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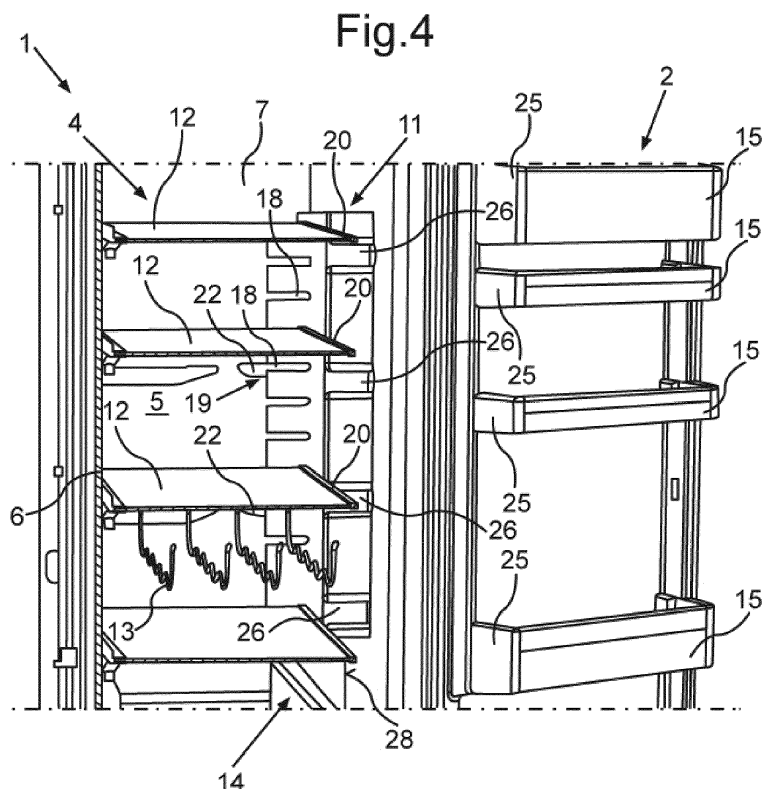
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(54) **HOUSEHOLD REFRIGERATING DEVICE WITH A TRANSPORT SECURING ELEMENT**

(57) The invention relates to a household refrigeration (1) device with an inner container (4) delimiting a storage space (5) for goods. The inner container (4) comprises a rear wall (6), two sidewalls (7,8), a top wall (9) and a bottom wall (10). The household refrigeration device (1) comprises a transport securing element (11) con-

figured to hold at least one equipment element (12, 13, 14, 15) in place, which is arranged within the inner container (4). The transport securing element (11) is fixed to one of the sidewalls (7) of the inner container (4) by means of at least one protrusion (22) which is engaged in a corresponding recess (19).



Description

[0001] The invention relates to a household refrigeration device with an inner container delimiting a storage space for goods and with a transport securing element configured to hold removable equipment elements in place which are arranged in the inner container.

[0002] Document DE19621542A1 describes a refrigerator with a transport securing element which is attached to shelves arranged within an inner container of the refrigerator. The transport securing element has also recesses which accommodate equipment elements arranged at a door of the refrigerator, when the door is closed.

[0003] Such a transport securing element does not reliably prevent the movement of the shelves and the equipment elements arranged at the door during transport. This is due to the fact that the shelves can move in an upward direction together with the equipment arranged at the door.

[0004] Moreover, document WO2014/170167A1 describes a household refrigerator with a transport securing element having a V-shape. The transport securing element is attached to the shelves arranged within the inner container of the refrigerator.

[0005] It is desirable that equipment which can be arranged within the inner container of a refrigeration device such as shelves, drawers, bottle racks, door racks and the like are designed in such a manner that a user can remove, displace and extract such equipment without difficulties. However, this advantage for the user turns out to be a disadvantage during the logistic distribution, i.e. the transport of such household refrigeration devices. The reason is that the degree of freedom of such mobile or removable equipment can cause damages and friction if the equipment is not secured in place during transport.

[0006] For securing such equipment elements during transport for example adhesive tapes, cardboard pieces or plastic pieces are employed. However, adhesive tapes are not very reliable. This is due to the fact that the correct placement of such adhesive tapes depends on the operator applying such tapes. It is therefore difficult to assure that the equipment is correctly fastened or secured. Cardboard pieces have the disadvantage that the mobile equipment arranged within the inner container of the refrigeration device can suffer friction and abrasion caused by the cardboard material. This is due to the fact that cardboard pieces have a rather rough surface structure which can lead to scratches in particular due to a relative movement between the cardboard piece and the mobile equipment during transport.

[0007] It is therefore the object of the present invention to provide a household refrigeration device of the initially mentioned kind with an improved transport securing element.

[0008] This object is solved by a household refrigeration device having the features of claim 1. Advantageous configurations with convenient further developments of

the invention are specified in the dependent claims.

