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(54) **A COOLING DEVICE**
KÜHLVORRICHTUNG
APPAREIL RÉFRIGÉRANT

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Description

[0001] The present invention relates to a cooling device comprising a storage container that opens by rotating.

[0002] In cooling devices, storage containers are used whereon objects to be cooled are placed, that can be pulled out of the cooling cabin partially or entirely like a drawer particularly by the user for loading or unloading. These storage containers can be positioned at various levels inside the cabin.

[0003] In the state of the art, storage containers are developed that can open by turning sideways or to the front in order to access easily into the storage containers for activities of unloading and cleaning. In these embodiments, the storage containers that open by tilting forward provide convenience of usage. Various embodiments are developed in the state of the art relating to the movement and assembly of storage containers that open by tilting forward.

[0004] However, the problem of the rotatably forward opening storage container to fall down uncontrollably faster than intended due to gravity effect, particularly when full, is encountered in these embodiments known in the state of the art. This uncontrollable motion can cause adversaries such as the food placed in the storage container to be crushed by colliding into one another and those in the glass containers, if any, to be broken etc.

[0005] One of the embodiments known in the state of the art for the solution of this problem is given in the cooling device explained in the United States of America Patent Application No US2005073227, wherein besides the pivotable structure providing the door basket to be opened by rotating, housings are provided for receiving the pins on both sides of the door basket, limiting the forward movement. By means of these housings the forward movement of the door basket is prevented outside of a predetermined range. However, in this embodiment accessing the rear of the door basket is difficult due to limited opening.

[0006] Whereas in another embodiment known in the state of the art, the German Patent No DE10146238, the drawer moves on two pins, one on the side wall and the other on the base of the space containing thereof. While the shaft moves horizontally in a housing formed on the side wall of the section wherein the drawer is disposed, the base of the drawer slides on the pin on the base of the section. The base of the drawer is shaped for opening by tilting. As the base thereof moves on the pin, it moves according to the formed shape. In this embodiment, the shape of the base is configured to be uneven with partial planes instead of a single arc segment in order to turn the drawer controllably. Thus, the drawer slows down while passing from the flat planes and forward movement is controlled. However, in this embodiment, storage space is occupied for maintaining controlled rotation and a smaller volume remains as a result of the uneven surface formed on the base of the drawer. Moreover, the

user is constrained in the amount of objects placed in the drawer by the uneven base DE29519963 U1 discloses a cooling device according to the preamble of claim 1.

[0007] The aim of the present invention is realization of a cooling device comprising a storage container that opens controllably by tilting forward.

[0008] The cooling device realized in order to attain the aim of the present invention, explicated in the first claim and the respective claims thereof, comprises a storage container disposed on the door or the cooling cabin that opens by tilting forward and a pinion gear-gearwheel pair that provides the opening motion of the storage container to be controlled.

[0009] The cooling device comprises at least one chamber wherein the storage container is disposed, a bearing mechanism for securing thereof, allowing to rotate for opening by tilting forward and a locking mechanism that locks the storage container in that position when brought to the closed position.

[0010] The gear path is disposed on the outer wall of the storage container and the pinion gear on the inner wall of the chamber so that the teeth thereof are engaged with the gear path. The pinion gear is disposed on the chamber inner wall rotatable around its own axis. The gear path, situated on the outer wall of the storage container, moves forward together with the storage container while it is opening. The motion of the gear path provides the pinion gear to rotate and the friction during this motion maintains the storage container to be opened controllably and softly. Accordingly, the storage container, when full, is prevented from opening rapidly with its weight and therefore damaging the items placed therein.

[0011] In the present invention, the bearing mechanism comprises at least one shaft on the storage container and at least one housing at the lower side of the chamber, wherein this shaft can be received. The storage container tilts by the shaft rotating around its axis in the housing.

[0012] In an embodiment of the present invention, the pinion gear comprises a coil spring that is wound by the motion of the storage container while closing, storing energy and spends this stored energy by rotating the storage container while opening. The coil spring is disposed in the center such that the pinion is triggered to rotate. Thus, the pinion gear and the gear path are prevented from being stuck due to friction and the movement to be entirely inhibited.

