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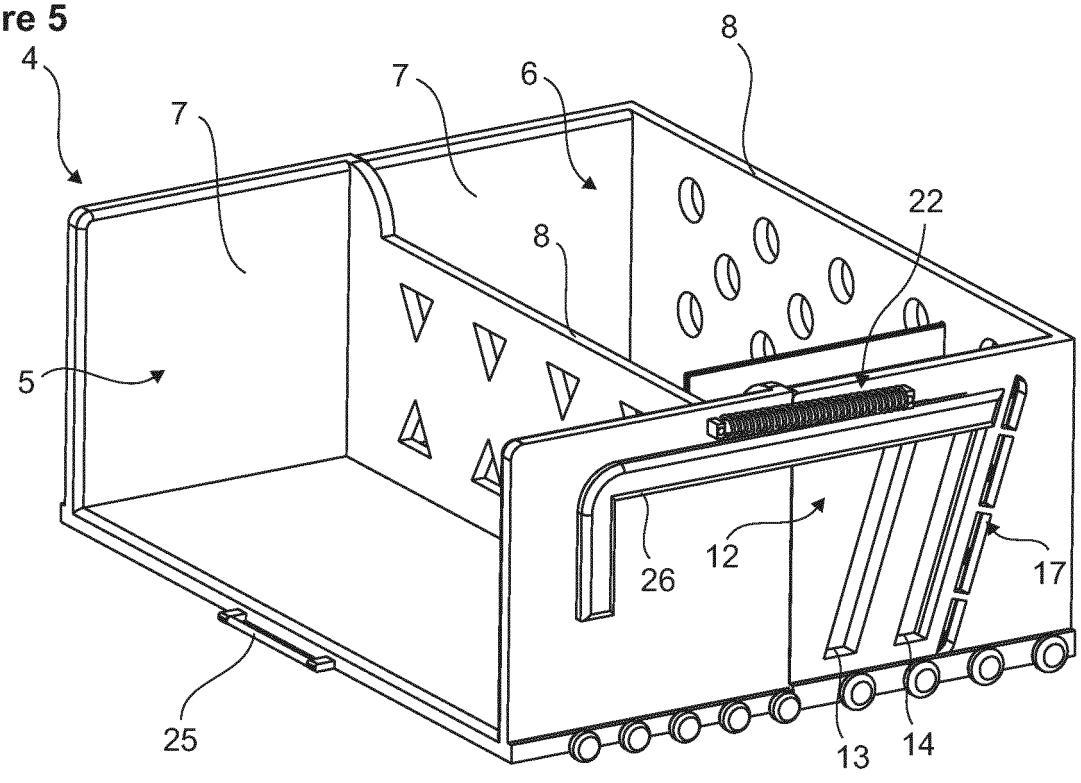
(71) Applicant: **Arçelik Anonim Sirketi**
34445 Istanbul (TR)

(72) Inventors:
- **ERDAL, GIZEM**
  34445 ISTANBUL (TR)
- **CETIN, CEMIL CAN**
  34445 ISTANBUL (TR)
- **CELIK, RIDVAN KADIR**
  34445 ISTANBUL (TR)

(54) **A COOLING DEVICE COMPRISING A MOVABLE CARRIER**

(57) The present invention relates to a cooling device (1) comprising at least one compartment (2) wherein products are stored; a door which provides access into the compartment (2); a carrier (4) which is disposed into the compartment (2) and which has a first part (5) and a second part (6) arranged one behind the other in the same horizontal plane; a rail mechanism (9) which is disposed on the side walls of the compartment (2) and which enables the carrier (4) to move in the horizontal axis when the latter is pulled forwards in the horizontal axis; and a movement mechanism (12) which, after the first part (5) is detached from the rail mechanism (9), enables the first part (5) to move to a level under the level of the second part (6) in the vertical axis.

Figure 5



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Description

[0001] The present invention relates to a cooling device comprising a movable carrier.

[0002] Generally, cooling devices have a freezing compartment for freezing and storing foodstuffs or beverages, and a fresh food compartment for storing foodstuffs or beverages at low temperatures. The fresh food compartment and the freezing compartment may have shelves, drawers, baskets and similar carriers arranged to store foodstuffs therein. Various foodstuffs to be stored by cooling or freezing are conveniently stored in a shelf, drawer, basket, etc. in the fresh food compartment and freezing compartment. Drawers, shelves and baskets can be arranged in a variety of ways in the fresh food and freezing compartments so as to store foodstuffs in different sizes, requiring different storage conditions.

[0003] The shelves, drawers and similar carriers most used by the user are usually those located at eye level of the user. Therefore, the carriers above this level are used less frequently, which reduces the usage efficiency of the storage volume of the cooling device. In the cooling devices, where the freezing compartment is located at the top, the user stacks the products and encounters difficulties especially in reaching the products at the rear. Since the products remaining behind are out of sight, said products may be forgotten, which leads to spoilage of foodstuffs. It is even more difficult for a short user to organize the freezing compartment and reach the products at the rear.

