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(54) Title: A HOUSEHOLD COOLING APPLIANCE WITH COLLAPSIBLE SHELF

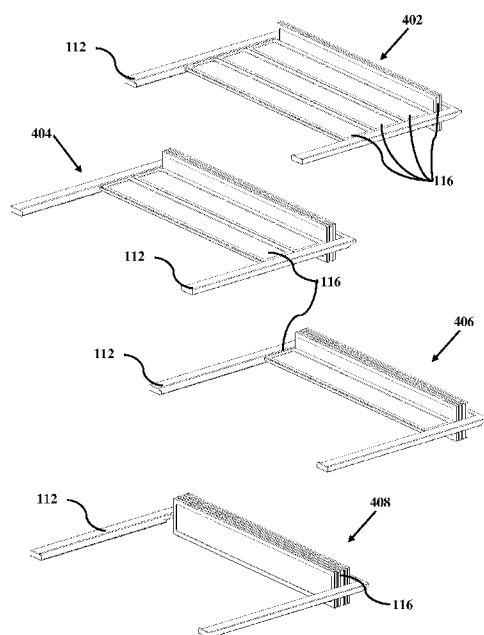


FIG. 4

(57) Abstract: A household cooling appliance (100) is provided comprising at least one storage compartment selected from a freezer compartment (102) and a preservation compartment (104). The household cooling appliance (100) also comprises a frame (112) having guides mounted to side surfaces inside the storage compartment, at least one shelf segment (116) is supported in the frame (112) in a sliding and rotatable manner.



Field of the invention:

[1] The present invention relates to a house-hold cooling appliance, and specifically
5 relates to a collapsible shelf of the house-hold cooling appliance.

Background of the invention:

[2] Existing shelves in a household cooling appliance or refrigerators are made in such a
way that in most of the cases gap between two shelves (upper and lower) is either fixed or
10 limited. Also placing taller items in the refrigerator/fridge is tough because of unavailability
of space.

[3] A patent literature KR20040049679 discloses a shelf structure of refrigerator. The
shelf structure of a refrigerator is provided to divide storage spaces simply without separating
15 shelves in a refrigerator, thereby utilizing upper and lower spaces of the shelves effectively.
The shelf structure of the refrigerator includes a pair of guide parts horizontally mounted to
both side surfaces in a storage chamber of the refrigerator, and a pair of rollers slidably
mounted to the guide parts. A front link plate is rotatably connected to the rollers at a front
end. A first link plate is rotatably connected to a rear part of the front link plate at a front end.
20 A pair of roller parts have front ends rotatably connected to the rear part of the first link plate,
and are mounted to the guide parts slidably. A second link plate is rotatably connected to rear
parts of the roller parts at a front end. A rear link plate has a front end rotatably connected to
the rear part of the second link plate and a rear end rotatably connected to the rear parts of the
guide parts. As the front link plate is pushed, the respective link plates have a predetermined
25 height and are overlapping each other through the rotation of the link plates and sliding of the
roller and roller parts.

Brief description of the invention:

[4] One of the objects of the present invention is to provide a household cooling appliance
30 with easily collapsible shelf.

[5] Another object of the present invention is to provide arrangements in the shelves so to
keep taller items within the storage compartment.

[6] Yet another object of the present invention is to provide a shelf which is retrofit to
35 existing household cooling appliance.

[7] The objects of the present invention are solved by features mentioned in claim 1.

According to a first aspect, a house-hold cooling appliance may comprise at least one storage
5 compartment selected from a freezer compartment and a preservation compartment. The
storage compartment may comprise a frame having guides mounted to inner sides of the
storage compartment. At least one shelf segment may be supported in the frame in a rotating
and sliding manner. The shelf segment may be rotated to horizontal position to serve as a
shelf or a platform. When there is a need for additional space to store taller items, the shelf
10 segment may be rotated to vertical position and moved back towards the rear side of the
storage compartment. Further, there may be a plurality of shelf segments supported in the
frame.