[0009] The household refrigeration device according to the invention comprises an inner container delimiting a storage space for goods. The inner container comprises a rear wall, two sidewalls, a top wall and a bottom wall. The household refrigeration device also comprises a transport securing element which is configured to hold at least one equipment element in place, which is arranged within the inner container. Herein the transport securing element is fixed to one of the sidewalls of the inner container by means of at least one protrusion which is engaged in a corresponding recess.

[0010] The indications "upper", "lower", "top", "front", "bottom", "floor", "horizontal", "vertical", "depth direction", "width direction", "height direction" and the like refer to the positions and orientations of the device in its intended use position with respect to an observer located in front of the device and regarding towards the device.

[0011] As the transport securing element is fixed to the sidewall of the inner container, any movement of mobile equipment elements which are arranged within the inner container can be reliably avoided. This is due to the fact that the transport securing element is securely held in place itself by being fixed to the sidewall. Thus, the transport securing element can also hold equipment elements in place reliably, which are arranged within the inner container. To achieve this, the transport securing element does not need to extend throughout the entire height of the storage space of the inner container. Therefore, even a comparatively small transport securing element or transporting securing piece is sufficient to hold the mobile or removable equipment elements in place during transport. The household refrigeration device therefore comprises an improved transport securing element.

[0012] The transport securing element which is fixed to one of the sidewalls of the inner container allows also to hold removable or displaceable equipment elements in place, which are arranged at a door of the household refrigeration device. Therefore, by utilizing the improved transport securing element or transport securing piece all equipment elements arranged within the inner container can be securely held in place or fixed in their correct position.

[0013] If the sidewall, to which the transport securing element is fixed has recesses or slots or the like, the transport securing element can have at least one protrusion corresponding with such a recess or slot in order to reliably and securely fix the transport securing element to the sidewall. Alternatively or additionally, if the sidewall has at least one protrusion or protuberance the transport securing element can have at least one corresponding recess to accommodate such a protrusion or protuberance.

[0014] Preferably, the transport securing element has a plurality of recesses. Herein a protrusion of the sidewall is engaged in at least one of the recesses. Thus, the transport securing element is reliably fixed to the sidewall. Further preferably, a front edge or front portion of

at least one shelf arranged within the inner container is engaged in another one of the recesses. Such a particularly simple configuration as a variety of recesses provided within the transport securing element can be utilized to fix the transport securing element to the sidewall on the one hand and to fix the shelves by means of the transport securing element on the other hand. Depending on the form of the protrusion of the sidewall and the form of front edge of the shelves, the recesses can have the same shape. Alternatively the shape of the recesses for the shelves can differ from the form of the recesses for the protrusions protruding from the sidewall.

[0015] A particularly reliable fixation of the shelves and the transport securing element can be achieved, if at least one shelf rests on one of the protrusions of the sidewall, and two adjacent recesses accommodate this protrusion on the one hand and the front edge of the shelf resting on the protrusion on the other hand. Herein the recess for the protrusion can originate from the recess accommodating or receiving the front edge or front portion of the shelf which rests in this protrusion.

[0016] The recesses can in particular be equally spaced from each other. This facilitates the utilization of the same transport securing element for different types of household refrigeration devices.

[0017] It has further proven advantageous if the transport securing element has a contact area which abuts against a section of the sidewall. Herein a thickness of the contact area is substantially equal to a space between an equipment element arranged at a door of the household refrigeration device and the sidewall, when the door is closed. The contact area which preferably extends along the total height of the transport securing element leads to a particularly good fixation of the transport securing element to the sidewall. This is due to the fact that a movement of the transport securing element relative to the sidewall can be easily avoided as a large plane of the transport securing element, i.e. the contact area abuts against the sidewall.

[0018] Furthermore, the contact area of the transport securing element can be clamped between the equipment elements arranged at the door and the sidewall. In other words the thickness of the transport securing element in the contact area substantially corresponds to a distance between a side face of at least one of the equipment elements arranged at the door and the sidewall. This also leads to a particularly secure and reliable fixation of the transport securing element to the sidewall.

[0019] Preferably, the transport securing element has at least one protrusion configured to limit an upward and/or a downward movement of at least one equipment element arranged at a door of the household refrigeration device. The at least one protrusion limits the respective movement of the equipment elements arranged at the door, when the door is closed. Such protrusions do not need to be in contact with an upper side and/or a lower side of the equipment element arranged at the door. It is sufficient if these protrusions limit the movement of the

equipment element arranged at the door to an extent which avoids that the equipment elements or door racks fall down.

[0020] Therefore, the transport securing element can have a small number of such protrusions, for example four protrusions, which are equally spaced from each other, and nevertheless equipment elements arranged at the door at different heights can be securely held in place.

[0021] Preferably, the at least one protrusion protrudes from the contact area of the transport securing element towards the opposite sidewall of the inner container. Such protrusions are particularly effective in preventing the equipment elements arranged at the door of the refrigeration device from falling down.