[0004] In the state of the art European Patent Application No. EP3677860, a cooling device is disclosed, comprising a shelf mechanism wherein in order to increase the usage efficiency, the level of the shelf located on the upper level of the storage volume is shifted to a level that the user can access more easily.

[0005] In the state of the art Japanese Patent Application No. JP2003322465, a cooling device is disclosed, comprising a shelf which can be moved to a position easily accessible by the user by changing the height thereof by means of a simple mechanism.

[0006] The aim of the present invention is the realization of a cooling device comprising a carrier which can be moved to a level easily accessible by the user, thus increasing the usage efficiency of the storage volume.

[0007] 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 carrier which has a first part and a second part arranged one behind the other in the same horizontal plane; a rail mechanism which enables the carrier to move in the horizontal axis when the latter is pulled forwards in the horizontal axis; and a movement mechanism which, after the first part is detached from the rail mechanism, enables the first part to move to a level under the level of the second part in the vertical axis.

[0008] In the first position which is the initial position, both the first and second parts which constitute the carrier are horizontally positioned at the same level in the horizontal axis in the cooling device such that the first part is in the front and the second part is at the back.

[0009] In the second position where the carrier is pulled towards the outside of the cooling device, the first and second parts move together in the horizontal axis to a position at the front side of the cooling device. This horizontal movement continues until the first part is detached from the rail mechanism. In this case, the first part is completely detached from the rail mechanism while the second part bears against the end of the rail mechanism and is moved to a position at the front side of the cooling device.

[0010] In the third position, where the first part is detached from the rail mechanism, the first part moves down in the vertical axis as connected to the movement mechanism to be positioned at a level below the level of the second part.

[0011] Thus, while the rear part of the carrier comes forward, the front part comes down, allowing the user to access the rear part of the carrier easily and comfortably. Consequently, both the products on the carrier can be taken out easily and the products can be stacked on the carrier from the outside.

[0012] The rail mechanism is composed of two rails placed in parallel, in the horizontal direction, on the two side walls of the cooling device, extending from the back to the front. The rail mechanism comprises a stopper at each end of both rails. While allowing the first part of the carrier to be detached, said stopper prevents the second part from being detached from the rail.

[0013] The carrier comprises at least two wheels on both sides of the first and second parts, which engage with the rail in the rail mechanism, preferably five wheels in the first part and four each in the second part. In the embodiment of the present invention, the diameter of the wheels in the second part is larger than the diameter of the wheels in the first part. Thus, while the first part is easily detached from the rails, the wheels in the second part get caught on the stoppers at the ends of the rails and the second part is prevented from detaching from the cooling device.

[0014] The movement mechanism has two parallel guides located on the side wall of the second part, and slides fixed on the side wall of the first part, extending to the guides in the second part and entering the guides so as to move in the guides. The guides are inclined from back to front, from top to bottom. By means of this inclination, the first part moves forward and downward.

[0015] The balancing mechanism comprises a main gear on the second slide which engages with the second guide, a pulley parallel to the second guide, that said main gear contacts, and at least two pulley gears disposed in the pulley. The lowermost two pulley gears are connected to each other by means of a balancing rod. By means of the balancing rod, the main gear and pulley system on both sides of the carrier move simultaneously and together. In this embodiment of the present inven-

tion, when the first part starts to move downwards, the second slide starts to move in the second guide and at the same time the gear on the second slide which contacts the pulley starts to rotate. Thus, both sides of the first part move an equal distance at equal speed such that the first part moves in a balanced way, eliminating the problems which may arise due to unbalanced loading.

[0016] The cooling device further comprises a spring mechanism with one end connected to the side wall of the first part and the other end connected to the side wall of the second part at the same level while the first and second parts are aligned. The spring mechanism comprises a spring and a piston integrated with the spring. By means of the spring mechanism, both the downwards movement of the first part and the return thereof to its original position are performed in a controlled manner.

[0017] By means of the present invention, the carrier is brought to a level easily accessible by the user such that the storage volume is used efficiently. In particular, the problems encountered in loading and unloading products on the carriers in the freezing compartment located at the top of the cooling device are eliminated by means of the present invention. While it becomes easier for the user to load products on the carrier, it is ensured that the products at the rear section of the carrier can be easily accessed.

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

Figure 1 - is the partial perspective view of a cooling device when the carrier is in the first position.

Figure 2 - is the partial perspective view of the cooling device when the carrier is in the second position.

Figure 3 - is the partial perspective view of the cooling device when the carrier is in the third position.

Figure 4 - is the perspective view of the rail mechanism.

Figure 5 - is the perspective view of the carrier when in the first position.

Figure 6 - is the sideways view of the carrier when in the last position.

Figure 7 - is the sideways view of the first part together with the movement mechanism.

