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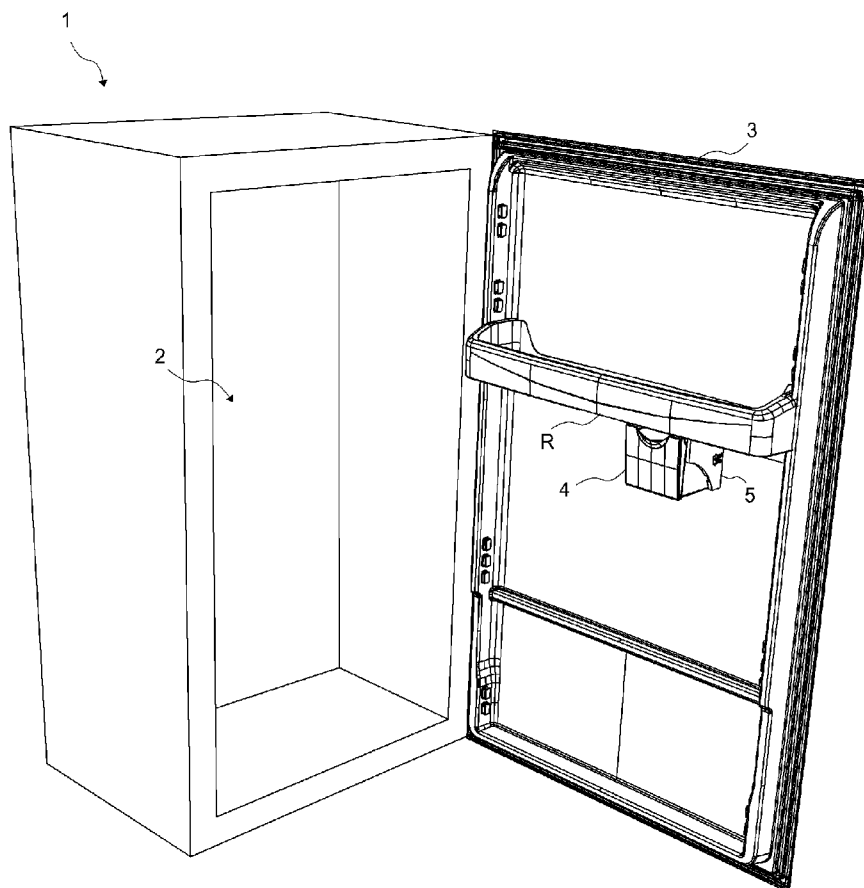


Fig. 1

(57) Abstract: The present invention relates to a cooling device (1) comprising a storage container (4) that opens controllably by tilting forward. The cooling device (1) comprises a pinion gear (6) that moves in the opposite direction while the storage container (4) is opening and a gear path (6) whereon this pinion gear (6) moves for maintaining controlled motion.

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**Description****A COOLING DEVICE**

- [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]
- [0006] 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.
- [0007] 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 thereof.

- [0008] The aim of the present invention is realization of a cooling device comprising a storage container that opens controllably by tilting forward.
- [0009] 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.
- [0010] 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.
- [0011] 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.

- [0012] In the preferred embodiment of 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.
- [0013] 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.
- [0014] 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.
- [0015] 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.
- [0016] 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.

- [0017] 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.
- [0018] 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.
- [0019] A cooling device realized in order to attain the aim of the present invention is illustrated in the attached figures, where:
- [0020] Figure 1 – is the perspective view of a cooling device.
- [0021] Figure 2 – is the sideways schematic view of a storage container when in the closed position.
- [0022] Figure 3 – is the sideways schematic view of the storage container when in the open position.
- [0023] 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

- [0024] 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).
- [0025] 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.
- [0026] 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).
- [0027] 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).
- [0028] 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.

- [0029] 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.
- [0030] 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.
- [0031] 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.
- [0032] 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).
- [0033] 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 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 and **characterized by** 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.
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 bearing mechanism (9) comprising a shaft (10) disposed on 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.
5. 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).
6. A cooling device (1) as in any one of the Claims 1 to 4, **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.

7. A cooling device (1) as in any one of the above claims, **characterized by** the push-in pop-out type locking mechanism (12).
8. A cooling device (1) as in Claim 7, **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.
9. A cooling device (1) as in any one of the above claims, **characterized by** the storage container (4) that is disposed under a shelf (R) situated on the door (3).
10. A cooling device (1) as in any one of the above claims, **characterized by** the storage container (4) that is disposed under a shelf (R) situated on the cabin (2).

