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(54) **A CRASHED ICE MAKING MACHINE AND REFRIGERATOR WHEREIN THE SAME IS USED**  
**MASCHINE ZUR HERSTELLUNG VON ZERSTOSSENEM EIS UND KÜHLSCHRANK DAMIT**  
**MACHINE À GLACE PILÉE ET RÉFRIGÉRATEUR L'UTILISANT**

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(56) References cited:  
**WO-A2-2010/131867 FR-A- 1 207 229**  
**US-A- 2 721 452 US-A- 3 861 163**  
**US-A- 4 261 182 US-B1- 6 220 038**

**EP 2 941 606 B1**

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## Description

**[0001]** The present invention relates to a crashed ice making machine and a refrigerator wherein the same is used.

**[0002]** Producers of white goods design a large number of different types of crashed ice making machines and refrigerators wherein the same is used in order to meet the crashed ice need of consumers. The crashed ice making machines occupy large space due to their complex structures and reduce the usable volume of the refrigerators. Since the consumers prefer refrigerators with large inner volumes, producers of white goods prefer using small crashed ice making machines in refrigerators. Small crashed ice making machines produce limited crashed ice and cannot fully meet the need of consumers.

**[0003]** In order to solve this problem, producers of white goods design crashed ice making machines that are plain in mechanical terms and that occupy less space.

**[0004]** In the state of the art International Patent Application No. WO2010/131867A2, an ice maker is described, having a driving unit and wherein a single electric motor that enables the ice separating unit and the ice elevating unit to be driven. A crashed ice making machine according to the preamble of claim 1 is known from FR1207229.

**[0005]** The aim of the present invention is the realization of a crashed ice making machine that is plain in mechanical terms and can be operated efficiently, that occupies a small space, that does not reduce the inner volume of the refrigerator and efficiently meets the crashed ice need of the user.

**[0006]** The crashed ice making machine realized in order to attain the aim of the present invention, explicated in the attached claims is suitable to be used in a refrigerator and comprises an ice dispensing mechanism having more than one pushing mechanism that are placed into the partition so as to linearly rise and descend between the base portion and the inlet portion of the ice container, that moves upwards when driven forwards by the driving mechanism and thus pushes and enables the ice to be dispensed from the ice container and that moves downwards when driven backwards by the driving mechanism and thus discharges the partition in order to fill in water. Thus, the entire inner volume of the partition is enabled to be used for making ice. Moreover, the entire ice formed in the ice container is enabled to be dispensed from the ice container. Thus, when fresh water is filled into the partition in the next crashed ice making cycle, water is not added onto the remainder ice remaining inside the partition contrary to the case with the present crashed ice making machines. Consequently, the crashed ice need of the user is provided with the frozen fresh water in each cycle.

**[0007]** In the present invention, the ice container comprises more than one partition wherein water can be filled. Ice can be formed separately in each partition with the

water filled into the ice container partitions being frozen in the cold environment. Moreover, the ice dispensing mechanism comprises more than one pushing mechanism, each placed into one partition so as to linearly rise and descend between the base portion and the inlet portion of the partition. When driven forwards by the driving mechanism, each pushing mechanism rises and thus pushes and dispenses the ice from the partition. Furthermore, when driven backwards by the driving mechanism, each pushing mechanism descends and discharges the partition in order to fill in water. Thus, the inner volumes of the ice container partitions are enabled to be used more effectively. Consequently, a large amount of crashed ice can be formed and the crashed ice need of the user can be efficiently met.

**[0008]** In an embodiment of the present invention, the ice cutting mechanism comprises an ice cutting blade that is placed at the inlet portion of the ice container and provides crashed ice by rotating and cutting the ice pushed out of the ice container. Thus, the ice is enabled to be cut while being pushed out of the ice container.

**[0009]** In an embodiment of the present invention, the lower surface of the ice cutting blade is realized so as to be seated onto the inlet of the ice container in a flat manner. Thus, the ice cutting blade is enabled to be operated in a balanced manner and safely driven. The upper surface of the ice cutting blade is inclined. Thus, the ice can be cut as thin layers.

**[0010]** In an embodiment of the present invention, the driving mechanism comprises a motor and a transmission mechanism that can be rotated by the motor and that has at least one worm and at least one gear placed outside the ice container partitions. Thus, the entire inner volume of the partition is enabled to be used for making ice. The transmission mechanism drives both the ice cutting mechanism and each pushing mechanism. Each pushing mechanism is driven by the transmission mechanism so as to rise and descend in the ice container. The ice cutting mechanism is driven by the transmission mechanism so as to cut the ice pushed out of the ice container by rotating. Thus, a crashed ice making machine that operates efficiently and that is plain in mechanical terms is obtained. In an embodiment of the present invention, the transmission mechanism comprises a worm. The worm is placed outside the ice container partitions so that the rotational axis thereof is parallel to the axis of the ice container partitions in the base-inlet direction. Thus, the crashed ice making machine is enabled to have a small width and to occupy a small space.

**[0011]** In an embodiment of the present invention, the ice cutting mechanism that cuts the ice pushed out of the ice container by rotating is connected to the end of the worm so as to pass over the inlet portion of the ice container partitions. Thus, an ice cutting mechanism that operates efficiently and that is plain in mechanical terms is obtained. Moreover, the cutting mechanism can be more easily serviced and repaired.

**[0012]** In an embodiment of the present invention, the

ice cutting mechanism is placed so that the rotational plane thereof is parallel to the plane formed by the inlet portions of the ice container partitions. Moreover, the ice container partitions are placed at equal intervals around the rotational axis of the ice cutting mechanism. Thus, the crashed ice making machine is enabled to occupy a small space.

**[0013]** In an embodiment of the present invention, each partition is realized as a receptacle that extends linearly in the base-inlet direction. The cross-section of each partition remains stationary along the axis thereof in the base-inlet direction. Thus, there is no unusable volume left between the partitions. Moreover, the crashed ice making machine is enabled to occupy a small space.

**[0014]** In another embodiment of the present invention, the cross-section of each ice container partition widens from the base portion towards the inlet portion along the axis thereof in the base-inlet direction. Thus, after being pushed and separated from the ice container partitions, the ice is enabled to be easily pushed out of the ice container partitions. Moreover, in the case that water is filled into the partition without taking the entire ice out of the ice container, the remainder ice is enabled to rise freely towards the inlet portion of the ice container, to freeze together with the newly forming ice at a position close to the inlet portion and to be cut firstly at the next cycle, thereby providing crashed ice. Thus, the remainder ice is prevented from getting stuck to the base of the ice container and remaining at the base of the ice container for a long time. Consequently, dirt accumulation in the ice container is prevented.

**[0015]** In another embodiment of the present invention, the cross-section of each ice container partition perpendicular to the axis thereof in the base-inlet direction is configured preferably in circular, triangular, square, rectangular or trapezoidal form. Thus, thin ice layers obtained by cutting have proper shapes. Thus, the ice container volume is enabled to be used more effectively in order to make ice.

**[0016]** In an embodiment of the present invention, the ice container comprises an inlet port that opens to at least one partition and that enables water to be filled into the partition. Moreover, the ice container comprises water passage openings that enable the water to pass from one partition to another partition. Thus, the ice container is enabled to be filled with water before the next crashed ice making cycle.