[8] Preferably, each shelf segment may comprise at least one hinge on two opposite sides
of said shelf segment. Further preferably, at least one shelf segment is placed on said frame on
15 said hinges.

[9] Preferably at least one shelf segment is placed on said frame on said two opposite
sides and said hinges.

[10] Preferably, said at least one shelf segment may be rotatable to a flat position /
horizontal position to serve as shelf/platform. Further, the at least one shelf segment may be
20 rotatable to a vertical position.

[11] Preferably, the at least one shelf segment may be foldable and/or movable to the back
of /rearwards to said storage compartment.

[12] Preferably, at least one shelf segment comprises a fixation, in order to fix the at least
one shelf segment in a horizontal position. In addition or alternatively, the at least one shelf
25 segment comprises at least one fixation, in order to fix the at least one shelf segment in a
vertical position. Preferably, the fixation is a seat and/or a projection. Preferably, the at least
one shelf segment comprises at least one seat at its front side and/or its rear side. Preferably,
the at least one shelf segment comprises at least one projection at its front side and/or its rear
side.

[13] Preferably a projection of a first shelf segment may rest on a seat of a second shelf
segment. Preferably, the first and the second shelf segment may be arranged next to each
other.

[14] Preferably, the frame may comprise an opening to allow rotation and/or moving of
said at least one shelf segment. Preferably, the opening may be at least one recess. Preferably,

the frame may comprise at least two recesses, which are arranged at the left and right sides of the frame.

[15] According to a second aspect, a shelf for a storage compartment of a household cooling appliance may comprise a frame, wherein at least one shelf segment may be supported in said frame in a sliding and rotatable manner. The shelf segment may be rotatable to horizontal position to serve as a shelf and rotated to vertical position and moved towards rear side of the storage compartment to provide additional storage space within the storage compartment.

[16] Preferably, all features and embodiments discussed with regard to the first aspect may be features and embodiments according to the second aspect. Preferably, the first and the second aspect may be combined or used in combination within one household cooling appliance.

Brief description of the accompanying drawings:

[17] An embodiment of the disclosure is described with reference to the following accompanying drawings,

[18] Fig. 1 illustrates a household cooling appliance, according to an embodiment of the present invention;

[19] Fig. 2 illustrates the household cooling appliance with folded shelf, according to an embodiment of the present invention;

[20] Fig. 3 illustrates the components of shelf, according to an embodiment of the present invention;

[21] Fig. 4 illustrates the collapsible configurations of the shelf, according to an embodiment of the present invention,

[22] Fig. 5 illustrates a shelf segment, according to an embodiment of the present invention.

Detailed description of the embodiments:

[23] Fig. 1 illustrates a household cooling appliance, according to an embodiment of the present invention. The household cooling appliance 100 comprises at least one storage

compartment selected from a freezer compartment 102 and a preservation compartment 104. The household cooling appliance 100 also comprises a frame 112 having guides mounted to side surfaces of the storage compartment. The shelf segment 116 is supported in the frame 112 in a sliding and rotatable manner. Plurality of conventional shelves 106 are shown just for illustrative purpose. In the present invention, a shelf 106 having collapsible/foldable structure or feature is disclosed which can also be used as a conventional shelf 106.

[24] Further in the enlarged view 110, ribs 114 are shown on which the frame 112 is placed similar to other shelves 106. A door 108 is provided to close the storage compartment.

[25] Fig. 2 illustrates the household cooling appliance with folded shelf, according to an embodiment of the present invention. In a first arrangement 204 and a second arrangement 206, a food or beverage item such as soft drinks bottle 202 is shown kept on a lower shelf 106 and below an upper shelf 106. If the shelf 106 in the middle is not adjustable or collapsible, then the bottle 202 has to be accommodated either inside the door bins or kept outside the household cooling appliance 100. However, the shelf 106 in the middle or between the lower shelf 106 and the upper shelf 106 is foldable or collapsible.