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

1. Cooling device
2. Compartment
3. Compartment side wall
4. Carrier
5. First part
6. Second part
7. Side wall
8. Rear wall
9. Rail mechanism
10. Rail
11. Stopper
12. Movement mechanism
13. First guide
14. Second guide
15. First slide
16. Second slide
17. Balancing mechanism
18. Main gear
19. Pulley
20. Pulley gear
21. Balancing rod
22. Spring mechanism
23. Spring
24. Piston
25. Handle
26. Connection member

[0020] The cooling device (1) comprises at least one compartment (2) wherein products are stored; a door which provides access into the compartment (2); a carrier (4) which is disposed into the compartment (2) and which has a first part (5) and a second part (6) arranged one behind the other in the same horizontal plane; a rail mechanism (9) which is disposed on the side walls of the compartment (2) and which enables the carrier (4) to move in the horizontal axis when the latter is pulled forwards in the horizontal axis; and a movement mechanism (12)

which, after the first part (5) is detached from the rail mechanism (9), enables the first part (5) to move to a level under the level of the second part (6) in the vertical axis.

[0021] In the first position which is the initial position, both the first and second parts (5 and 6) which constitute the carrier (4) are horizontally positioned at the same level in the horizontal axis in the compartment (2) such that the first part (5) is in the front and the second part (6) is at the back (Figure 1 and Figure 5).

[0022] In the second position where the carrier (4) is pulled towards the outside of the compartment (2), the first and second parts (5 and 6) move together in the horizontal axis to a position at the front side of the cooling device (1). This horizontal movement continues until the first part (5) is detached from the rail mechanism (9). In this case, the first part (5) is completely detached from the rail mechanism (9) while the second part (6) bears against the end of the rail mechanism (9) and is moved to a position at the front side of the cooling device (1) (Figure 2).

[0023] When the first part (5) is detached from the rail mechanism (9) and shifted to the third position, the first part (5) moves down in the vertical axis as connected to the movement mechanism (12) to be positioned at a level below the level of the second part (6). Thus, while the rear second part (6) of the carrier (4) comes forward, the front part (5) comes down, allowing the user to access the rear part of the carrier (4) easily and comfortably. Consequently, both the products on the carrier (4) can be taken out easily and the products can be stacked / loaded on the carrier (4) from the outside (Figure 3 and Figure 6).

[0024] The first part and the second part (5 and 6) comprise two parallel side walls (7) and one rear wall (8) each which joins said two side walls (7). In the embodiment of the present invention, there are ventilation holes of different shapes and sizes on the rear walls (8). Thus, a homogeneous air distribution is obtained inside the carrier (4).

[0025] The rail mechanism (9) comprises two rails (10) placed in parallel, in the horizontal direction, on the two opposite side walls (3) of the compartment (2), extending from the back to the front. The rail mechanism (9) comprises a stopper (11) at each end of both rails (10). While allowing the first part (5) of the carrier (4) to be detached from the rail (10), said stopper (11) prevents the second part (6) from being detached from the rail (10) (Figure 4).

[0026] The carrier (4) comprises at least two wheels on both sides of the first and second parts (5 and 6), which engage with the rail (10) in the rail mechanism (9), preferably five wheels in the first part (5) and four each in the second part (6). In the embodiment of the present invention, the diameter of the wheels in the second part (6) is larger than the diameter of the wheels in the first part (5). Thus, while the first part (5) is easily detached from the rails (10), the wheels in the second part (6) get caught on the stoppers (11) at the ends of the rails (10) and the second part (6) is prevented from detaching from the compartment (2).

[0027] The movement mechanism (12) comprises a first guide (13) and a second guide (14) which are located parallel to each other on both side walls (7) of the second part (6); a connection member (26) which fixed to both side walls (7) of the first part (5) and which extends until the first and second guides (13 and 14) on the second part (6); and a first and second slide (15 and 16) which enter the first and second guides (13 and 14) on the connection member (26) so as to move in the first and second guides (13 and 14), with one entering the first guide (13) and the other entering the second guide (14). The first and second guides (13 and 14) are inclined from back to front and from top to bottom. By means of this inclination, the first part (5) moves forward and downward. In the embodiment of the present invention, the first and second guides (13 and 14) are a slit.

[0028] The balancing mechanism (17) comprises a main gear (18) on the second slide (16) which engages with the second guide (14), a pulley (19) parallel to the second guide (14) that said main gear (18) contacts, and at least two pulley gears (20) disposed in the pulley (19). The lowermost two pulley gears (20) are connected to each other by means of a balancing rod (21). By means of the balancing rod (21), the main gear (18) and the pulley (19) on both sides of the carrier (4) as well as the pulley gears (20) move simultaneously and together. In the embodiment of the present invention, the pulley (19) is a geared pulley. In this embodiment of the present invention, when the first part (5) starts to move downwards, the second slide (16) starts to move in the second guide (14) and at the same time the main gear (18) on the second slide (16) which contacts the pulley (19) starts to rotate, which in turn rotates the pulley (19) and the pulley gears (20). Thus, both sides of the first part (5) move an equal distance at equal speed such that the first part (5) moves in a balanced way, eliminating the problems which may arise due to unbalanced loading.