**[0017]** In the present invention, the pushing mechanism is realized by means of a pushing shaft that extends into the partition through an opening formed at the base portion of the ice container and skidded to the ice container opening over a sealing element so as to rise and descend. When the portion of the pushing shaft remaining outside the ice container is driven upwards by the driving mechanism, the portion thereof remaining inside the partition rises, pushes the ice towards the partition inlet and out of the partition. When the portion of the pushing shaft remaining outside the ice container is driven

downwards by the driving mechanism, the portion thereof remaining inside the partition descends and discharges the partition in order to fill in water. It is not compulsory for the pushing mechanism to be composed of a pushing shaft. In another embodiment of the present invention, the pushing mechanism comprises more than one gear-shaft that is placed at the base portion of the partition and that can open/close telescopically, one being screwed onto the other so as to rotate freely around an axis perpendicular to the partition base. When driven forwards by the driving mechanism, the gear-shafts change from a closed position to a telescopically open position and push the ice out of the ice container. When driven backwards by the driving mechanism, the gear-shafts changes from the telescopically open position to the closed position and discharges the partition in order to fill in water. Thus, the entire inner volume of the partition is enabled to be used for making ice. Moreover, the entire ice formed in the ice container is enabled to be pushed out of the ice container. Moreover, the crashed ice making machine is enabled to occupy a small space.

**[0018]** In the present invention, the ice container comprises more than one partition wherein water can be filled. A pushing mechanism is provided in each partition. Each pushing mechanism is realized by means of a pushing shaft that extends into the partition through an opening formed at the base portion of the partition and skidded to the partition opening over a sealing element so as to rise and descend. Moreover, the ice dispensing mechanism comprises a geared or screwed shaft carrier driven by the driving mechanism and whereon the pushing shafts are fixed. In another embodiment of the present invention, the pushing mechanism in each partition comprises more than one gear-shaft that is placed at the base portion of the partition and that can open/close telescopically, one being screwed onto the other so as to rotate freely around an axis perpendicular to the partition base.

**[0019]** In an embodiment of the present invention, the crashed ice making machine comprises a stopping mechanism that limits the forwards-backwards movement of the shaft carrier. Thus, the crashed ice making machine is enabled to be operated in a safe manner.

**[0020]** In an embodiment of the present invention, the stopping mechanism comprises a stopper realized as a first flange that is situated on the shaft carrier and that limits the forwards movement of the shaft carrier. In an embodiment of the present invention, the stopping mechanism furthermore comprises a second stopper realized as a second flange that is situated on the lower side of the worm in the driving mechanism and that limits the backwards movement of the shaft carrier. Thus, the forwards-backwards movement of the shaft carrier is limited.

**[0021]** In an embodiment of the present invention, the refrigerator comprises a freezing compartment, a crashed ice making machine of the present invention placed into the freezing compartment, a control unit that controls the driving mechanism of the crashed ice making

machine and the water filling mechanism filling the ice container with water, and a crashed ice collection receptacle that is stationary or detachable, that can be accessed from inside or outside the refrigerator and wherein crashed ice pieces produced by the crashed ice making machine are collected. Thus, the user is enabled to easily reach the crashed ice pieces.

**[0022]** By means of the present invention, a crashed ice making machine is realized, that is plain in mechanical terms and can be operated efficiently, that occupies a small space, that does not reduce the inner volume of the refrigerator and efficiently meets the crashed ice need of the user.

**[0023]** The model embodiments relating to the crashed ice making machine realized in order to attain the aim of the present invention are illustrated in the attached figures, where:

Figure 1 - is a perspective view of the crashed ice making machine with its components separated in an embodiment of the present invention.

Figure 2 - is a perspective view of the crashed ice making machine in an embodiment of the present invention.

Figure 3 - is another perspective view of the crashed ice making machine in an embodiment of the present invention.

**[0024]** The elements illustrated in the figures are numbered as follows:

1. Crashed ice making machine
2. Ice cutting blade
3. Blade fixing member
4. Ice container
5. Partition
6. Inlet port
7. Sealing element
8. Ice pushing shaft
9. Shaft carrier
10. First flange
11. Transmission mechanism
12. Second flange
13. Motor

**[0025]** In all embodiments of the present invention, the crashed ice making machine (1) comprises an ice container (4) having at least one partition (5) wherein water can be filled and that enables ice to be formed by the water filled therein being frozen in the cold environment; an ice dispensing mechanism that enables the ice to be pushed out of the ice container (4) and that has a sealing element (7), at least one ice pushing shaft (8), a shaft carrier (9) and a first flange (10); an ice cutting mechanism that is placed at the inlet portion of the ice container (4), that cuts the ice pushed out of the ice container (4) by rotating thus providing crashed ice and that has an ice cutting blade (2) and a blade fixing member (3); and

a driving mechanism that drives the ice dispensing mechanism and the ice cutting mechanism and that has a transmission mechanism (11), a second flange (12) and a motor (13) (Figure 1, Figure 2, Figure 3).

**[0026]** In all embodiments of the present invention, the crashed ice making machine (1) comprises an ice dispensing mechanism having at least one pushing mechanism that is placed into the partition (5) so as to linearly rise and descend between the base portion and the inlet portion of the ice container (4), that moves upwards when driven forwards by the driving mechanism and thus pushes and enables the ice to be dispensed from the ice container (4) and that moves downwards when driven backwards by the driving mechanism and thus discharges the partition (5) in order to fill in water (Figure 2, Figure 3). Thus, the entire inner volume of the partition (5) is enabled to be used for making ice (Figure 2, Figure 3). Moreover, the entire ice formed in the ice container (4) is enabled to be dispensed from the ice container (4). Thus, when fresh water is filled into the partition (5) in the next crashed ice making cycle, water is not added onto the remainder ice remaining inside the partition (5) contrary to the case with the present crashed ice making machines. Consequently, the crashed ice need of the user is provided with the frozen fresh water in each cycle.

**[0027]** In an embodiment of the present invention, the ice container (4) comprises more than one partition (5) wherein water can be filled (Figure 2, Figure 3). Ice can be formed separately in each partition (5) with the water filled into the ice container (4) partitions (5) being frozen in the cold environment. Moreover, the ice dispensing mechanism comprises more than one pushing mechanism, each placed into one partition (5) so as to linearly rise and descend between one base portion and one inlet portion of the partition (5) (Figure 1, Figure 2, Figure 3). When driven forwards by the driving mechanism, each pushing mechanism rises and thus pushes and dispenses the ice from the partition (5) (Figure 1, Figure 2, Figure 3). Moreover, when driven backwards by the driving mechanism, each pushing mechanism descends and discharges the partition (5) in order to fill in water (Figure 1, Figure 2, Figure 3). Thus, the inner volumes of the ice container (4) partitions (5) are enabled to be used more effectively. Consequently, a large amount of crashed ice can be formed and the crashed ice need of the user can be efficiently met. The crashed ice making machine (1) shown in the figures has preferably seven partitions (5). However, the number of partitions (5) is not limited to seven. A single partition (5) is sufficient.

**[0028]** In an embodiment of the present invention, the ice cutting mechanism comprises an ice cutting blade (2) that is placed at the inlet portion of the ice container (4) and provides crashed ice by rotating and cutting the ice pushed out of the ice container (4) (Figure 1, Figure 3). Thus, the ice is enabled to be cut while being pushed out of the ice container (4). The said cutting blade (2) is preferably produced from steel. The width of the ice cutting

blade (2) is sized so as to fit into the region between two partitions (5). Thus, while the ice cutting blade (2) is rotating, the ice can be pushed out of the ice container (4).

**[0029]** In an embodiment of the present invention, a lower surface of the ice cutting blade (2) is realized so as to be seated onto the inlet of the ice container (4) in a flat manner (Figure 3). Thus, the ice cutting blade (2) is enabled to be operated in a balanced manner and safely driven. An upper surface of the ice cutting blade (2) is inclined ( $\theta$ ) (Figure 3). Thus, the ice can be cut as thin layers.