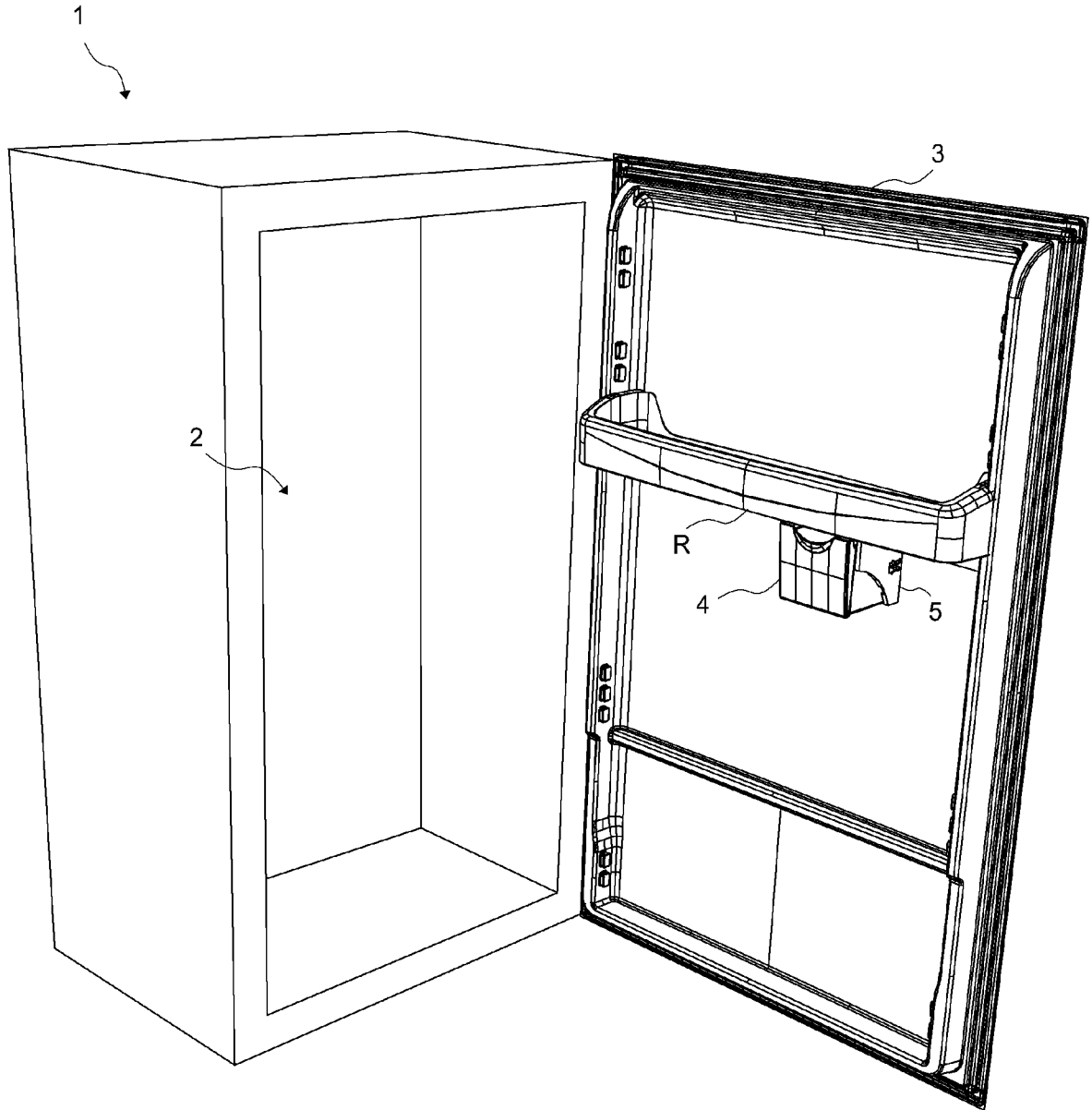


Fig. 1

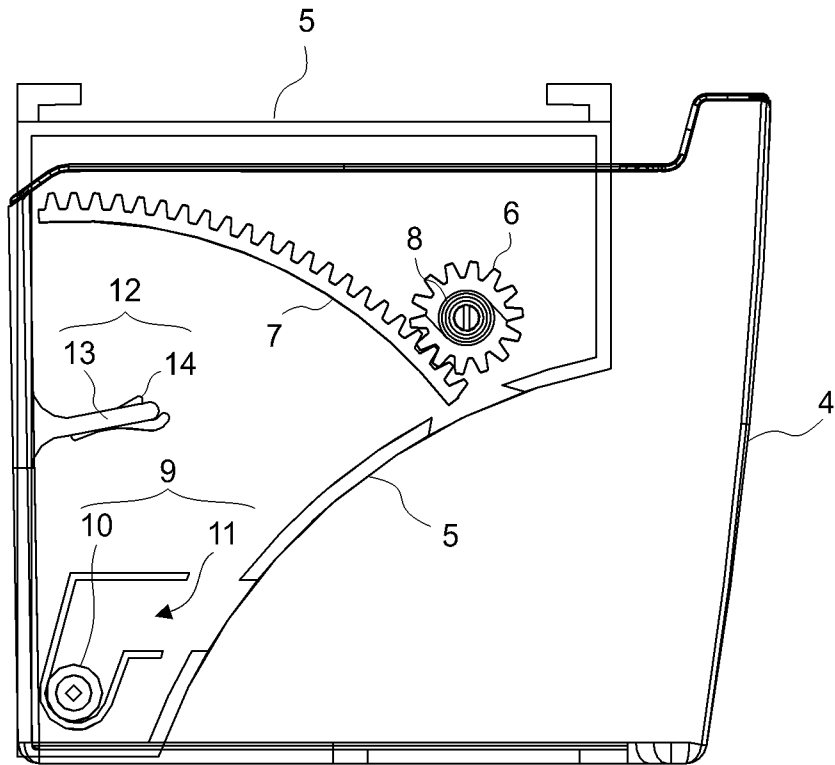