[26] The at least one shelf segment 116 is rotatable to a flat position to serve as shelf 106 or a platform. The at least one shelf segment 116 is foldable and movable to back of the storage compartment to provide an additional storage space within the storage compartment. In the first arrangement 204, the shelf 106 in the middle is shown folded with two shelf segments 116 still remaining on the frame 112, whereas the other shelf segments 116 are rotated and folded back. In the second arrangement 206, the shelf 106 in the middle is shown completely folded with all the shelf segments 116 rotated to vertical position and moved back.

[27] Fig. 3 illustrates the components of shelf, according to an embodiment of the present invention. Each of the shelf segments 116 of the shelf 106 comprises a hinge 1162 on its two opposite sides. The at least one shelf segment 116 is placed on the frame 112 on the hinges 1162.

[28] The frame 112 is shown which is either fit inside the storage compartment or placed over the ribs 114 inside the storage compartment of the household cooling appliance 100. The frame 112 comprises hollow space which functions as guide. The guides receive the two

opposite sides of the shelf segment 116 and the respective hinges 1162. Since the two sides of each of the shelf segments 116 are rested on the guides, the shelf 106 is able to provide stable support to the food items kept over the same.

5 [29] The frame 112 further comprises an opening 1122 or cut-section over which only the hinges 1162 of the shelf segments 116 are supported. The two sides bearing the hinges 1162 become free and are allowed to be pivoted, thus enables rotation. The opening 1122 allows rotation and movement of the at least one shelf segment 116.

10 [30] The shelf 106 is shown where the five shelf segments 116 are assembled inside the frame 112. The number of shelf segments 116 are adjustable and must not be understood in a limiting manner.

[31] Fig. 4 illustrates the collapsible configurations of the shelf, according to an
15 embodiment of the present invention. In a shelf 106 comprising five shelf segments 116, a first configuration 402 comprises folding and moving two shelf segments 116 and pushing the remaining three shelf segments 116 to backward to fill the gap. A second configuration 404 shows three shelf segments 116 folded and two shelf segments 116 being flat. A third configuration 406 shows four shelf segments 116 folded, and only one shelf segment 116
20 remaining as flat. A fourth configuration 408 shows that all the shelf segments 116 are folded and moved to the back of the frame 112.

[32] Fig. 5 illustrates a shelf segment, according to an embodiment of the present invention. A side view 502 of the shelf segment 116 is shown with the hinges 1162. A seat 1164 on the
25 rear top edge is formed. Similarly, a projection 1166/ protrusion at front top edge is provided.

[33] A side view 504 of the shelf 106 is provided, where all the five shelf segments 116 are assembled with support of each other. In the view below the side view 504, two shelf segments 116 are shown. Consider the shelf segment 116 to the left side in the view to be first
30 shelf segment 116 and the one to the right side as a second shelf segment 116. The projection 1166 of the first shelf segment 116 rests on the seat 1164 of the second shelf segment 116, providing a flush or flat fitting. Similarly, all the other shelf segments 116 are assembled in the same manner. The assembly of shelf segments 116 in such a manner prevents unintentional rotation of the shelf segment 116 which is near to the opening 1122 of the frame

112. The Flush fitting through projection or seat 1164 is shown as non-limiting example for illustrative purpose. There are different other fitting methods possible to join the shelf segments 116

5 [34] In accordance to an embodiment of the present invention, a shelf 106 for a storage compartment of a household cooling appliance 100 is provided. The shelf 106 comprises a frame 112, and at least one shelf segment 116 is supported in the frame 112 in a sliding and rotatable manner. The shelf segment 116 is rotated to horizontal position to serve as a shelf 106 and rotated to vertical position and moved towards rear side of the storage compartment
10 to provide additional storage space within the storage compartment

[35] Each of the shelf segment 116 comprises a hinge 1162 on two opposite sides of the shelf segment 116.