**[0030]** In an embodiment of the present invention, the driving mechanism comprises a motor (13) and a transmission mechanism (11) that can be rotated by the motor (13) and that has at least one worm and at least one gear placed outside the ice container (4) partitions (5) (Figure 1). Thus, the entire inner volume of the partition (5) is enabled to be used for making ice. The transmission mechanism (11) drives both the ice cutting mechanism and each pushing mechanism (Figure 1). Each pushing mechanism is driven by the transmission mechanism (11) so as to rise and descend in the ice container (4) (Figure 1, Figure 2, Figure 3). The ice cutting mechanism is driven by the transmission mechanism (11) so as to cut the ice pushed out of the ice container (4) by rotating (Figure 1, Figure 2, Figure 3). Thus, a crashed ice making machine (1) that operates efficiently and that is plain in mechanical terms is obtained.

**[0031]** In an embodiment of the present invention, the transmission mechanism (11) comprises a worm (Figure 1). The worm is placed outside the partitions (5) so that the rotational axis (Z) thereof is parallel to the axis of the ice container (4) partitions (5) in the base-inlet direction (Figure 1). Thus, the crashed ice making machine (1) is enabled to have a small width and to occupy a small space. The thickness of thin ice layers obtained by cutting is determined by the step of the worm.

**[0032]** In an embodiment of the present invention, the ice cutting mechanism that cuts the ice pushed out of the ice container (4) by rotating is connected to the end of the worm so as to pass over the inlet portions of the partitions (5) (Figure 1, Figure 3). The ice cutting blade (2) in the ice cutting mechanism is connected to the worm preferably by means of a blade fixing member (3). Thus, an ice cutting mechanism that operates efficiently and that is plain in mechanical terms is obtained. Moreover, the ice cutting mechanism can be more easily serviced and repaired.

**[0033]** In an embodiment of the present invention, the ice cutting mechanism is placed so that the rotational plane thereof is parallel to the plane formed by the inlet portions of the partitions (5) (Figure 3). Moreover, the partitions (5) are placed at equal intervals around the rotational axis of the ice cutting mechanism (Figure 3). Thus, the crashed ice making machine (1) is enabled to occupy a small space.

**[0034]** In an embodiment of the present invention, each partition (5) is realized as a receptacle that extends lin-

early in the base-inlet direction. The cross-section of each partition (5) remains stationary along the axis thereof in the base-inlet direction. Thus, there is no unusable volume left between the partitions (5). Consequently, the crashed ice making machine (1) is enabled to occupy a small space. In another embodiment of the present invention, the cross-section of each partition (5) widens from the base portion towards the inlet portion along the axis thereof in the base-inlet direction. Thus, after being pushed and separated from the partitions (5), the ice is enabled to be easily pushed out of the ice container (4) partitions (5). Moreover, in the case that water is filled into the partition (5) without taking the entire ice out of the ice container (4), the remainder ice is enabled to rise freely towards the inlet portion of the ice container (4), to freeze together with the newly forming ice at a position close to the inlet portion and to be cut firstly at the next cycle, thereby providing crashed ice. Thus, the remainder ice is prevented from getting stuck to the base of the ice container (4) and remaining at the base of the ice container (4) for a long time. Consequently, dirt accumulation in the ice container (4) is prevented.

**[0035]** In another embodiment of the present invention, the cross-section of each partition (5) perpendicular to the axis thereof in the base-inlet direction is configured preferably in circular, triangular, square, rectangular or trapezoidal form (Figure 3). Thus, thin ice layers obtained by cutting have proper shapes. Thus, the ice container (4) volume is enabled to be used more effectively in order to make ice.

**[0036]** In an embodiment of the present invention, the ice container (4) comprises an inlet port (6) that opens to at least one partition (5) and that enables water to be filled into the partition (5) (Figure 1, Figure 2, Figure 3). Moreover, the ice container (4) comprises water passage openings that enable the water to pass from one partition (5) to another partition (5) (Figure 3). Thus, the ice container (4) is enabled to be filled with water before the next crashed ice making cycle.

**[0037]** In the present invention, the pushing mechanism is realized by means of a pushing shaft (8) that extends into the partition (5) through an opening formed at the base portion of the ice container (4) and skidded to the ice container (4) opening over a sealing element (7) so as to rise and descend (Figure 1). When the portion of the pushing shaft (8) remaining outside the ice container (4) is driven upwards by the driving mechanism, the portion thereof remaining inside the partition (5) rises, pushes the ice towards the partition (5) inlet and out of the partition (5). When the portion of the pushing shaft (8) remaining outside the ice container (4) is driven downwards by the driving mechanism, the portion thereof remaining inside the partition (5) descends and discharges the partition (5) in order to fill in water (Figure 2 and Figure 3). The length of the pushing shaft (8) is preferred to be such that when pushed entirely into the ice container (4), the pushing shaft (8) reaches the inlet of the ice container (4). Thus, the entire ice is enabled to be taken out of the

ice container (4). It is not compulsory for the pushing mechanism to be composed of a pushing shaft (8). In another embodiment of the present invention not shown in the figures, the pushing mechanism comprises more than one gear-shaft that is placed at the base portion of the partition (5) and that can open/close telescopically, one being screwed onto the other so as to rotate freely around an axis perpendicular to the partition (5) base. When driven forwards by the driving mechanism, the gear-shafts change from a closed position to a telescopically open position and push the ice out of the ice container (4). When driven backwards by the driving mechanism, the gear-shafts change from the telescopically open position to the closed position and discharge the partition (5) in order to fill in water. Thus, the entire inner volume of the partition (5) is enabled to be used for making ice. Moreover, the entire ice formed in the ice container (4) is enabled to be pushed out of the ice container (4). Consequently, the crashed ice making machine (1) is enabled to occupy a small space.

**[0038]** In the present invention, the ice container (4) comprises more than one partition (5) wherein water can be filled (Figure 3). A pushing mechanism is provided in each partition (5). Each pushing mechanism is realized by means of a pushing shaft (8) that extends into the partition (5) through an opening formed at the base portion of the partition (5) and skidded to the partition (5) opening over a sealing element (7) so as to rise and descend. Moreover, the dispensing mechanism comprises a geared or screwed shaft carrier (9) driven by the driving mechanism and whereon the pushing shafts (8) are fixed (Figure 1). The pushing shafts (8) are fixed to the shaft carrier (9) preferably by screwing. The sealing element (7) is composed of a sealing element (7) (Figure 1). In another embodiment of the present invention not shown in the figures, the pushing mechanism in each partition (5) comprises more than one gear-shaft that is placed at the base portion of the partition (5) and that can open/close telescopically, one being screwed onto the other so as to rotate freely around an axis perpendicular to the partition (5) base.

**[0039]** In an embodiment of the present invention, the crashed ice making machine (1) comprises a stopping mechanism that limits the forwards-backwards movement of the shaft carrier (9). Thus, the crashed ice making machine (1) is enabled to be operated in a safe manner.

**[0040]** In an embodiment of the present invention, the stopping mechanism comprises a stopper realized as a first flange (10) that is situated on the shaft carrier (9) and that limits the forwards movement of the shaft carrier (9). In an embodiment of the present invention, the stopping mechanism furthermore comprises a second stopper realized as a second flange (12) that is situated on the lower side of the worm in the driving mechanism and that limits the backwards movement of the shaft carrier (9). Thus, the forwards-backwards movement of the shaft carrier (9) is limited.