[0013] In this embodiment, the user pushes the storage container for closing the storage container. While the storage container moves towards the closed position by the exerted force, the gear path also moves forward rotating the pinion gear. Meanwhile the coil spring at the center of the pinion gear is wound. When the storage container is in the entirely closed position, the pinion gear is situated at the end of the gearwheel and the coil spring is wound. In this position, the locking mechanism changes to the locked position and keeps the storage container in the closed position.

[0014] In another embodiment of the present invention, the pinion gear comprises a coil spring that is wound by the motion of the storage container while opening and thereby storing energy and spends this stored energy while the storage container is closing and provides the storage container to move by itself in the closing direction. The coil spring is disposed in the center such that the pinion gear is triggered to rotate. Consequently, not only the storage container is further slowed in falling in the opening direction by its own weight but also the closing process is performed softly.

[0015] In an embodiment of the present invention, the locking mechanism is a push-in-pop-out type of mechanism. The locking mechanism comprises a heart shaped support and a resilient pin that moves around this support for unlocking and locking. Thus, locking is performed as the user closes the storage container. Afterwards, the lock opens by slightly pushing the storage container in the closed position forwards and the storage container is enabled to easily start moving for changing to the open position.

[0016] The storage container and the chamber containing the storage container can be placed under the shelves situated on the door or the cabin or directly on a channel formed on the door or the cabin.

[0017] The storage container used in the cooling device of the present invention moves controllably while opening by tilting forward and thus a convenient and safe usage is provided.

[0018] A cooling device realized in order to attain the aim of the present invention is illustrated in the attached figures, where:

Figure 1 - is the perspective view of a cooling device.

Figure 2 - is the sideways schematic view of a storage container when in the closed position.

Figure 3 - is the sideways schematic view of the storage container when in the open position.

[0019] The elements illustrated in the figures are numbered as follows:

1. Cooling device
2. Cabin
3. Door
4. Storage container
5. Chamber
6. Pinion gear
7. Gear path
8. Coil spring
9. Bearing mechanism
10. Shaft
11. Housing
12. Locking mechanism
13. Support
14. Pin

[0020] The cooling device (1) comprises a cabin (2),

at least one door (3) for accessing inside the cabin (2), at least one storage container (4) disposed on the cabin (2) or the door (3), wherein items to be cooled are stored, at least one chamber (5) wherein the storage container (4) is disposed, a bearing mechanism (9) for securing the storage container (4) to the chamber (5) allowing rotation for opening by tilting forward and a locking mechanism (12) for locking the storage container (4) in that position when the storage container (4) is changed to the closed position (Figure 1 and Figure 2).

[0021] The cooling device (1) furthermore comprises at least one gear path (7) disposed on the outer wall of the storage container (4) and a pinion gear (6) disposed on the inner wall of the chamber (5), aligned with the gear path (7), attached to rotate around its axis and rotated by the motion of the gear path (7) while the storage container (4) is opening. The gear path (7) is configured as a gear piece having a step size matching the steps of the pinion gear (6). While the storage container (4) is opening, the gear path (7) moves together with the storage container (4) and the pinion gear (6) rotates as a result of this motion and prevents the storage container (4) to suddenly fall by its own weight.

[0022] In the preferred embodiment of the present invention, the bearing mechanism (9) comprises a shaft (10) disposed on the rear lower corners of the storage container (4) and a housing (11) situated on the chamber (5), wherein the shaft (10) is placed such that the storage container (4) is allowed to tilt forward by rotating. The storage container (4) tilts by rotating around the axis of the shaft (10).

[0023] In an embodiment of the present invention, the pinion gear (6) comprises a coil spring (8) disposed at the core. The coil spring (8) is wound by the motion of the storage container (4) while closing to store energy and spends this stored energy by helping the pinion gear (6) to rotate with the movement of the gear path (7). Thus, the pinion gear (6) and the gear path (7) are prevented from getting stuck due to friction and the movement to be entirely inhibited (Figures 2 and 3).

[0024] In this embodiment, the storage container (4) is pushed for changing to the closed position. While the storage container (4) moves towards the closed position by the exerted force, the pinion gear (6) rotates as well and the coil spring (8) at the core of the pinion gear (6) is wound. When the storage container (4) is in the entirely closed position, the pinion gear (6) reaches the end of the gear path (7) and the coil spring (8) is entirely wound as well and also the locking mechanism (12) changes to the locked position and keeps the storage container (4) in the closed position.