[0022] In terms of ease of manufacturing it is advantageous if a thickness of the transport securing element in an area with the plurality of recesses is substantially equal to a thickness of the transport securing element at the at least one protrusion which protrudes from the contact area of the transport securing element. This increased thickness of the transport securing element with respect to the thickness in the contact area leads to a very reliable fixation of the transport securing element to the sidewall and to a particularly reliable fixation of the shelves, bottle racks or the like which engage in the recesses of the transport securing element.

[0023] Advantageously a height of the transport securing element is lower than a distance between sides of the top wall and the bottom wall of the inner container, which face each other. Thus, a rather small transport securing element can be utilized to fix all the mobile equipment elements within the inner container. As the transport securing element is fixed to the sidewall, it is not necessary that the transport securing element reaches the ceiling or the floor of the inner container, i.e. the top wall and the bottom wall of the inner container.

[0024] Preferably the transport securing element comprises at least one protrusion which is in contact with a front face of a drawer arranged within the inner container. Such a protrusion reliably prevents any movement of the drawer during transportation of the household refrigeration device.

[0025] The at least one protrusion can in particular be formed as an end section of the transport securing element, wherein this end section protrudes towards the bottom wall of the inner container.

[0026] Finally it has proven advantageous if the transport securing element is made of plastic, in particular of an expanded plastic material such as expanded polystyrene which is commercially available as "porex". Also moulded porex can be utilized to form the transport securing element. Such expanded plastic materials are particularly light weight and also reliably prevent any abrasion due to friction between a surface of the transport securing element and the equipment elements.

[0027] The features and feature combinations mentioned above in the description as well as the features and feature combinations mentioned below in the de-

scription of figures and/or shown in the figures alone are usable not only in the respectively specified combination, but also in other combinations or alone, without departing from the scope of the invention. Thus, implementations are also to be considered as encompassed and disclosed by the invention, which are not explicitly shown in the figures or explained, but arise from and can be generated by separated feature combinations from the explained implementations.

Therefore also embodiments and feature combinations shall be considered as disclosed, which do not have all the features of an originally drafted independent claim.

[0028] Further advantages, features and details of the invention are apparent from the claims, the following description of preferred embodiments as well as based on the drawings in which features having analogous functions are designated with the same reference signs. Therein show:

Fig. 1 a perspective view of a household refrigeration device with a transport securing element fixed to a sidewall of an inner container of the refrigeration device;

Fig. 2 the transport securing element shown in Fig. 1 in a perspective view;

Fig. 3 the transport securing element in another perspective view towards the side which is in contact with the sidewall of the inner container of the refrigeration device shown in Fig. 1;

Fig. 4 a partially cut perspective view of the refrigeration device with the transport securing element being fixed to the sidewall of the inner container, wherein a door of the household refrigeration device is shown in an open position; and

Fig. 5 an enlarged view corresponding to Fig. 4, wherein the door is moved into a closed position.

[0029] A household refrigeration device 1 is shown in a perspective view in Fig. 1. Herein, a door 2 of the refrigeration device 1 is shown in an open position. The refrigeration device 1 is shown as a combination of a refrigerator and a freezer. However, the household refrigeration device 1 can also be a refrigerator or a freezer alone.

[0030] The refrigeration device 1 comprises an outer casing 3 in which an inner container 4 is arranged. The inner container 4 delimits a storage space 5 for goods to be placed in the refrigeration device 1. The inner container 4 comprises a rear wall 6, two sidewalls 7, 8, a top wall 9 and a bottom wall 10. A generally plate-shaped transport securing element 11 is fixed to the sidewall 7. This transport securing element 11 which is preferably made of moulded porex, i.e. an expanded polystyrene,

holds mobile or removable equipment elements in place, which are arranged within the inner container 4 and at an inner side of the door 2. Such equipment elements, which can be removed from the refrigeration device 1 or which can be displaced within the storage space 5, comprise for example a plurality of shelves 12, a bottle rack 13, drawers 14 and door racks 15 arranged at the door 2. It is possible to arrange another transport securing element 11 to the opposite sidewall 8. However, this is not necessary for holding the removable equipment elements in place.

[0031] The fixation of the transport securing element 11 to the sidewall 7 shall be explained with reference to Fig. 2 and Fig. 3. The transport securing element 11 has a first section 16 with a constant thickness 17. The thickness 17 corresponds to an extension of the section 16 in a width direction of the inner container 4, if the transport securing element 11 is fixed to the sidewall 7. The width direction is illustrated by an x-axis in Fig. 1.