**[0041]** In an embodiment of the present invention not

shown in the figures, the refrigerator comprises a freezing compartment, a crashed ice making machine (1) of the present invention placed into the freezing compartment, a control unit that controls the driving mechanism of the crashed ice making machine (1) and the water filling mechanism filling the ice container (4) with water, and a crashed ice collection receptacle that is stationary or detachable, that can be accessed from inside or outside the refrigerator and wherein crashed ice pieces produced by the crashed ice making machine (1) are collected. Thus, the user is enabled to easily reach the crashed ice pieces.

**[0042]** In an embodiment of the present invention not shown in the figures, the refrigerator furthermore comprises a control panel connected to the control unit. Thus, the user is enabled to use the crashed ice making machine (1) via the control panel.

**[0043]** In an embodiment of the present invention not shown in the figures, a heating electric cable controlled by the control unit and provides the heating of the ice container (4) is wrapped around the ice container (4) in order that the ice is easily separated from the ice container (4) and taken out. However, it is not compulsory to use the electric cable. It is possible to take the ice out of the ice container (4) by using the pushing mechanism without heating.

**[0044]** By means of the present invention, a crashed ice making machine (1) is realized, that does not reduce the inner volume of the ice container (4) nor the refrigerator, that is plain in mechanical terms and occupies a small space, that can be efficiently operated, and that enables the entire ice formed in the ice container (4) to be taken out of the ice container (4) and above all that efficiently meets the crashed ice need of the user.

**[0045]** The crashed ice making machine (1) shown in the figures has more than one partition (5). The crashed ice making machine (1) not shown in the figures and comprising a single partition (5) should not be considered within the scope of the present invention.

## Claims

1. A crashed ice making machine (1) comprising
  - an ice container (4) having at least one partition (5) wherein water can be filled and that enables ice to be formed by the water filled therein being frozen in the cold environment,
  - an ice dispensing mechanism that enables the ice to be pushed out of the ice container (4) and that has a sealing element (7), at least one ice pushing shaft (8), a shaft carrier (9) and a first flange (10),
  - an ice cutting mechanism that is placed at the inlet portion of the ice container (4), that cuts the ice pushed out of the ice container (4) by rotating thus providing crashed ice and that has an ice cutting blade (2) and a blade fixing member (3),
  - a driving mechanism that drives the ice dispensing

mechanism and the ice cutting mechanism and that has a transmission mechanism (11), a second flange (12) and a motor (13),

the ice dispensing mechanism having at least one pushing mechanism that is placed into the partition (5) so as to linearly rise and descend between the base portion and the inlet portion of the ice container (4), that moves upwards when driven forwards by the driving mechanism and thus pushes and enables the ice to be dispensed from the ice container (4) and that moves downwards when driven backwards by the driving mechanism and thus discharges the partition (5) in order to fill in water, wherein

the pushing mechanism realized by means of at least one pushing shaft (8) that extends into the partition (5) through an opening formed at the base portion of the ice container (4) and skidded to the ice container (4) opening over a sealing element (7) so as to rise and descend, wherein when the portion of the pushing shaft (8) remaining outside the ice container (4) is driven upwards by the driving mechanism, the portion thereof remaining inside the partition (5) rises, pushes the ice towards the partition (5) inlet and out of the partition (5) and wherein when the portion of the pushing shaft (8) remaining outside the ice container (4) is driven downwards by the driving mechanism, the portion thereof remaining inside the partition (5) descends and discharges the partition (5) in order to fill in water, and wherein said crashed ice making machine has

more than one pushing mechanism, each being realized by means of a pushing shaft (8) that extends into the partition (5) through an opening formed at the base portion of the partition (5) and skidded to the partition (5) opening over a sealing element (7) so as to rise and descend, **characterized in that** the ice dispensing mechanism has a geared or screwed shaft carrier (9) driven by the driving mechanism and whereon the pushing shafts (8) are fixed.

2. A crashed ice making machine (1) as in Claim 1, **characterized by** an ice container (4) that has more than one partition (5) wherein water can be filled and that enables ice to be formed separately in each partition (5) by the water filled in the partitions (5) being frozen in the cold environment and by the ice dispensing mechanism having more than one pushing mechanism, each placed into one partition (5) so as to linearly rise and descend between the base portion and the inlet portion of the partition (5), that moves upwards when driven forwards by the driving mechanism and thus pushes and enables the ice to be dispensed from the partition (5) and that moves downwards when driven backwards by the driving mechanism and thus discharges the partition (5) in order to fill in water.

3. A crashed ice making machine (1) as in Claim 1 or

2, **characterized by** the ice cutting mechanism comprising an ice cutting blade (2) that is placed at the inlet portion of the ice container (4) and provides crashed ice by rotating and cutting the ice pushed out of the ice container (4).

4. A crashed ice making machine (1) as in Claim 3, **characterized by** the ice cutting blade (2), the lower surface of which is realized so as to be seated onto the inlet of the ice container (4) in a flat manner and the upper surface of which is realized to be inclined (8).

5. A crashed ice making machine (1) as in any one of the Claims 1 to 4, **characterized by** a motor (13), the driving mechanism comprising a transmission mechanism (11) that can be rotated by the motor (13) and that has at least one worm and at least one gear placed outside the partitions (5), more than one pushing mechanism each driven by the transmission mechanism (11) so as to rise and descend in the ice container (4) and the ice cutting mechanism driven by the transmission mechanism (11) so as to cut the ice pushed out of the ice container (4) by rotating.

6. A crashed ice making mechanism (1) as in Claim 5, **characterized by** the driving mechanism comprising the transmission mechanism (11) having a worm placed outside the partitions (5) so that the rotational axis (Z) thereof is parallel to the axis of the partitions (5) in the base-in let direction.

7. A crashed ice making machine (1) as in Claim 6, **characterized by** the ice cutting mechanism that is connected to the end of the worm so as to pass over the inlet portions of the ice container (4) partitions (5) and that cuts the ice pushed out of the ice container (4) by rotating.

8. A crashed ice making machine (1) as in any one of the Claims 1 to 7, **characterized by** the partitions (5) that are placed at equal intervals around the rotational axis of the ice cutting mechanism and the plane formed by the inlet portions thereof being parallel to the rotational plane of the ice cutting mechanism.

9. A crashed ice making machine (1) as in any one of the Claims 1 to 8, **characterized by** the partitions (5), each shaped as a receptacle extending linearly in the base-in let direction, the cross-section of each remaining stationary along the axis thereof in the base-in let direction or the crass-section of each widening from the base portion towards the inlet portion along the axis thereof in the base-inlet direction.

10. A crashed ice making mechanism (1) as in Claim 9, **characterized by** the partitions (5), the crass-sec-

tion perpendicular to the axis thereof in the base-inlet direction of each being configured in circular, triangular, square, rectangular or trapezoidal form.

11. A crashed ice making machine (1) as in any one of the Claims 1 to 10, **characterized by** the ice container (4) having an inlet port (6) that opens to at least one partition (5) and that enables water to be filled into the partition (5) and furthermore having water passage openings that enable the water to pass from one partition (5) to another partition (5).
12. A crashed ice making machine (1) as in any of the Claims 1 to 11, **characterized by** a stopping mechanism that limits the forwards-backwards movement of the shaft carrier (9).
13. A refrigerator **characterized by** a freezing compartment, a crashed ice making machine (1) as in any one of the Claims 1 to 12, placed into the freezing compartment, a control unit that controls the driving mechanism of the crashed ice making machine (1) and the water filling mechanism filling the ice container (4) with water, and a crashed ice collection receptacle that is stationary or detachable, that can be accessed from inside or outside the refrigerator and wherein crashed ice pieces produced by the crashed ice making machine (1) are collected.