Fig. 2

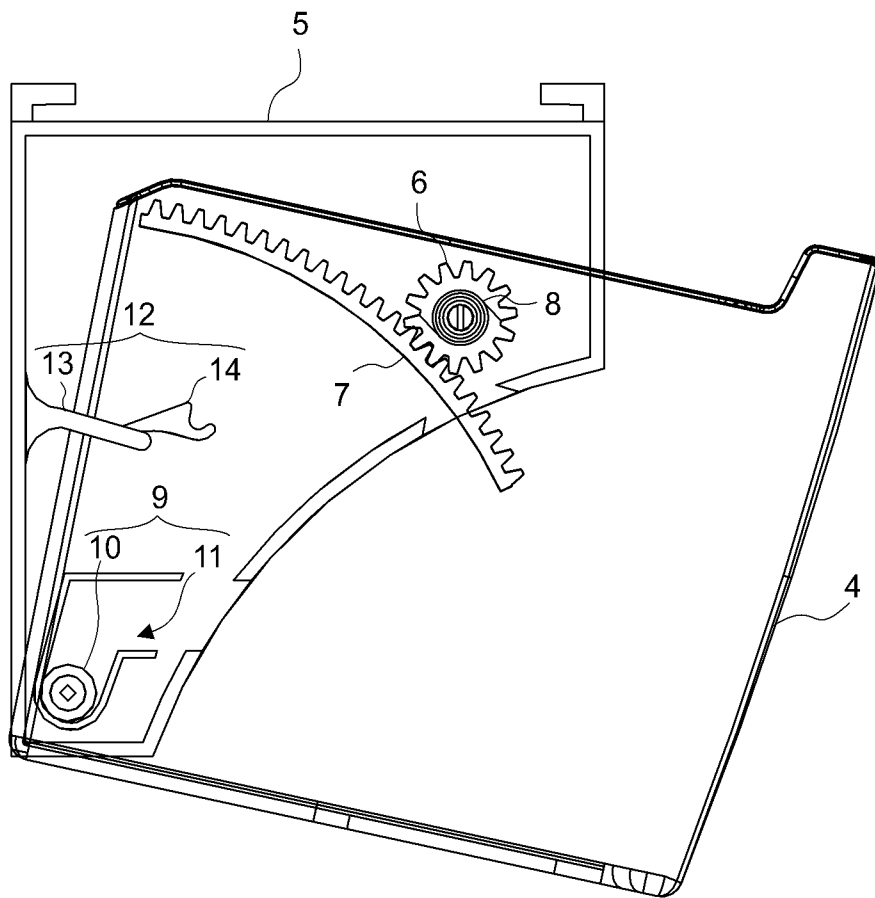


Fig. 3