[0025] In the preferred embodiment of the present invention, the ratio of diameters of the pinion gear (6) and the gear path (7) is in the range of 1/12 to 1/17.

[0026] In another embodiment of the present invention, the pinion gear (6) comprises a coil spring (8) that is wound by the motion of the storage container (4) while opening and stores energy. The coil spring (8) spends

the stored energy while the storage container (4) is closing and helps the storage container (4) to move in the closing direction. Thus, the falling down of the storage container (4) by its weight in the opening direction is slowed down and the closing process is performed softly.

[0027] In an embodiment of the present invention, the locking mechanism (12) is a push-in-pop-out type of mechanism and it is sufficient to push a little and then to release in order to set free the storage container (4) in the closed position. In a version of this embodiment, the locking mechanism (12) comprises a heart shaped support (13) disposed on the side wall of the storage container (4) and a resilient pin (14) disposed on the side wall of the chamber (5) that moves around this support (13) for locking and unlocking.

[0028] In different embodiments of the present invention, the storage container (4) can be disposed under one of the shelves (R) situated on the door (4) or the cabin (2).

[0029] By means of the present invention, the storage container (4) that opens by tilting forward is prevented from opening uncontrollably and the damaging of the items placed therein, the storage container (4) is enabled to change to the open position by moving softly and controllably.

Claims

1. A cooling device (1) that comprises

- a cabin (2),
- at least one door (3) for accessing inside the cabin (2),
- at least one storage container (4) disposed on the cabin (2) or the door (3), wherein items to be cooled are stored,
- at least one chamber (5) wherein the storage container (4) is disposed,
- a bearing mechanism (9) for securing the storage container (4) to the chamber (5) allowing rotation for opening by tilting forward,
- a locking mechanism (12) for locking the storage container (4) in that position when the storage container (4) is changed to the closed position and
- at least one gear path (7) disposed on the outer wall of the storage container (4) and a pinion gear (6) disposed on the inner wall of the chamber (5) aligned with the gear path (7), attached to rotate around its axis and rotated by the motion of the gear path (7) while the storage container (4) is opening,

characterized in that the bearing mechanism (9) comprises a shaft (10) disposed on the storage container (4) such that the storage container (4) rotates around the axis of the said shaft (10) and a housing (11) situated on the chamber (5), wherein the shaft

(10) is placed such that the storage container (4) is allowed to tilt forward by rotating.

2. A cooling device (1) as in Claim 1, **characterized by** the gear path (7) having the step size matching the steps of the pinion gear (6).
3. A cooling device (1) as in Claim 1 or 2, **characterized by** the pinion gear (6) and gear path (7) with the ratio of their diameters being within the range of 1/12 to 1/17.
4. A cooling device (1) as in any one of the above claims, **characterized by** the pinion gear (6) comprising a coil spring (8) that is wound by the motion of the storage container (4) while closing to store energy and spends this stored energy while the storage container (4) is opening for helping to rotate thereof by the motion of the gear path (7).
5. A cooling device (1) as in any one of the Claims 1 to 3, **characterized by** the pinion gear (6) comprising a coil spring (8) that is wound by the motion of the storage container (4) while opening to store energy and spends this stored energy while the storage container (4) is closing and helps to rotate thereof by the motion of the gear path (7) and maintains soft closing.
6. A cooling device (1) as in any one of the above claims, **characterized by** a push-in pop-out type locking mechanism (12).
7. A cooling device (1) as in Claim 6, **characterized by** the locking mechanism (12) comprising a heart shaped support (13) disposed on the side wall of the storage container (4) and a pin (14) disposed on the side wall of the chamber (5) that moves around this support (13) for locking and unlocking.
8. A cooling device (1) as in any one of the above claims, **characterized in that** the storage container (4) is disposed under a shelf (R) situated on the door (3).
9. A cooling device (1) as in any one of the above claims, **characterized in that** the storage container (4) is disposed under a shelf (R) situated on the cabin (2).