[0032] In this section 16 the transport securing element 11 has a number of equally spaced recesses 18, 19 (see Fig. 3). The first recesses 18 are substantially horizontal, i.e. extend into a depth direction illustrated by a z-axis in Fig. 1. The first recesses 18 are configured to receive front edges 20 or front portions of the shelves 12 arranged within the inner container 4 (see Fig. 4). Other recesses 19 in the section 16 (see Fig. 3) are slightly inclined with respect to a plane defined by the x-axis and the z-axis in Fig. 1. These other recesses 19 are configured to accommodate parts of protrusions 22 of the sidewall 7, to which the transport securing element 11 is fixed (see Fig. 4 and Fig. 5). The inclined recesses 19 originate at about a half length of the horizontal recesses 18 and terminate at a rear face 21 of the transport securing element 11. This rear face 21 faces the rear wall 6 of the inner container 4, when the transport securing element 11 is fixed to the sidewall 7. The rear face 21 is a narrow side of the section 16 of the transport securing element 11 and has the thickness 17 (see Fig. 2). Preferably, two adjacent recesses 18, 19 accommodate one protrusion 22 on the one hand and the front edge 20 of the shelf 12 resting on this protrusion 22 on the other hand (see Fig. 4).

[0033] A side of the section 16 of the transport securing element 11, which can be seen in Fig. 3, abuts against the sidewall 7, when the transport securing element 11 is fixed to the sidewall 7.

[0034] The transport securing element 11 further comprises a contact area 23 which also abuts against the sidewall 7 when the transport securing element 11 is fixed to the sidewall 7. In this contact area 23 the transport securing element 11 has a reduced thickness 24. The thickness 24 of the transport securing element 11 in the contact area 23 corresponds to a distance between side faces 25 of the door racks 15 and the sidewall 7, when the door 2 is closed (see Fig. 4 and Fig. 5).

[0035] The transport securing element 11 further has a plurality of protrusions 26, which protrude from the contact area 23 towards the opposite sidewall 8 of the inner

container 4. These protrusions 26, which extend in the width direction (x-axis) of the refrigeration device 1 avoid an upward and a downward movement of the door racks 15 sufficiently to prevent the door racks 15 from falling down.

[0036] By means of at least one of the recesses 19 which corresponds in shape and geometry to at least one of the protrusions 22 protruding from the sidewall 7, the transport securing element 11 is fixed to the sidewall 7. At the same time the transport securing element 11 fixes the shelves 12 as a front section of the shelves 12 comprising the front edge 20 is engaged in one of the other recesses 18, in particular in a recess 18 adjacent to the recess 19 accommodating the protrusion 22, provided in the section 16 of the transport securing element 11 (see Fig. 4).

[0037] As can be further seen from Fig. 4 in combination with Fig. 2 and Fig. 3, another protrusion 27 of the transport securing element 11 is in contact with a front face 28 of one of the drawers 14 arranged within the inner container 4. This protrusion 27 is formed as an end section of the transport securing element 11, which protrudes towards the bottom wall 10 of the inner container 4 (see Fig. 3).

[0038] The protrusions 22, which act as guides for the shelves 12 introduced in the storage space 5 of the inner container 4 keep the transport securing element 11 in its position within the storage space 5. In other words, the protrusions 22 which are engaged in the recesses 19 of the transport securing element 11 keep the transport securing element 11 fixed to the sidewall 7 (see Fig. 4).

[0039] In a next step the door 2 is closed (see Fig. 5). In this position of the door 2 the protrusions 26 of the transport securing element 11 avoid the upward and downward movement of the door racks 15 sufficiently to prevent a detachment of the door racks 15 from the door 2. Therefore, by fixing the transport securing element 11 to the sidewall 7, also the door racks 15 remain fixed or at least positioned at their correct position at the door 2 by means of the transport securing element 11 once the door 2 is closed.

LIST OF REFERENCE SIGNS

[0040]

1	refrigeration device
2	door
3	casing
4	inner container
5	storage space
6	rear wall
7	sidewall
8	sidewall
9	top wall
10	bottom wall
11	transport securing element
12	shelf

13	bottle rack
14	drawer
15	door rack
16	section
5 17	thickness
18	recess
19	recess
20	front edge
21	rear face
10 22	protrusion
23	contact area
24	thickness
25	side face
26	protrusion
15 27	protrusion
28	front face

Claims

1. Household refrigeration device with an inner container (4) delimiting a storage space (5) for goods, wherein the inner container (4) comprises a rear wall (6), two sidewalls (7, 8), a top wall (9) and a bottom wall (10), and with a transport securing element (11) configured to hold at least one equipment element (12, 13, 14, 15) in place, which is arranged within the inner container (4), **characterized in that** the transport securing element (11) is fixed to one of the sidewalls (7) of the inner container (4) by means of at least one protrusion (22) which is engaged in a corresponding recess (19).
2. Household refrigeration device according to claim 1, **characterized in that** the transport securing element (11) has a plurality of recesses (18, 19), wherein a protrusion (22) of the sidewall (7) is engaged in at least one of the recesses (19) and a front edge (20) of at least one shelf (12) arranged within the inner container (4) is engaged in another one of the recesses (18).
3. Household refrigeration device according to claim 2, **characterized in that** at least one shelf (12) rests on one of the protrusions (22) of the sidewall (7), and two adjacent recesses (18, 19) accommodate this protrusion (22) on the one hand and the front edge (20) of the shelf (12) resting on the protrusion (22) on the other hand.
4. Household refrigeration device according to any one of claims 1 to 3, **characterized in that** the transport securing element (11) has a contact area (23) which abuts against a section of the sidewall (7), wherein a thickness (24) of the contact area (23) is substantially equal to a space between an equipment element (15) arranged at a door (2) of the household refrigeration device (1) and the sidewall (7), when

the door (2) is closed.

