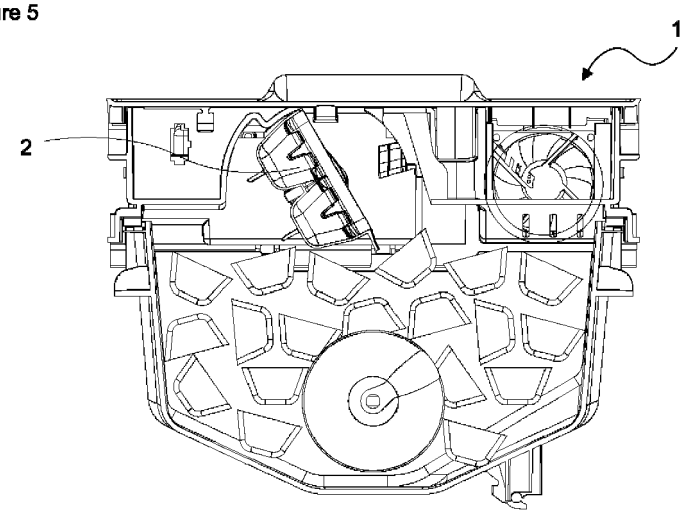
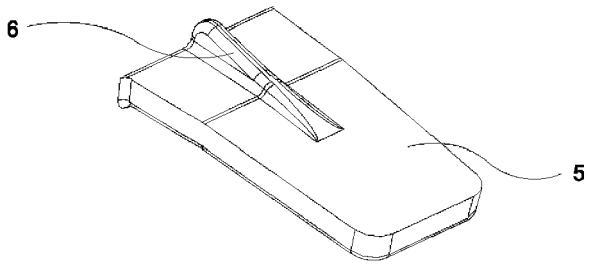


Figure 6



Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 21 18 7571

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	JP H04 257677 A (TOSHIBA CORP) 11 September 1992 (1992-09-11) * abstract; figure 5 *	1-7	INV. F25C5/185 F25C5/20
X	WO 2006/137038 A1 (ARCELIK AS [TR]; CELIK RIDVAN KADIR [TR] ET AL.) 28 December 2006 (2006-12-28) * abstract; figures 6-10 *	1-7	ADD. F25C1/24
X	JP H02 126069 A (MATSUSHITA REFRIGERATION) 15 May 1990 (1990-05-15) * abstract; figure 2 *	1-7	
X	KR 2015 0099913 A (LG ELECTRONICS INC [KR]) 2 September 2015 (2015-09-02) * abstract; figures 4, 7 *	1-7	
X	US 3 029 609 A (ZEARFOSS JR ELMER W) 17 April 1962 (1962-04-17) * abstract; figures 1-7 *	1-7	
			TECHNICAL FIELDS SEARCHED (IPC) F25C F25D

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

Place of search	Date of completion of the search	Examiner
The Hague	11 January 2022	Yousufi, Stefanie

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 21 18 7571

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

11-01-2022

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
JP H04257677 A	11-09-1992	JP H04257677 A	11-09-1992
		KR 920016800 A	25-09-1992
WO 2006137038 A1	28-12-2006	TR 200708579 T1	23-06-2008
		WO 2006137038 A1	28-12-2006
JP H02126069 A	15-05-1990	NONE	
KR 20150099913 A	02-09-2015	NONE	
US 3029609 A	17-04-1962	NONE	

EPO FORM P0459

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

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- US 2004237563 A1 **[0003]**
- DE 102018200079 A1 **[0004]**