Patentansprüche

1. Eine Kühlvorrichtung (1) umfassend,

- eine Kabine (2),
- mindestens eine Tür (3), um in die Kabine (2) zu erreichen,

- mindesten ein Lagergehäuse (4), das auf der Kabine (2) oder der Tür (3) eingestellt wird und in welche die zu kühlende Materialien gelagert werden,
- mindestens eine Kammer (5), in welche das Lagergehäuse (4) eingestellt wird
- ein Lager-Mechanismus (9) zum Befestigen des Lagergehäuses (4), das zum Kippen nach vorne und zum Drehen für das Öffnen erlaubt, mit der Kammer (5),
- eine Verriegelungseinrichtung (12) zum Verriegeln des Lagergehäuses (4) bei der Veränderung der Position des Lagergehäuses (4) in die Schliessrichtung, und
- ein Ritzel (6), das dazu hinzugefügt ist, um um mindestens einen Zahnpfad (7), der auf der Außenwand des Lagergehäuses (4) eingestellt ist, und deren Achse zu drehen und das beim Öffnen des Lagergehäuses (4) durch Bewegen des Zahnpfads (7) gedreht wird, und das an die innere Wand der Kammer (5), die mit dem Zahnpfad (7) ausgerichtet ist,

dadurch gezeichnet, dass das Lagergehäuse (4) des Lager-Mechanismus es (9) eine Welle (10) umfasst, die auf das Lagergehäuse (4) um die betreffende Welle (10) drehend eingesetzt ist, und eine Schlitz (11) umfasst, die in die Kammer (5) eingesetzt ist, in welche die Welle (10) so eingesetzt ist, dass sie das Neigen des Lagergehäuses (4) drehend nach vorne erlaubt.

2. Eine Kühlvorrichtung (1) nach Anspruch 1 **gekennzeichnet durch** einen Zahnpfad (7), der eine Zahnteilung, die mit der Zahnteilung des Ritzels (6) abstimmt, aufweist.
3. Eine Kühlvorrichtung (1) nach Anspruch 1 oder 2 **gekennzeichnet durch** ein Ritzel (6) und einen Zahnpfad (7), deren Durchmesser im Bereich zwischen 1/12 bis 1/17 liegen.
4. Eine Kühlvorrichtung (1) nach einem der vorgehenden Ansprüche **gekennzeichnet durch** ein Ritzel (6), das eine Schraubenfeder (8) aufweist, die beim Schliessen, um Energie zu speichern, durch die Bewegung des Lagergehäuses (4) aufgewickelt wird, und beim Öffnen des Lagergehäuses (4) diese gespeicherte Energie zum Unterstützen dessen Drehung durch die Bewegung des Zahnpfads (7) verbraucht.
5. Eine Kühlvorrichtung (1) nach einem der Ansprüche 1 bis 3 **gekennzeichnet durch** ein Ritzel (6), das eine Schraubenfeder (8) aufweist, die beim Öffnen, um Energie zu speichern, durch die Bewegung des Lagergehäuses (4) aufgewickelt wird, und beim Schliessen des Lagergehäuses (4) diese gespei-

cherte Energie zum Unterstützen dessen Drehung durch die Bewegung des Zahnpfads (7) verbraucht und die ein nachgiebiges Schliessen unterstützt.

- 5 6. Eine Kühlvorrichtung (1) nach einem der vorgehenden Ansprüche **gekennzeichnet durch** eine Einschub / Ausschub typische Verriegelungseinrichtung (12).
- 10 7. Eine Kühlvorrichtung (1) nach Anspruch 6 **gekennzeichnet durch** einen herzförmigen Träger (13), der an die Seitenwand des Lagergehäuses (4) eingesetzt ist, und eine Verriegelungseinrichtung (12), die einen Stift (14) umfasst, der an die Seitenwand der Kammer (5), die um diesen Träger (13) bewegt, um verriegeln und entriegeln, aufgesetzt wird
- 15 8. Eine Kühlvorrichtung (1) nach einem der vorgehenden Ansprüche **gekennzeichnet durch** Einsetzen des Lagergehäuses (4) unter einen Regal (R) auf der Tür (3)
- 20 9. Eine Kühlvorrichtung (1) nach einem der vorgehenden Ansprüche **gekennzeichnet durch** Einsetzen des Lagergehäuses (4) unter einen Regal (R) auf der Kabine (2).
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Revendications