#### Patentansprüche

1. Maschine zum Herstellen von zerstoßenem Eis (1), **umfassend** einen Eisbehälter (4) mit wenigstens einem Teilraum (5), in den Wasser gefüllt werden kann und der das Bilden von Eis ermöglicht, indem das eingefüllte Wasser in der kalten Umgebung gefriert, einen Eisabgabemechanismus, der es ermöglicht, dass das Eis aus dem Eisbehälter (4) geschoben wird, und der ein Dichtungselement (7), wenigstens einen Eisschiebeschäft (8), einen Schaffträger (9) und einen ersten Flansch (10) aufweist, einen Eisschneidemechanismus, der am Einlassabschnitt des Eisbehälters (4) angeordnet ist und das Eis, das aus dem Eisbehälter (4) geschoben wird, drehend schneidet und dadurch zerstoßenes Eis bereitstellt, und der eine Eisschneideklinge (2) und ein Klingenfixierungsglied (3) aufweist, einen Antriebsmechanismus, der dem Eisabgabemechanismus und den Eisschneidemechanismus antreibt und einen Getriebemechanismus (11), einen zweiten Flansch (12) und einen Motor (13) aufweist, wobei der Eisabgabemechanismus wenigstens einen Schiebemechanismus aufweist, der in dem Teilraum (5) angeordnet ist, derart, dass er zwischen dem Basisabschnitt und dem Einlassabschnitt des

Eisbehälters (4) linear ansteigt und sich absenkt, und der sich nach oben bewegt, wenn er von dem Antriebsmechanismus vorwärts getrieben wird, und dadurch das Eis schiebt und ermöglicht, dass es aus dem Eisbehälter (4) abgegeben wird, und der sich nach unten bewegt, wenn er von dem Antriebsmechanismus zurück getrieben wird, und dadurch den Teilraum (5) entleert, um Wasser einzufüllen, **wobei** der Schiebemechanismus durch wenigstens einen Schiebeschäft (8) umgesetzt ist, der sich durch eine Öffnung, die an dem Basisabschnitt des Eisbehälters (4) gebildet ist, in den Teilraum (5) erstreckt und über ein Dichtungselement (7) hebend und senkend an der Öffnung des Eisbehälters (4) gleitet, wobei, wenn ein Abschnitt des Schiebeschäfts (8), der außerhalb des Eisbehälters (4) verbleibt, von dem Antriebsmechanismus nach oben getrieben wird, sein innerhalb des Teilraums (5) verbleibender Abschnitt ansteigt, das Eis zum Einlass des Teilraums (5) und aus dem Teilraum (5) heraus schiebt, und wobei, wenn der Abschnitt des Schiebeschäfts (8), der außerhalb des Eisbehälters (4) verbleibt, von dem Antriebsmechanismus nach unten getrieben wird, sein innerhalb des Teilraums (5) verbleibender Abschnitt sich absenkt und den Teilraum (5) entleert, um Wasser einzufüllen, und wobei die Maschine zum Herstellen von zerstoßenem Eis mehr als einen Schiebemechanismus aufweist, der jeweils mittels eines Schiebeschäfts (8) umgesetzt ist, der sich durch eine Öffnung, die an dem Basisabschnitt des Teilraums (5) gebildet ist, in den Teilraum (5) erstreckt und über ein Dichtungselement (7) hebend und senkend an der Öffnung des Teilraums (5) gleitet, **dadurch gekennzeichnet, dass** der Eisabgabemechanismus einen gezahnten oder mit Schraubgewinde versehenen Schaffträger (9) aufweist, der durch den Antriebsmechanismus angetrieben wird und an dem die Schiebeschäfte (8) befestigt sind.

2. Maschine zum Herstellen von zerstoßenem Eis (1) nach Anspruch 1, **gekennzeichnet durch** einen Eisbehälter (4), der mehr als einen Teilraum (5) aufweist, in den Wasser gefüllt werden kann, und der ermöglicht, dass Eis separat in jedem Teilraum (5) gebildet wird, indem das in die Teilräume (5) gefüllte Wasser in der kalten Umgebung gefriert, und **dadurch**, dass der Eisabgabemechanismus mehr als einen Schiebemechanismus aufweist, der jeweils in einem Teilraum (5) angeordnet ist, derart, dass er zwischen dem Basisabschnitt und dem Einlassabschnitt des Teilraums (5) linear ansteigt und sich absenkt, und der sich nach oben bewegt, wenn er von dem Antriebsmechanismus vorwärts getrieben wird, und **dadurch** das Eis schiebt und ermöglicht, dass es aus dem Teilraum (5) abgegeben wird, und der sich nach unten bewegt, wenn er von dem Antriebsmechanismus zurück getrieben wird, und **dadurch** den Teilraum (5) entleert, um Wasser einzufüllen.

3. Maschine zum Herstellen von zerstoßenem Eis (1) nach Anspruch 1 oder 2, **dadurch gekennzeichnet, dass** der Eisschneidemechanismus eine Eisschneideklinge (2) umfasst, die an dem Einlassabschnitt des Eisbehälters (4) angeordnet ist und zerstoßenes Eis bereitstellt, indem sie sich dreht und das aus dem Eisbehälter (4) geschobene Eis schneidet. 5
4. Maschine zum Herstellen von zerstoßenem Eis (1) nach Anspruch 3, **dadurch gekennzeichnet, dass** die Unterseitenfläche der Eisschneideklinge (2) derart umgesetzt ist, dass sie flach auf dem Einlass des Eisbehälters (4) sitzt, und die Oberseitenfläche derselben geneigt (8) umgesetzt ist. 10
5. Maschine zum Herstellen von zerstoßenem Eis (1) nach einem der Ansprüche 1 bis 4, **gekennzeichnet durch** einen Motor (13), wobei der Antriebsmechanismus einen Getriebemechanismus (11) umfasst, der von dem Motor (13) gedreht werden kann und wenigstens eine Schnecke und wenigstens ein Zahnrad aufweist, die außerhalb der Teilräume (5) angeordnet sind, wobei mehrere Schiebemechanismen jeweils von dem Getriebemechanismus (11) im Eisbehälter (4) hebend und senkend angetrieben werden und der Eisschneidemechanismus von dem Getriebemechanismus (11) angetrieben wird, um das aus dem Eisbehälter (4) geschobene Eis drehend zu schneiden. 20
6. Maschine zum Herstellen von zerstoßenem Eis (1) nach Anspruch 5, **dadurch gekennzeichnet, dass** der Antriebsmechanismus den Getriebemechanismus (11) mit einer Schnecke außerhalb der Teilräume (5) umfasst, derart, dass die Drehachse (Z) derselben parallel zur Achse der Teilräume (5) in der Basis-Einlass-Richtung ist. 25
7. Maschine zum Herstellen von zerstoßenem Eis (1) nach Anspruch 6, **dadurch gekennzeichnet, dass** der Eisschneidemechanismus mit dem Ende der Schnecke verbunden ist, derart, dass er über die Einlassabschnitte der Teilräume (5) des Eisbehälters (4) verläuft, und der aus dem Eisbehälter (4) geschobenes Eis drehend schneidet. 30
8. Maschine zum Herstellen von zerstoßenem Eis (1) nach einem der Ansprüche 1 bis 7, **dadurch gekennzeichnet, dass** die Teilräume (5) in gleichmäßigen Abständen um die Drehachse des Eisschneidemechanismus angeordnet sind und die Ebene, die von ihren Einlassabschnitten gebildet wird, parallel zur Drehebene des Eisschneidemechanismus ist. 35
9. Maschine zum Herstellen von zerstoßenem Eis (1) nach einem der Ansprüche 1 bis 8, **dadurch gekennzeichnet, dass** die Teilräume (5) jeweils als ein Behälter geformt sind, der sich in Basis-Einlass-Richtung linear erstreckt, und deren Querschnitt entlang ihrer Achse in Basis-Einlass-Richtung konstant bleibt, oder deren Querschnitt sich entlang ihrer Achse in Basis-Einlass-Richtung vom Basisabschnitt zum Einlassabschnitt hin erweitert. 40
10. Maschine zum Herstellen von zerstoßenem Eis (1) nach Anspruch 9, **dadurch gekennzeichnet, dass** der Querschnitt der Teilräume (5) senkrecht zu ihrer Achse in Basis-Einlass-Richtung jeweils kreisförmig, dreieckig, quadratisch, rechteckig oder trapezförmig konfiguriert ist. 45
11. Maschine zum Herstellen von zerstoßenem Eis (1) nach einem der Ansprüche 1 bis 10, **dadurch gekennzeichnet, dass** der Eisbehälter (4) eine Einlassöffnung (6) aufweist, die sich zu wenigstens einem Teilraum (5) öffnet und das Einfüllen von Wasser in den Teilraum (5) ermöglicht, und ferner Wasserdurchlassöffnungen aufweist, durch die das Wasser von einem Teilraum (5) zu einem anderen Teilraum (5) gelangen kann. 50
12. Maschine zum Herstellen von zerstoßenem Eis (1) nach einem der Ansprüche 1 bis 11, **gekennzeichnet durch** einen Anschlagmechanismus, der die Vor- und Zurückbewegung des Schaffträgers (9) beschränkt. 55
13. Kühlschrank, **gekennzeichnet durch** ein Gefrierfach, eine Maschine zum Herstellen von zerstoßenem Eis (1) nach einem der Ansprüche 1 bis 12, die in dem Gefrierfach angeordnet ist, eine Steuereinheit, die den Antriebsmechanismus der Maschine zum Herstellen von zerstoßenem Eis (1) und den Wassereinfüllmechanismus steuert, der den Eisbehälter (4) mit Wasser füllt, und einen Aufnahmebehälter für zerstoßenes Eis, der fest angeordnet oder lösbar ist und auf den von innerhalb oder außerhalb des Kühlschranks zugegriffen werden kann, und in dem die zerstoßenen Eisstücke, die von der Maschine zum Herstellen von zerstoßenem Eis (1) erzeugt werden, aufgefangen werden. 60