15 [36] According to an embodiment of the present invention, an easy to use structure for a shelf 106 is provided. The shelf 106 adds value feature to the household cooling appliance 100.

[37] The shelf 106 is standalone apparatus and no additional investment is required to fit to
20 the household cooling appliance 100. The frame 112 is placed on existing ribs 114 provided on sides of the storage compartment. The shelf segments 116 are independent from each other. A collapsible shelf assembly is disclosed which provides an added value feature for the consumers. The shelf assembly comprises simple slide and rotating operation of shelf segments 116 to make shelf 106 collapsible. Further, since the size of the shelf 106 is still
25 same as conventional shelves 106, there is no additional cost. No extra logistics cost is involved.

[38] It should be understood that embodiments explained in the description above are only illustrative and do not limit the scope of this invention. Many such embodiments and other
30 modifications and changes in the embodiment explained in the description are envisaged. The scope of the invention is only limited by the scope of the claims.

List of references:

- 100 → Household cooling appliance
- 102 → Freezer compartment
- 104 → Preservation compartment
- 5 106 → Shelf
- 108 → Door
- 110 → Enlarged view
- 112 → Frame
- 1122 → Opening
- 10 114 → Ribs
- 116 → Shelf segment
- 1162 → Hinge
- 202 → Bottle
- 204 → First arrangement
- 15 206 → Second arrangement
- 402 → First configuration
- 404 → Second configuration
- 406 → Third configuration
- 408 → Fourth configuration
- 20 502 → Side view of the Shelf assembly
- 504 → Side view of the Shelf

We claim:

1. A household cooling appliance (100), comprising
at least one storage compartment selected from a freezer compartment (102)
and a preservation compartment (104), and
a frame (112) having guides mounted to side surfaces of said storage
compartment, characterized in that
at least one shelf segment (116) supported in said frame (112) in a
sliding and rotatable manner.
2. The household cooling appliance (100) according to claim 1, wherein each of said shelf
segment (116) comprises a hinge (1162) on two opposite sides of said shelf segment (116),
and said at least one shelf segment (116) is placed on said frame (112) on said hinges
(1162).
3. The household cooling appliance (100) according to claim 2, wherein said at least one
shelf segment (116) is placed on said frame (112) on said two opposite sides and said
hinges (1162).
4. The household cooling appliance (100) according to one or more of claims 1 to 3, wherein
said at least one shelf segment (116) is rotatable to a flat position to serve as
shelf/platform (106).
5. The household cooling appliance (100)) according to one or more of claims 1 to 4,
wherein said at least one shelf segment (116) is foldable and movable to back of said
storage compartment to provide an additional storage space within said storage
compartment.
6. The household cooling appliance (100)) according to one or more of claims 1 to 5,
wherein said at least one shelf segment (116) comprises a seat (1164) and/or a projection
(1166) on a front side and a rear side respectively.

7. The household cooling appliance (100) according to claim 6, wherein said projection (1166) of a first shelf segment (116) rests on said seat (1164) of a second shelf segment (116).
- 5 8. The household cooling appliance (100) according to one or more of claims 1 to 7, wherein said frame (112) comprises an opening (1122) to allow rotation and moving of said at least one shelf segment (116).
9. A shelf (106) for a storage compartment of a household cooling appliance (100),
10 comprising a frame (112), characterized in that
at least one shelf segment (116) supported in said frame (112) in a sliding and rotatable manner,
said shelf segment (116) rotated to horizontal position to serve as a shelf and
rotated to vertical position and moved towards rear side of the storage
15 compartment to provide additional storage space within the storage compartment.
10. The shelf (106) according to claim 9, wherein each of said shelf segment (116) comprises a hinge (1162) on two opposite sides of said shelf segment (116).