1. Un dispositif de refroidissement (1) qui comprend
 - une cabine (2)
 - au moins une porte (3) pour accéder à l'intérieur de la cabine (2),
 - au moins un récipient de stockage (4) disposé sur la cabine (2) ou la porte (3), dans lequel les éléments à refroidir sont stockés,
 - au moins une chambre (5) dans laquelle le récipient de stockage (4) est disposé,
 - un mécanisme de palier (9) pour fixer le récipient de stockage (4) à la chambre (5) permettant la rotation pour l'ouverture en inclinant vers l'avant,
 - un mécanisme de verrouillage (12) pour verrouiller le récipient de stockage (4) dans cette position lorsque le récipient de stockage (4) est changé en position fermée et
 - au moins une voie d'engrenage (7) disposée sur la paroi extérieure du récipient de stockage (4) et un engrenage à pignon (6) disposé sur la paroi intérieure de la chambre (5) aligné avec la voie d'engrenage (7), fixé à tourner autour de son axe et tourné par le mouvement de la voie d'engrenage (7) pendant l'ouverture du réservoir de stockage (4), **caractérisé en ce que** le mécanisme de palier (9) comprend un arbre (10) disposé sur le récipient de stockage (4) tel que
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- le récipient de stockage (4) tourne autour de l'axe dudit arbre (10) et un boîtier (11) situé sur la chambre (5), dans lequel l'arbre (10) est placé de sorte que le récipient de stockage (4) est autorisé pour incliner vers l'avant en tournant. 5
2. Un dispositif de refroidissement (1) selon la revendication 1, **caractérisé par** la voie d'engrenage (7) ayant la taille de pas correspondant aux pas de l'engrenage à pignons (6). 10
3. Un dispositif de refroidissement (1) selon les revendications 1 ou 2, **caractérisé par** l'engrenage à pignon (6) et la voie d'engrenage (7) avec le rapport de leurs diamètres étant dans la plage de 1/12 à 1/17. 15
4. Un dispositif de refroidissement (1) selon l'une quelconque des revendications précédentes, **caractérisé par** l'engrenage à pignon (6) comprenant un ressort hélicoïdal (8) qui est enroulé par le mouvement du récipient de stockage (4) tout en fermant pour stocker de l'énergie et dépense cette énergie stockée tandis que le conteneur de stockage (4) s'ouvre pour aider à la faire tourner par le mouvement de la voie d'engrenage (7). 20
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5. Un dispositif de refroidissement (1) selon l'une quelconque des revendications 1 à 3, **caractérisé par** l'engrenage à pignon (6) comprenant un ressort hélicoïdal (8) qui est enroulé par le mouvement du récipient de stockage (4) tout en ouvrant pour stocker de l'énergie et dépense cette énergie stockée tandis que le conteneur de stockage (4) se ferme et permet de la faire tourner par le mouvement de la voie d'engrenage (7) et maintient la fermeture douce. 30
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6. Un dispositif de refroidissement (1) selon l'une quelconque des revendications précédentes, **caractérisé par** un mécanisme de verrouillage (12) de type push-in pop-out. 40
7. Un dispositif de refroidissement (1) selon la revendication 6, **caractérisé par** le mécanisme de verrouillage (12) comprenant un support en forme de coeur (13) disposé sur la paroi latérale du récipient de stockage (4) et une épingle (14) disposée sur la paroi latérale de la chambre (5) qui se déplace autour de ce support (13) pour le verrouillage et le déverrouillage. 45
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8. Un dispositif de refroidissement (1) selon l'une quelconque des revendications précédentes, **caractérisé en ce que** le récipient de stockage (4) est disposé sous une étagère (R) située sur la porte (3). 55
9. Un dispositif de refroidissement (1) selon l'une quelconque des revendications précédentes, **caractérisé en ce que** le récipient de stockage (4) est disposé