## Revendications

1. Une machine de fabrication de glace pilée (1) **comprenant** un récipient de glace (4) présentant au moins une cloison (5) dans laquelle l'eau peut être remplie et qui permet la formation de la glace par la congélation de l'eau y remplie dans l'environnement froid, un mécanisme de distribution de glace qui permet à la glace d'être poussée hors du récipient de glace (4) et qui présente un élément d'étanchéité (7), au moins un arbre de poussement de glace (8), un support d'arbre (9) et une première bride (10), 65

un mécanisme de coupe de glace qui est placé à la partie d'entrée du récipient de glace (4), qui coupe la glace poussée hors du récipient de glace (4) en tournant, donc fournissant la glace pilée et qui présente une lame de coupe de glace (2) et un élément de fixation de lame (3),

un mécanisme d'entraînement qui entraîne le mécanisme de distribution de glace et mécanisme de coupe de glace et qui présente un mécanisme de transmission (11), une deuxième bride (12) et un moteur (13),

le mécanisme de distribution de glace présentant au moins un mécanisme de poussement qui est placé dans la cloison (5) de manière à s'élever et descendre linéairement entre la partie de base et la partie d'entrée du récipient de glace (4), qui se déplace vers le haut lorsqu'il est entraîné vers l'avant par le mécanisme d'entraînement et donc pousse et permet la distribution de la glace à partir du récipient de glace (4) et qui se déplace vers le bas lorsqu'il est entraîné vers l'arrière par le mécanisme d'entraînement et donc décharge la cloison (5) afin de remplir de l'eau, où le mécanisme de poussement réalisé au moyen d'au moins un arbre de poussement (8) qui s'étend dans la cloison (5) à travers une ouverture formée à la partie de base du récipient de glace (4) et est coulissé à l'ouverture du récipient de glace (4) sur un élément d'étanchéité (7) de manière à s'élever et descendre, où lorsque la partie de l'arbre de poussement (8) restant en dehors du récipient de glace (4) est entraînée vers le haut par le mécanisme d'entraînement, la partie de celui-ci restant dans la cloison (5) s'élève et pousse la glace vers l'entrée de la cloison (5) et hors de la cloison (5) et où la partie de l'arbre de poussement (8) restant en dehors du récipient de glace (4) est entraîné vers le bas par le mécanisme d'entraînement, la partie de celui-ci restant dans la cloison (5) descend et décharge la cloison (5) afin de remplir de l'eau, et où ladite machine de fabrication de glace pilée présente plus d'un mécanisme de poussement, chacun étant réalisé au moyen d'un arbre de poussement (8) qui s'étend dans la cloison (5) à travers une ouverture formée à la partie de base de la cloison (5) et est coulissé à la cloison (5) s'ouvrant sur un élément d'étanchéité (7) de manière à s'élever et descendre, **caractérisée en ce que** le mécanisme de distribution de glace présente un support d'arbre fileté ou à engrenage (9) entraîné par le mécanisme d'entraînement et sur lequel les arbres de poussement (8) sont fixés.

2. Une machine de fabrication de glace pilée (1) selon la Revendication 1, **caractérisée par** un récipient de glace (4) qui présente plus d'une cloison (5) dans laquelle l'eau est remplie et qui permet la formation séparée de la glace dans chaque cloison (5) par la congélation de l'eau remplie dans les cloisons (5) dans l'environnement froid et par le mécanisme de

distribution de glace présentant plus d'un mécanisme de poussement, chacun placé dans une cloison (5) de manière à s'élever et descendre linéairement entre la partie de base et la partie d'entrée de la cloison (5), qui se déplace vers le haut lorsqu'il est entraîné vers l'avant par le mécanisme d'entraînement et donc pousse et permet la distribution de la glace à partir de la cloison (5) et qui se déplace vers le bas lorsqu'il est entraîné vers l'arrière par le mécanisme d'entraînement et donc décharge la cloison (5) afin de remplir de l'eau.

3. Une machine de fabrication de glace pilée (1) selon la Revendication 1 ou 2, **caractérisée par** le mécanisme de coupe de glace comprenant une lame de coupe de glace (2) qui est placée à la partie d'entrée du récipient de glace (4) et qui fournit la glace pilée en tournant et coupant la glace poussée hors du récipient de glace (4).
4. Une machine de fabrication de glace pilée (1) selon la Revendication 3, **caractérisée par** la lame de coupe de glace (2) dont la surface inférieure est réalisée de manière à être placée sur l'entrée du récipient de glace (4) de manière plate et dont la surface supérieure est réalisée de manière à être inclinée (8).
5. Une machine de fabrication de glace pilée (1) selon l'une quelconque des revendications de 1 à 4, **caractérisée par** un moteur (13), le mécanisme d'entraînement comprenant un mécanisme de transmission (11) qui peut être tourné par le moteur (13) et qui présente au moins un engrenage à vis sans fin et au moins une roue dentée placés en dehors des cloisons (5), plus d'un mécanisme de poussement, chacun étant entraîné par le mécanisme de transmission (11) de manière à s'élever et descendre dans le récipient de glace (4) et le mécanisme de coupe de glace entraîné par le mécanisme de transmission (11) de manière à couper la glace poussée hors du récipient de glace (4) en tournant.
6. Une machine de fabrication de glace pilée (1) selon la Revendication 5, **caractérisée par** le mécanisme d'entraînement comprenant le mécanisme de transmission (11) présentant un engrenage à vis sans fin placé en dehors des cloisons (5) de telle sorte que l'axe de rotation (Z) de celui-ci est parallèle à l'axe des cloisons (5) dans la direction de base-entrée.
7. Une machine de fabrication de glace pilée (1) selon la Revendication 6, **caractérisée par** le mécanisme de coupe de glace qui est relié à l'extrémité de l'engrenage à vis sans fin de manière à passer au-dessus des parties d'entrée des cloisons (5) du récipient de glace (4) et qui coupe la glace poussée hors du récipient de glace (4) en tournant.