5. Household refrigeration device according to any one of claims 1 to 4, **characterized in that** the transport securing element (11) has at least one protrusion (26) configured to limit an upward and/or a downward movement of at least one equipment element (15) arranged at a door (2) of the household refrigeration device (1), when the door (2) is closed.

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6. Household refrigeration device according to claim 4 and 5, **characterized in that** the at least one protrusion (26) protrudes from the contact area (23) of the transport securing element (11) towards the opposite sidewall (8) of the inner container (4).

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7. Household refrigeration device according to claim 2 and 6, **characterized in that** a thickness (17) of the transport securing element (11) in an area (16) with the plurality of recesses (18, 19) is substantially equal to a thickness of the transport securing element (11) at the at least one protrusion (26) protruding from the contact area (23) of the transport securing element (11).

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8. Household refrigeration device according to any one of claims 1 to 7, **characterized in that** a height of the transport securing element (11) is lower than a distance between sides of the top wall (9) and the bottom wall (10) of the inner container (4), which face each other.

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9. Household refrigeration device according to any one of claims 1 to 8, **characterized in that** the transport securing element (11) comprises at least one protrusion (27) which is in contact with a front face (28) of a drawer (14) arranged within the inner container (4).

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10. Household refrigeration device according to claim 9, **characterized in that** the at least one protrusion (27) is formed as an end section of the transport securing element (11), protruding towards the bottom wall (10) of the inner container (4).

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11. Household refrigeration device according to any one of claims 1 to 10, **characterized in that** the transport securing element (11) is made of plastic, in particular of an expanded plastic material.