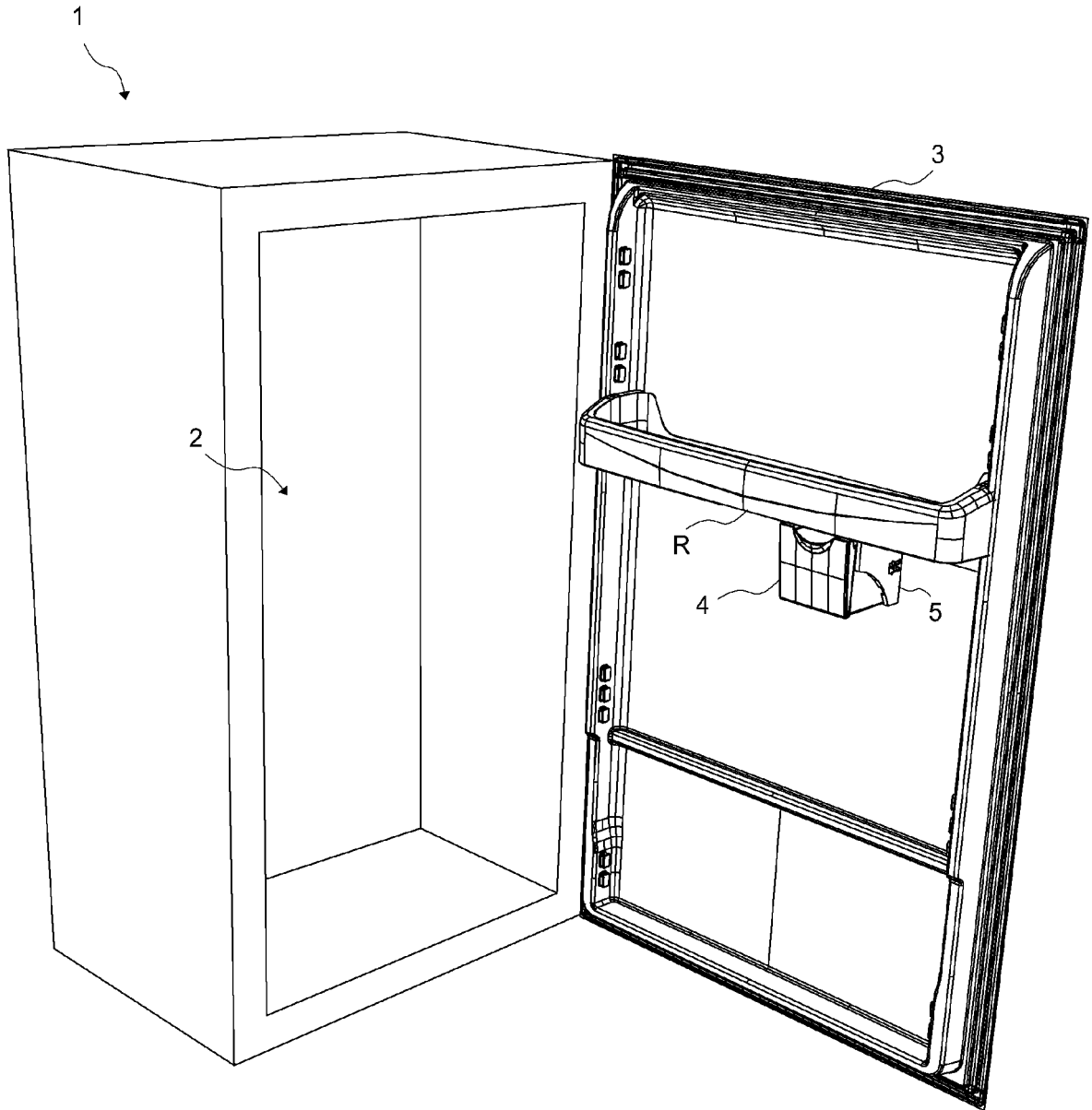


Fig. 1

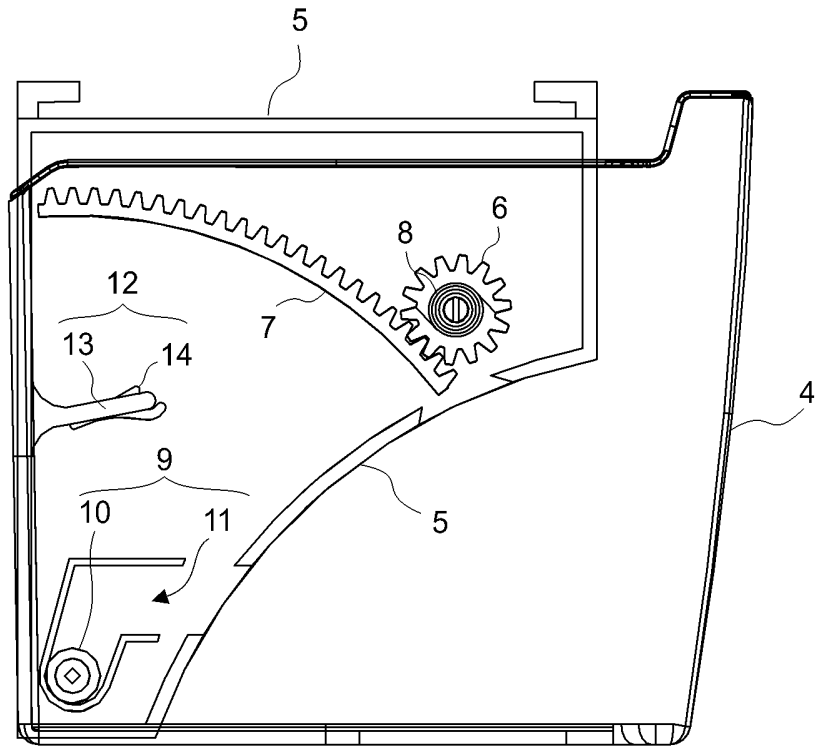


Fig. 2