[0029] The cooling device (1) further comprises a spring mechanism (22) with one end connected to the side wall (7) of the first part (5) and the other end connected to the side wall (7) of the second part (6) at the same level while the first and second parts (5 and 6) are aligned. The spring mechanism (22) comprises a spring (23) and a piston (24) integrated with the spring (23). By means of the spring mechanism (22), the first and second parts (5 and 6) are pulled towards each other, and it is ensured that no gap remains between the first and second parts (5 and 6) in the initial position and that the first and second parts (5 and 6) are kept in the horizontal position with almost no gap therebetween. Moreover, by means of the spring mechanism (22), both the downwards movement of the first part (5) and the return thereof to its original position are performed in a controlled manner (Figure 7).

[0030] The cooling device (1) comprises a handle (25) which is disposed on the front side of the first part (5) in

front of the carrier (4) and which enables the user to grip and pull the carrier (4).

[0031] By means of the present invention, the carrier (4) is brought to a level easily accessible by the user such that the storage volume is used efficiently. In particular, the problems encountered in loading and unloading products on the carriers (4) in the freezing compartment (2) located at the top of the cooling device (1) are eliminated by means of the present invention. While it becomes easier for the user to load products on the carrier (4), it is ensured that the products at the rear section of the carrier (4) can be easily accessed.

Claims

1. A cooling device (1) **comprising** at least one compartment (2) wherein products are stored and a door which provides access into the compartment (2), **characterized by** a carrier (4) which is disposed into the compartment (2) and which has a first part (5) and a second part (6) arranged one behind the other in the same horizontal plane; a rail mechanism (9) which is disposed on the side walls of the compartment (2) and which enables the carrier (4) to move in the horizontal axis when the latter is pulled forwards in the horizontal axis; and a movement mechanism (12) which, after the first part (5) is detached from the rail mechanism (9), enables the first part (5) to move to a level under the level of the second part (6) in the vertical axis.

2. A cooling device (1) as in Claim 1, **characterized by** the carrier (4) where in the initial position both the first and second parts (5 and 6) are horizontally positioned at the same level in the horizontal axis in the compartment (2) such that the first part (5) is in the front and the second part (6) is at the back.

3. A cooling device (1) as in Claim 1, **characterized by** the carrier (4) where in the second position where the same is pulled towards the outside of the compartment (2), the first part (5) and the second part (6) move together in the horizontal axis to a position at the front side of the cooling device (1).

4. A cooling device (1) as in Claim 1, 2 and 3, **characterized by** the carrier (4) comprising the first part (5) which is detached from the rail mechanism (9) and shifted to the third position and which moves down in the vertical axis as connected to the movement mechanism (12) to be positioned at a level below the level of the second part (6).

5. A cooling device (1) as in Claim 1, **characterized by** the first part and the second part (5 and 6) which comprise two parallel side walls (7) and one rear wall (8) each which joins said two side walls (7).

6. A cooling device (1) as in Claim 1, **characterized by** the rail mechanism (9) comprising two rails (10) placed in parallel, in the horizontal direction, on the two opposite side walls (3) of the compartment (2), extending from the back to the front.

7. A cooling device (1) as in Claim 6, **characterized by** a stopper (11) on the end of each of the two rails (10), which allows the first part (5) of the carrier (4) to be detached from the rail and which prevents the second part (6) from being detached from the rail (10).

8. A cooling device (1) as in Claim 6 or 7, **characterized by** the carrier (4) comprising at least two wheels on both sides of the first and second parts (5 and 6), which engage with the rail (10) in the rail mechanism (9).

9. A cooling device (1) as in Claim 8, **characterized by** the carrier (4) wherein the diameter of the wheels in the second part (6) is larger than the diameter of the wheels in the first part (5).

10. A cooling device (1) as in any one of the Claims 5 to 9, **characterized by** the movement mechanism (12) comprising a first guide (13) and a second guide (14) which are located parallel to each other on both side walls (7) of the second part (6); a connection member (26) which fixed to both side walls (7) of the first part (5) and which extends until the first and second guides (13 and 14) on the second part (6); and a first and second slide (15 and 16) which enter the first and second guides (13 and 14) on the connection member (26) so as to move in the first and second guides (13 and 14), with one entering the first guide (13) and the other entering the second guide (14).

11. A cooling device (1) as in Claim 10, **characterized by** the balancing mechanism (17) comprising a main gear (18) on the second slide (16) which engages with the second guide (14), a pulley (19) parallel to the second guide(14), that said main gear (18) contacts, and at least two pulley gears (20) disposed in the pulley (19).

12. A cooling device (1) as in Claim 11, **characterized by** a balancing rod (21) which connects the lowermost two pulley gears (20) to each other.

13. A cooling device (1) as in Claim 11, **characterized by** the pulley (19) which is a geared pulley.

14. A cooling device (1) as in Claim 5, **characterized by** a spring mechanism (22) with one end connected to the side wall (7) of the first part (5) and the other end connected to the side wall (7) of the second part (6) at the same level while the first and second parts

(5 and 6) are aligned.

15. A cooling device (1) as in Claim 14, **characterized by** the spring mechanism (22) comprising a spring (23) and a piston (24) integrated with the spring (23).