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Fig.1

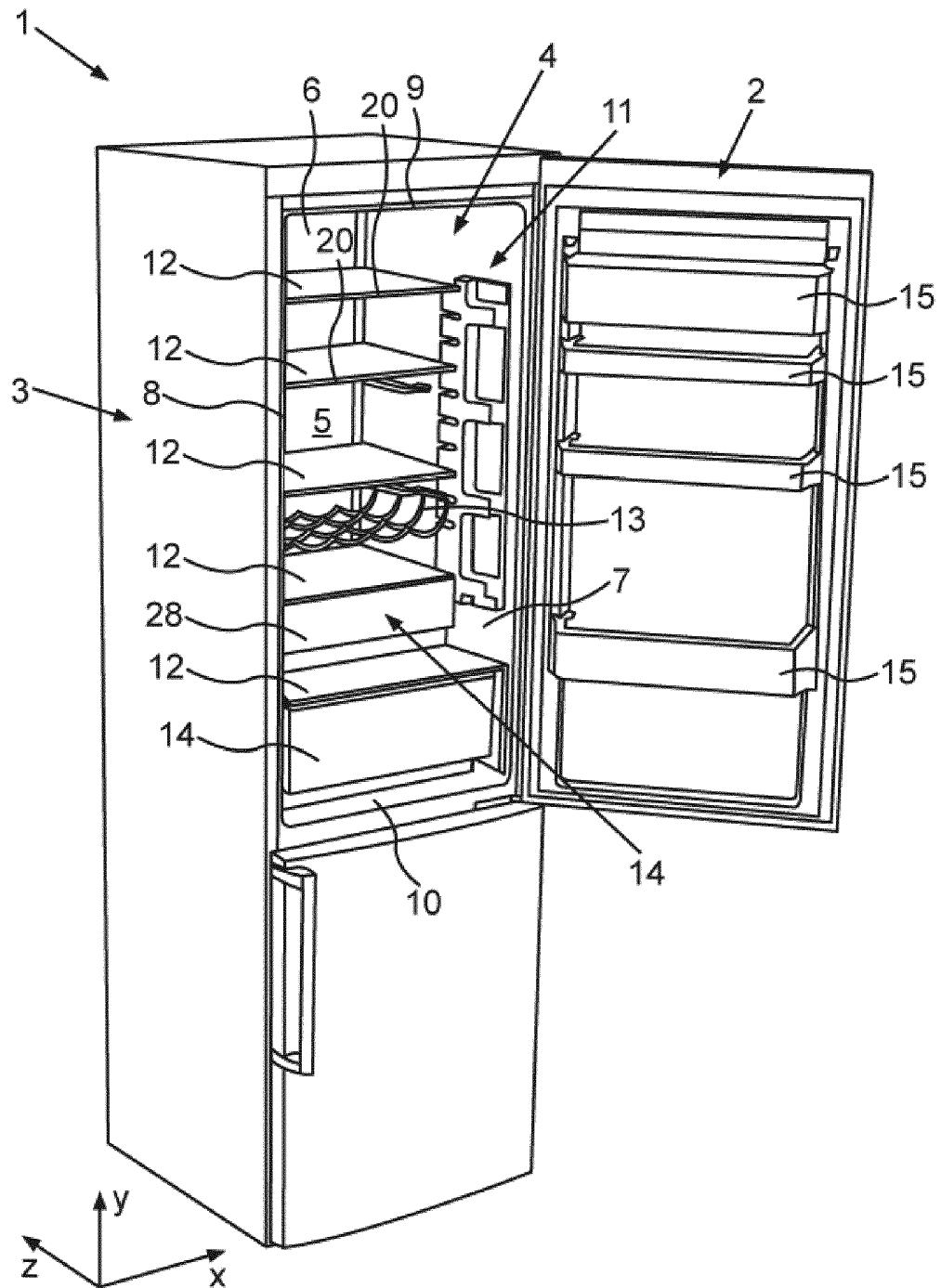


Fig.2

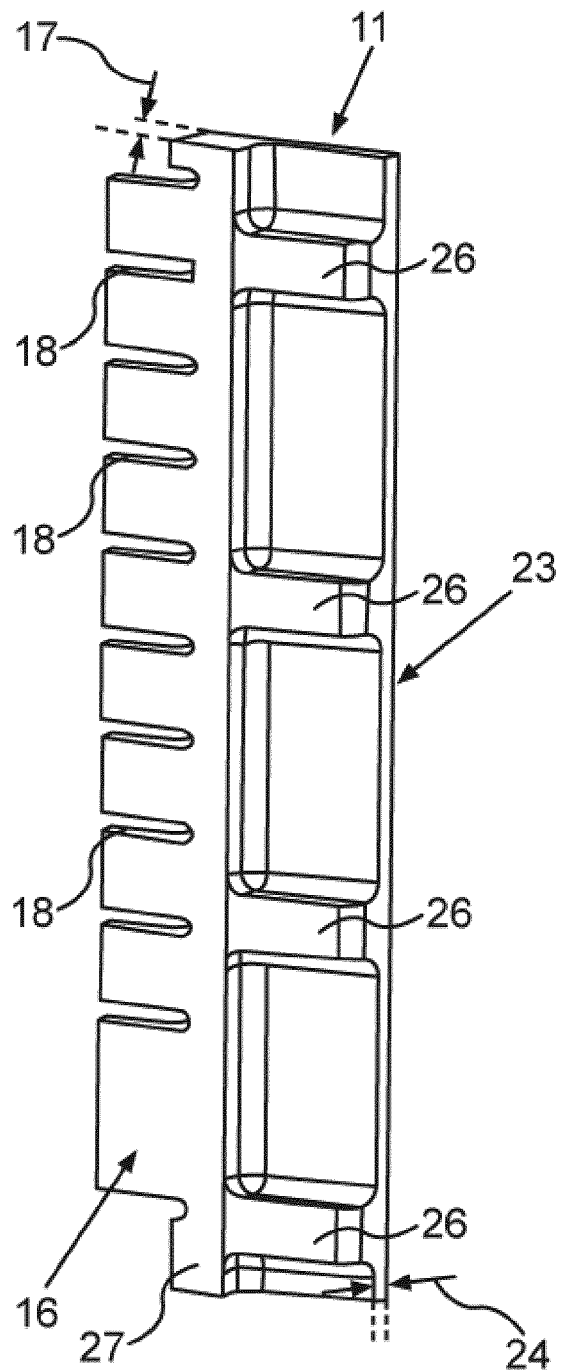


Fig.3

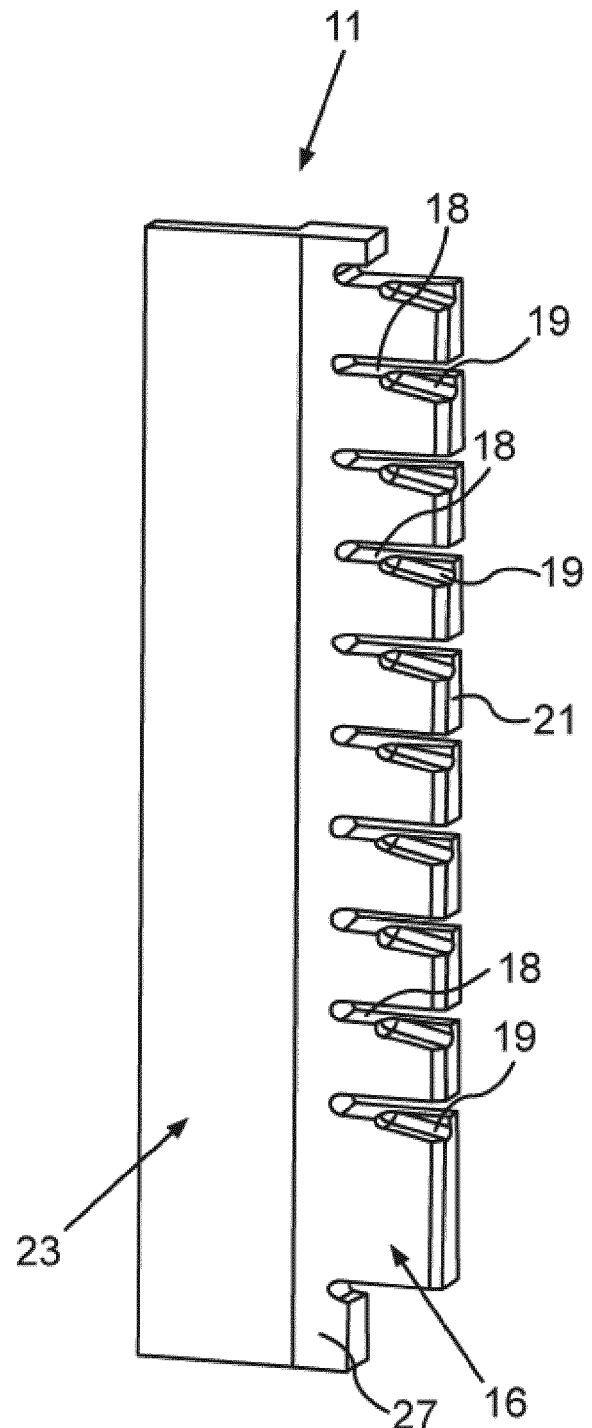


Fig.4

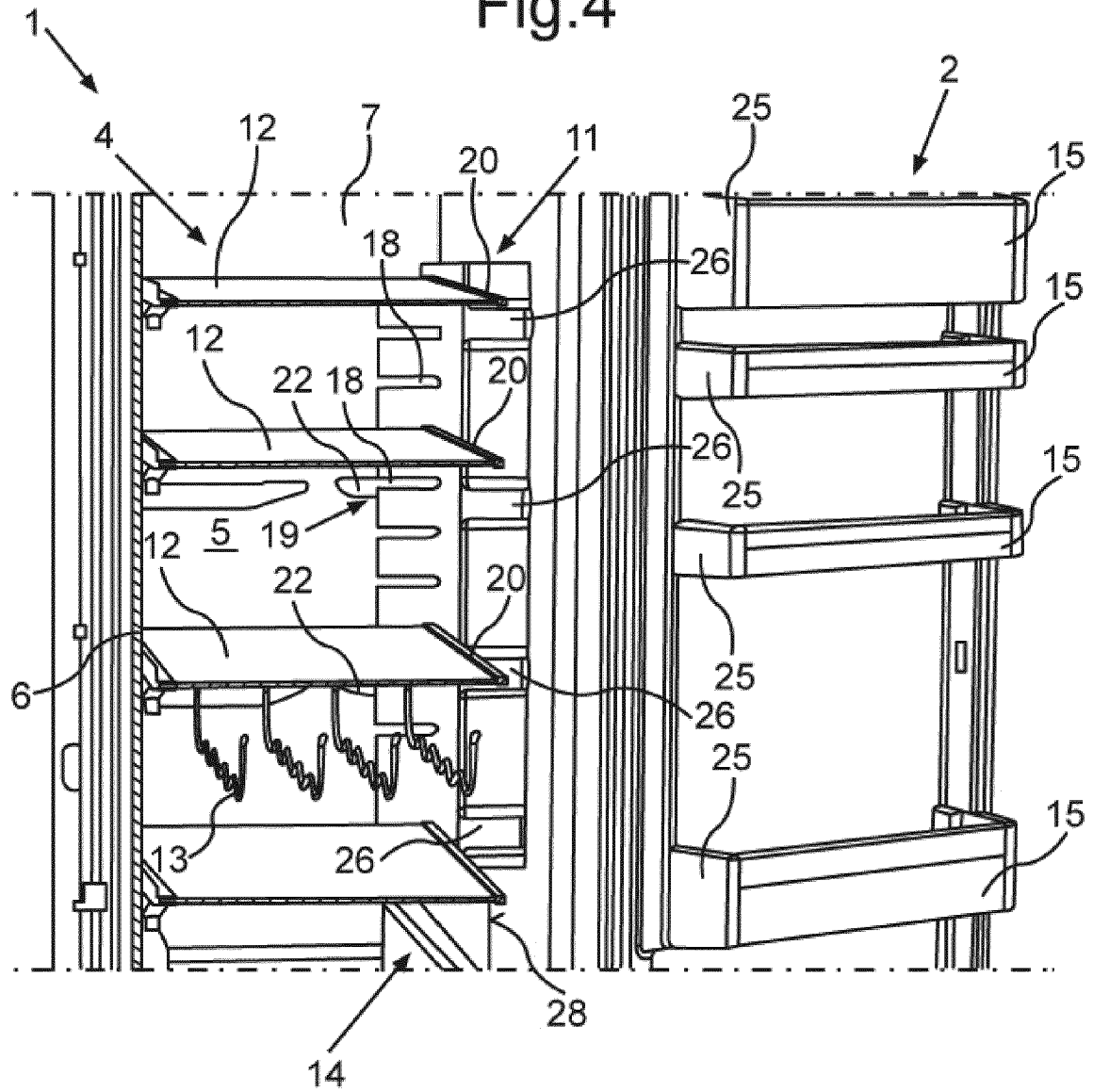