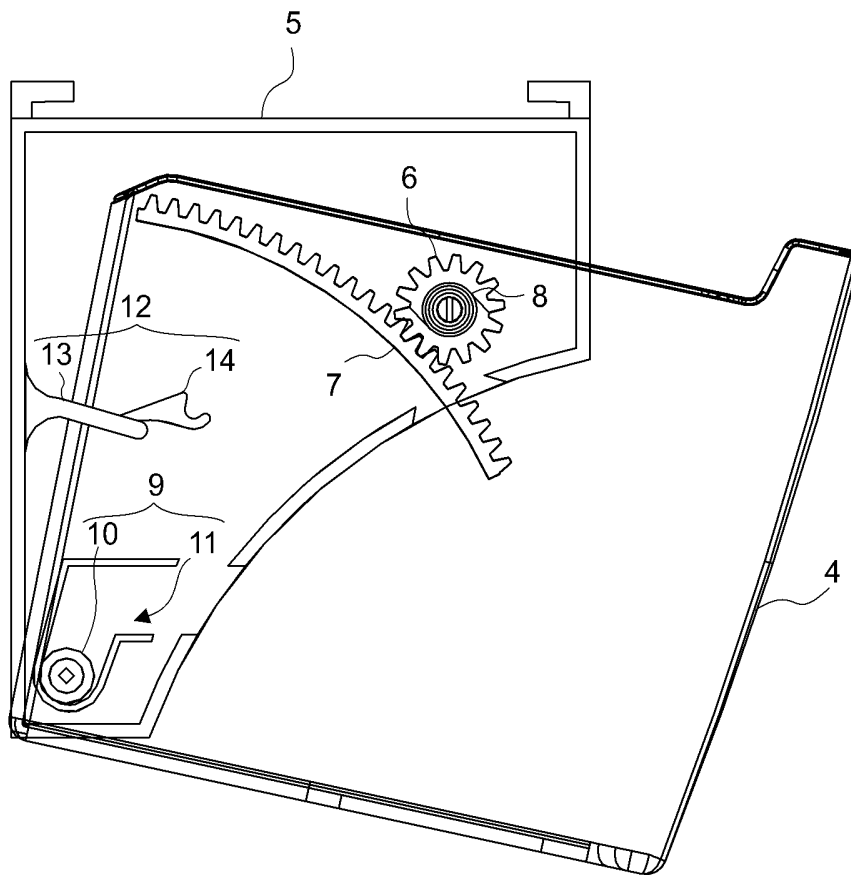


Fig. 3

REFERENCES CITED IN THE DESCRIPTION

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