8. Une machine de fabrication de glace pilée (1) selon l'une quelconque des revendications de 1 à 7, **caractérisée par** les cloisons (5) qui sont placées à des intervalles égaux autour de l'axe de rotation du mécanisme de coupe de glace et le plan formé par les parties d'entrée de celles-ci étant parallèle au plan de rotation du mécanisme de coupe de glace. 5
  
9. Une machine de fabrication de glace (1) selon l'une quelconque des revendications de 1 à 8, **caractérisée par** les cloisons (5), chacune formée comme un réceptacle s'étendant linéairement dans la direction de base-entrée, la section transversale de chacune restant immobile le long de son axe dans la direction de base-entrée ou la section transversale de chacune élargissant à partir de la partie de base vers la partie d'entrée le long de son axe dans la direction de base-entrée. 10  
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10. Une machine de fabrication de glace pilée (1) selon la Revendication 9, **caractérisée par** les cloisons (5), la section transversale perpendiculaire à son axe dans la direction de base-entrée de chacune étant formée comme un cercle, un triangle, un carré, un rectangle ou un trapèze. 20  
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11. Une machine de fabrication de glace pilée (1) selon l'une quelconque des revendications de 1 à 10, **caractérisée par** le récipient de glace (4) présentant un orifice d'entrée (6) qui s'ouvre à au moins une cloison (5) et qui permet le remplissage de l'eau dans la cloison (5) et présentant en outre des ouvertures de passage d'eau qui permettent le passage de l'eau à partir d'un cloison (5) à une autre cloison (5). 30  
35
  
12. Une machine de fabrication de glace pilée (1) selon l'une quelconque des revendications de 1 à 11, **caractérisée par** un mécanisme d'arrêt qui limite le mouvement vers l'avant/vers l'arrière du support d'arbre (9). 40
  
13. Un réfrigérateur **caractérisé par** un compartiment de congélation, une machine de fabrication de glace pilée (1) selon l'une quelconque des revendications de 1 à 12, qui est placée dans le compartiment de congélation, une unité de commande qui contrôle le mécanisme d'entraînement de la machine de fabrication de glace pilée (1) et le mécanisme de remplissage d'eau qui remplit le récipient de glace (4) avec l'eau, et un réceptacle de collecte de glace pilée qui est immobile ou détachable, qui peut être accessible à partir de l'intérieur ou l'extérieur du réfrigérateur et où des morceaux de glace pilée produites par la machine de fabrication de glace pilée (1) sont collectés. 45  
50  
55