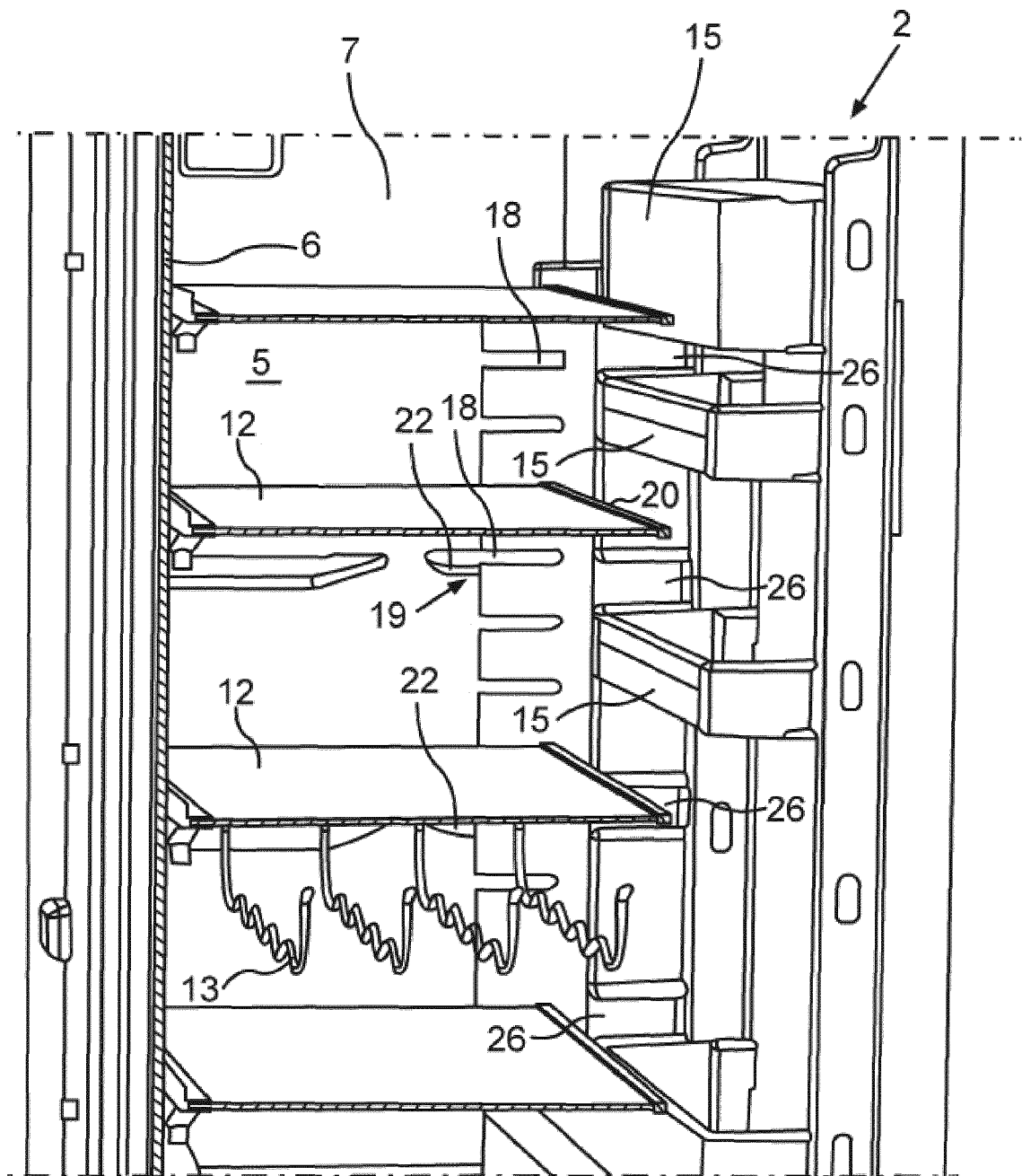


Fig.5





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Application Number
EP 16 19 6167

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EPO FORM 1503 03.82 (P04C01)

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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 20 April 2017	Examiner Léandre, Arnaud
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**ANNEX TO THE EUROPEAN SEARCH REPORT
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