Figure 1

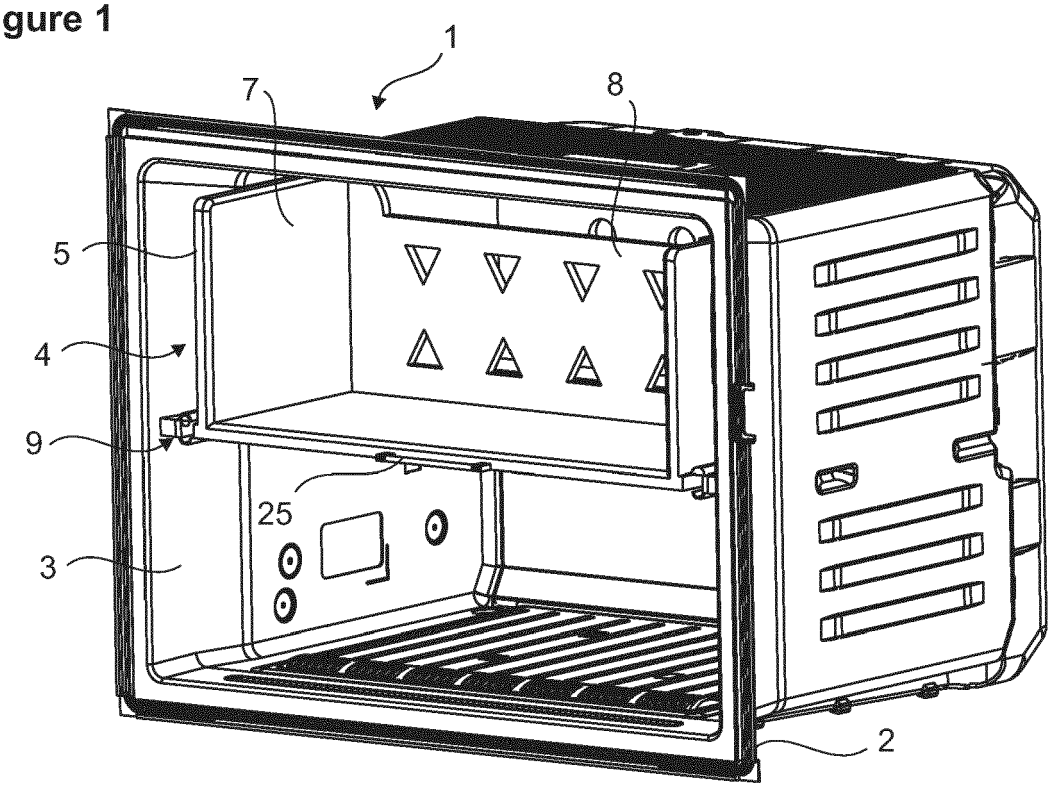


Figure 2

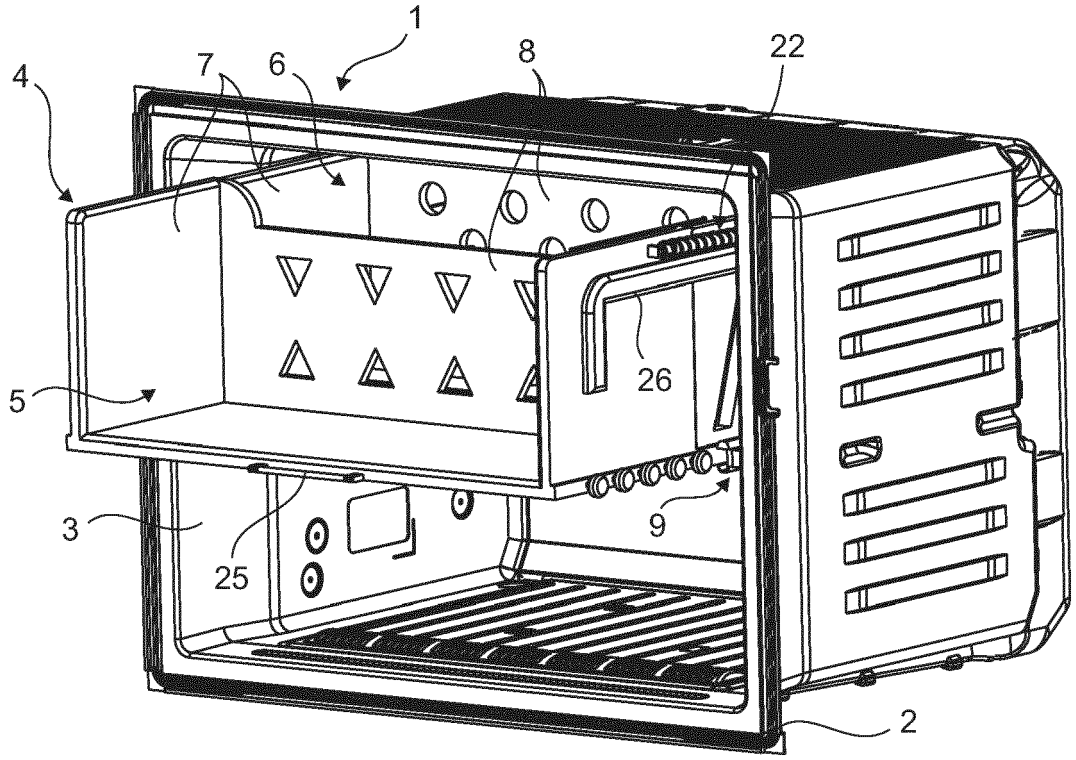


Figure 3

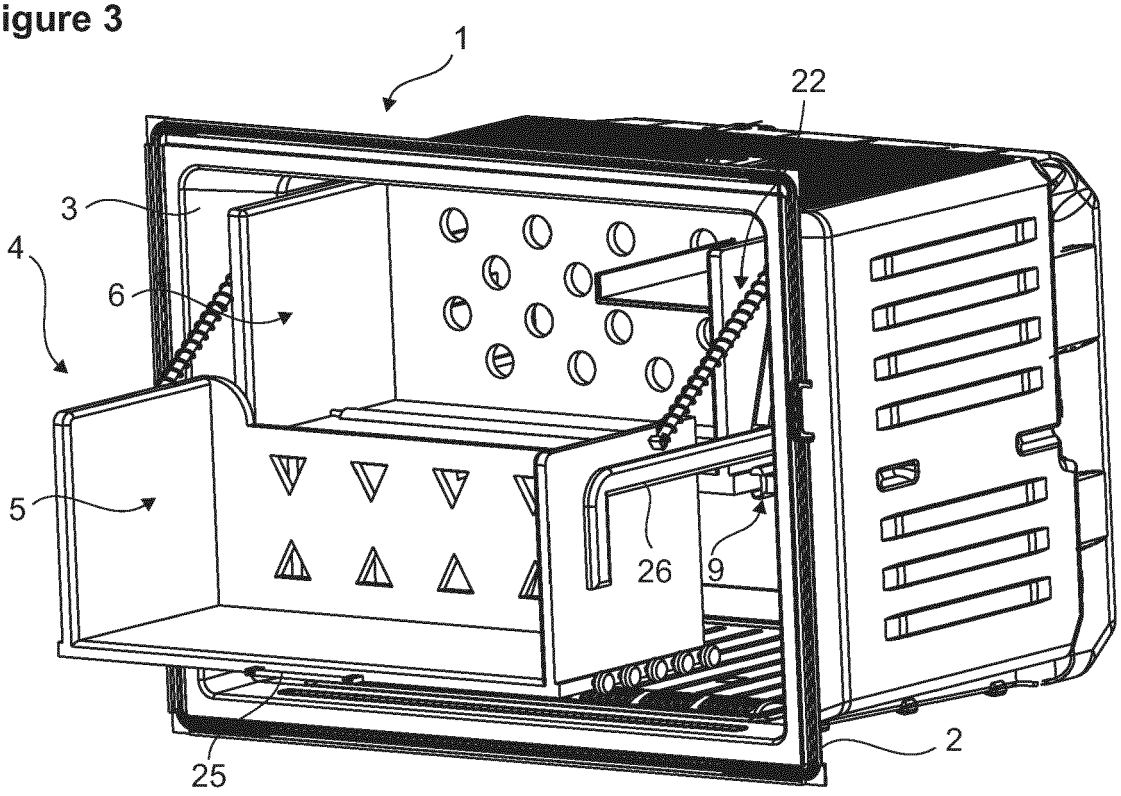


Figure 4

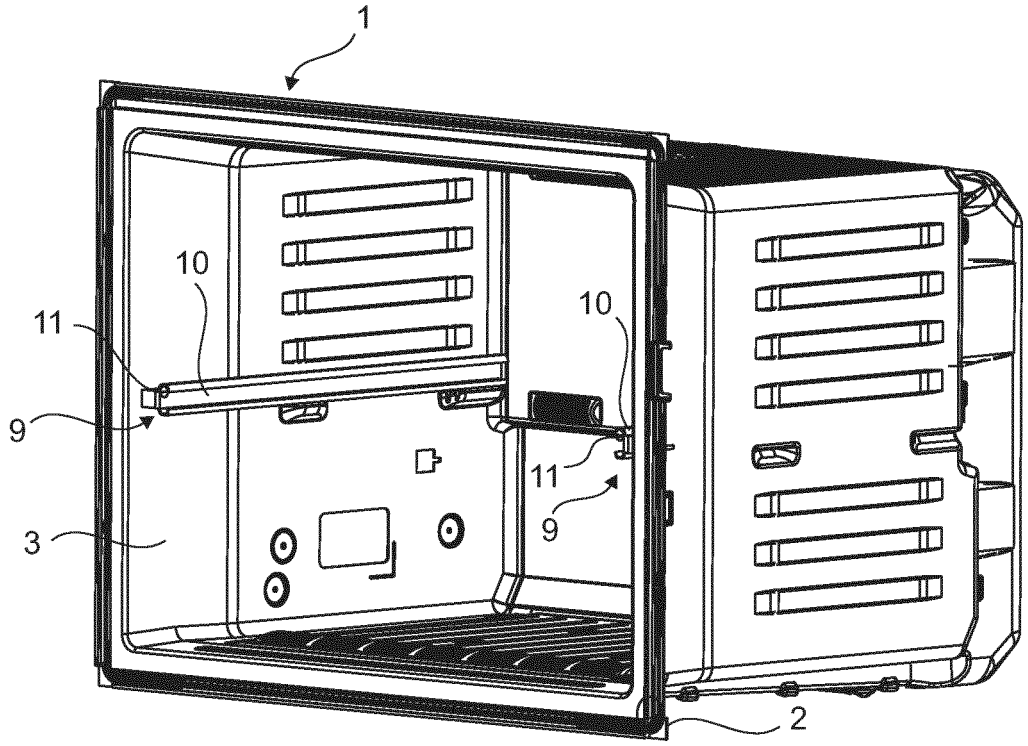