Figure 1

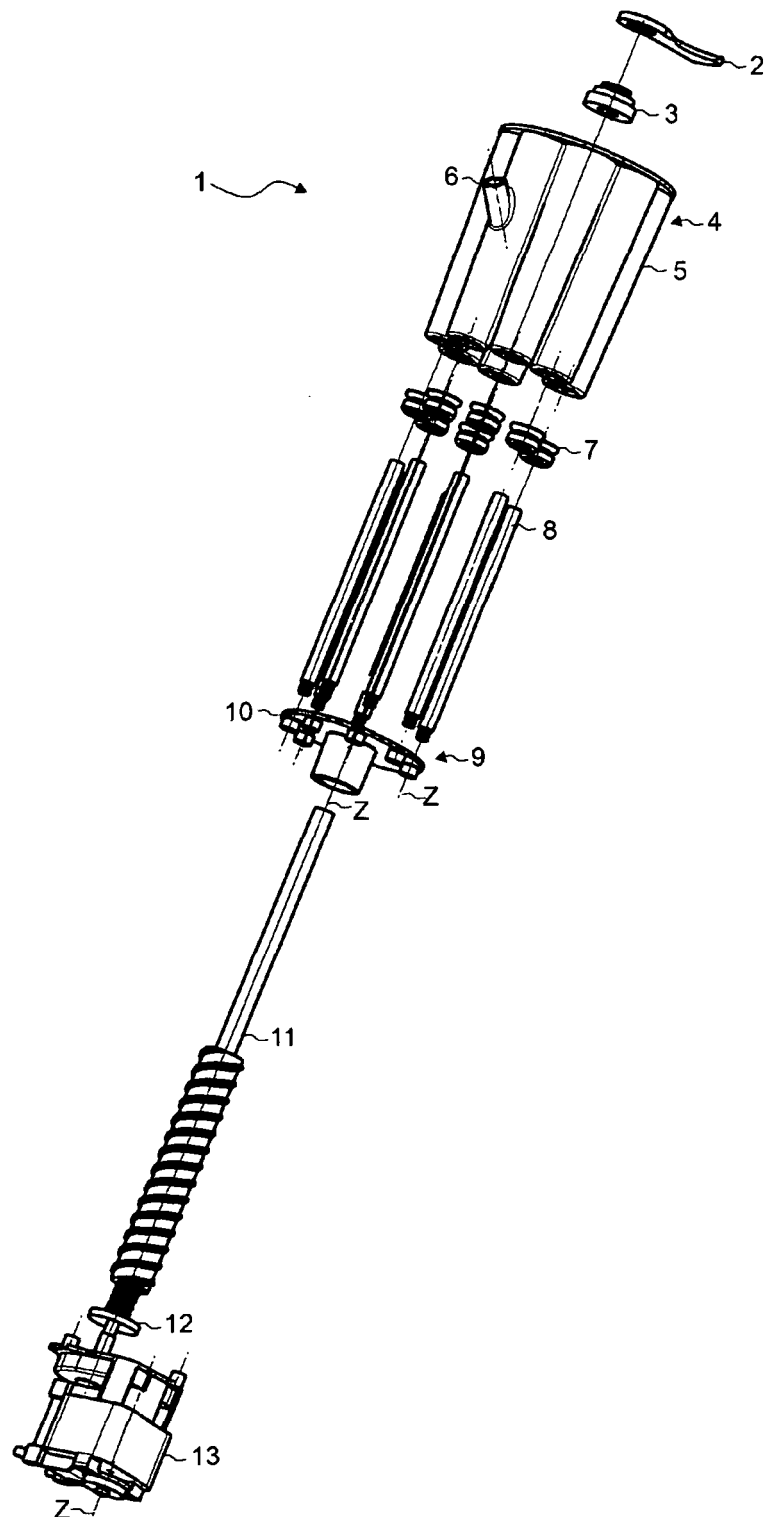


Figure 2

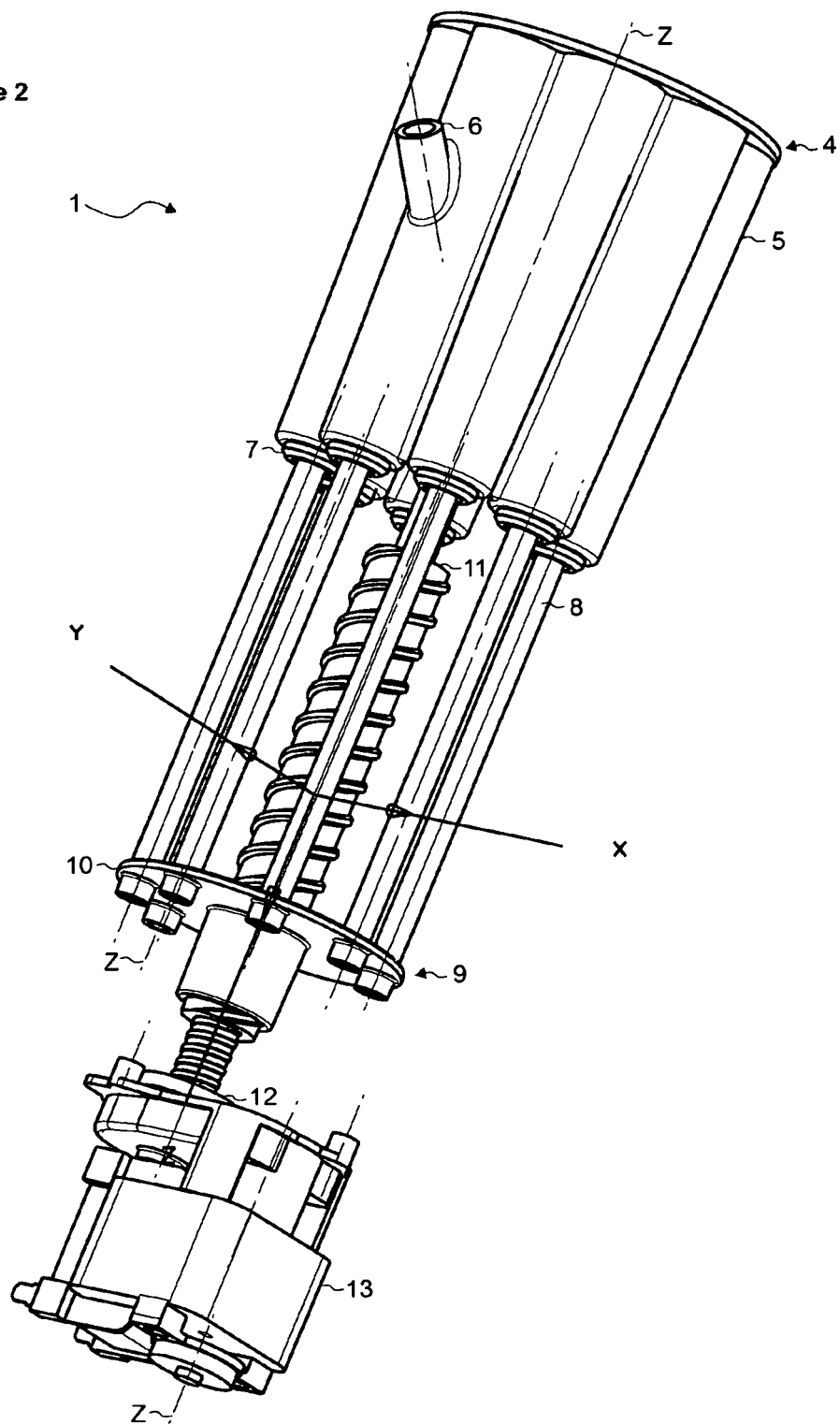
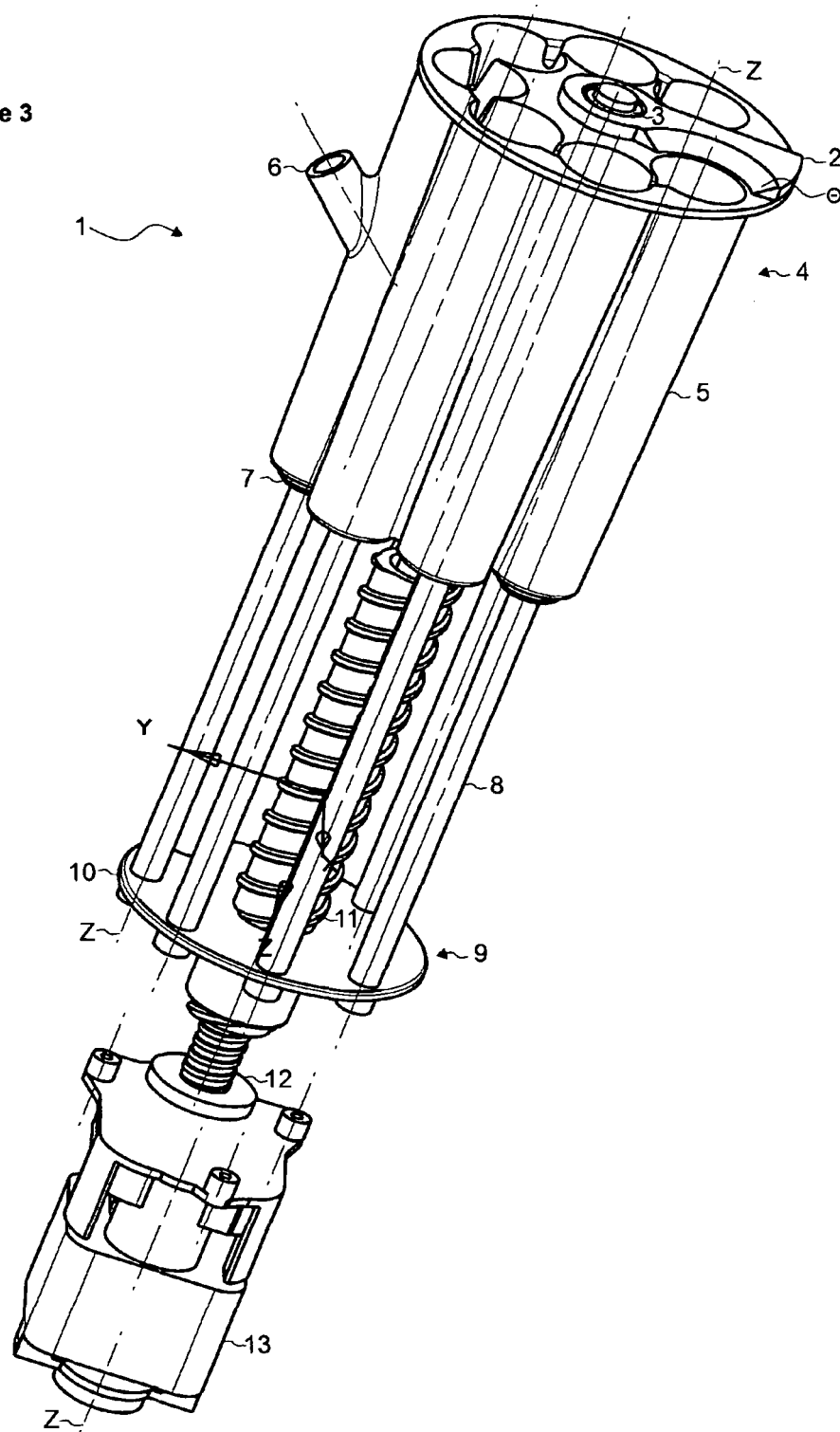


Figure 3



**REFERENCES CITED IN THE DESCRIPTION**

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**Patent documents cited in the description**

- WO 2010131867 A2 [0004]
- FR 1207229 [0004]