Figure 5

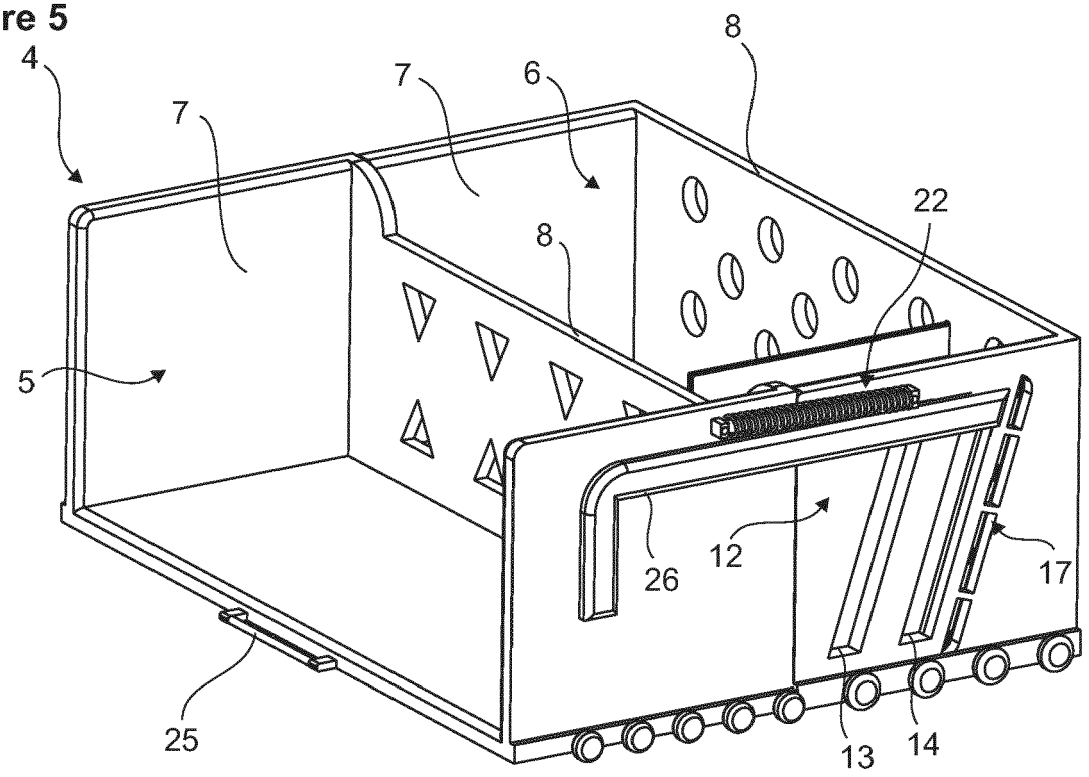


Figure 6

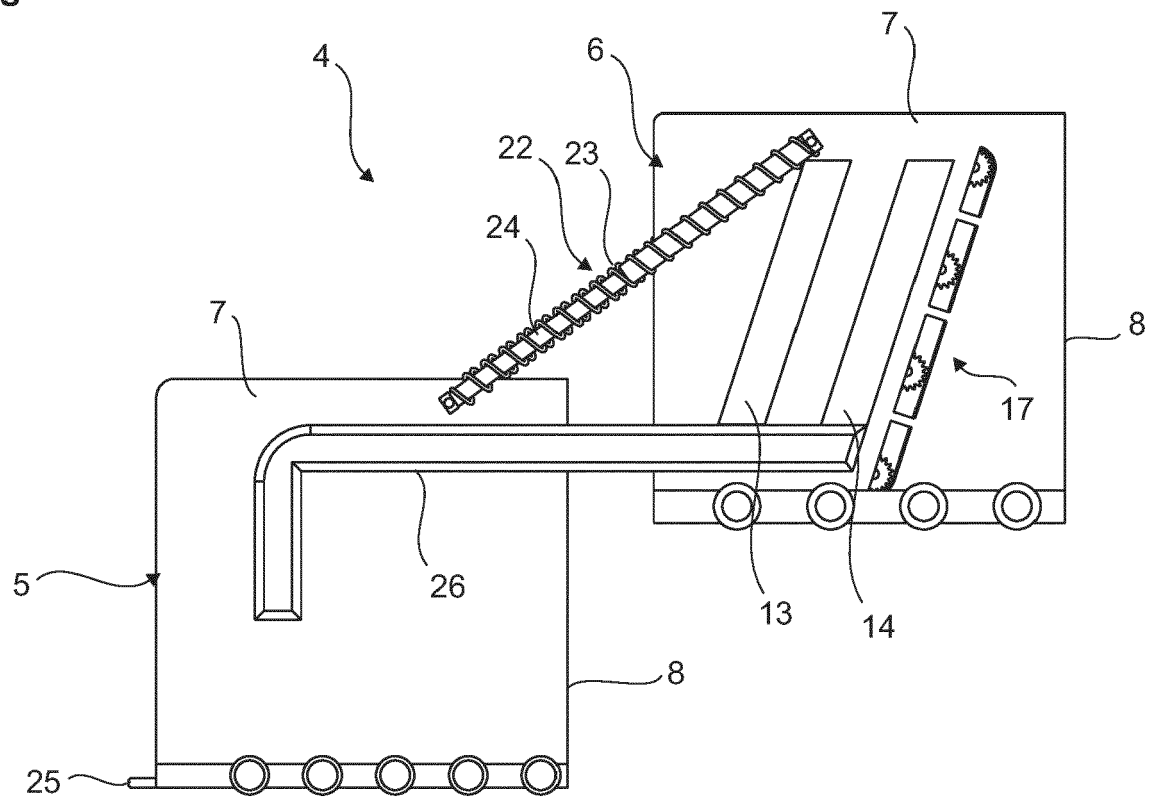
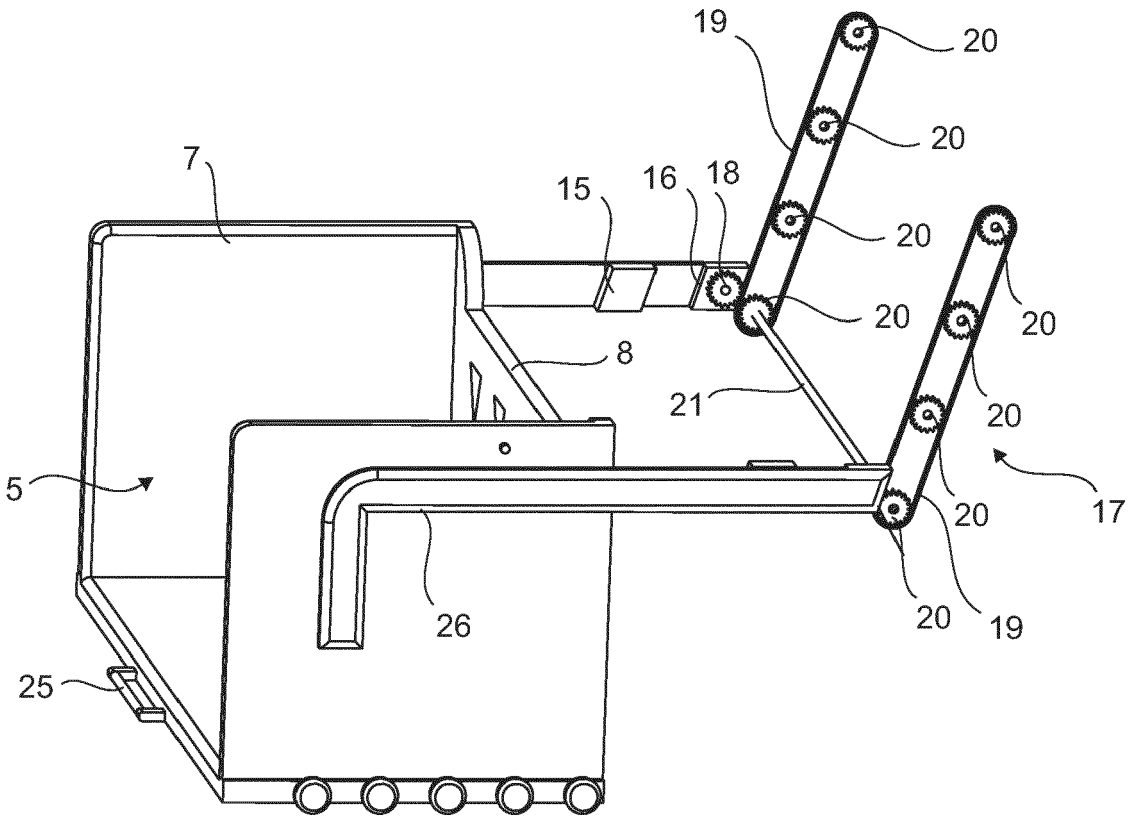


Figure 7



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EUROPEAN SEARCH REPORT

Application Number
EP 22 19 8926

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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TECHNICAL FIELDS SEARCHED (IPC)

F25D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	16 February 2023	Canköy, Necdet

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