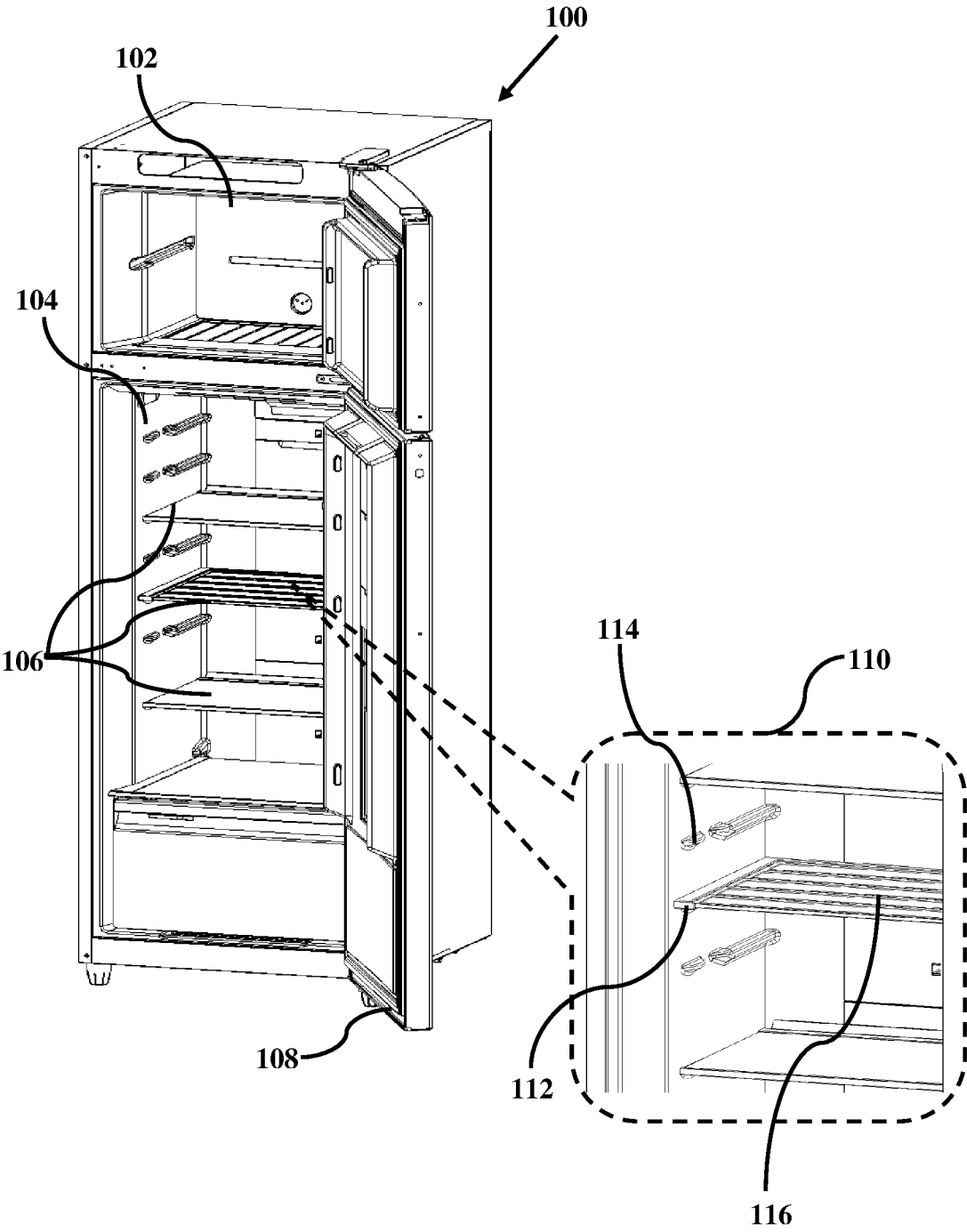


FIG. 1

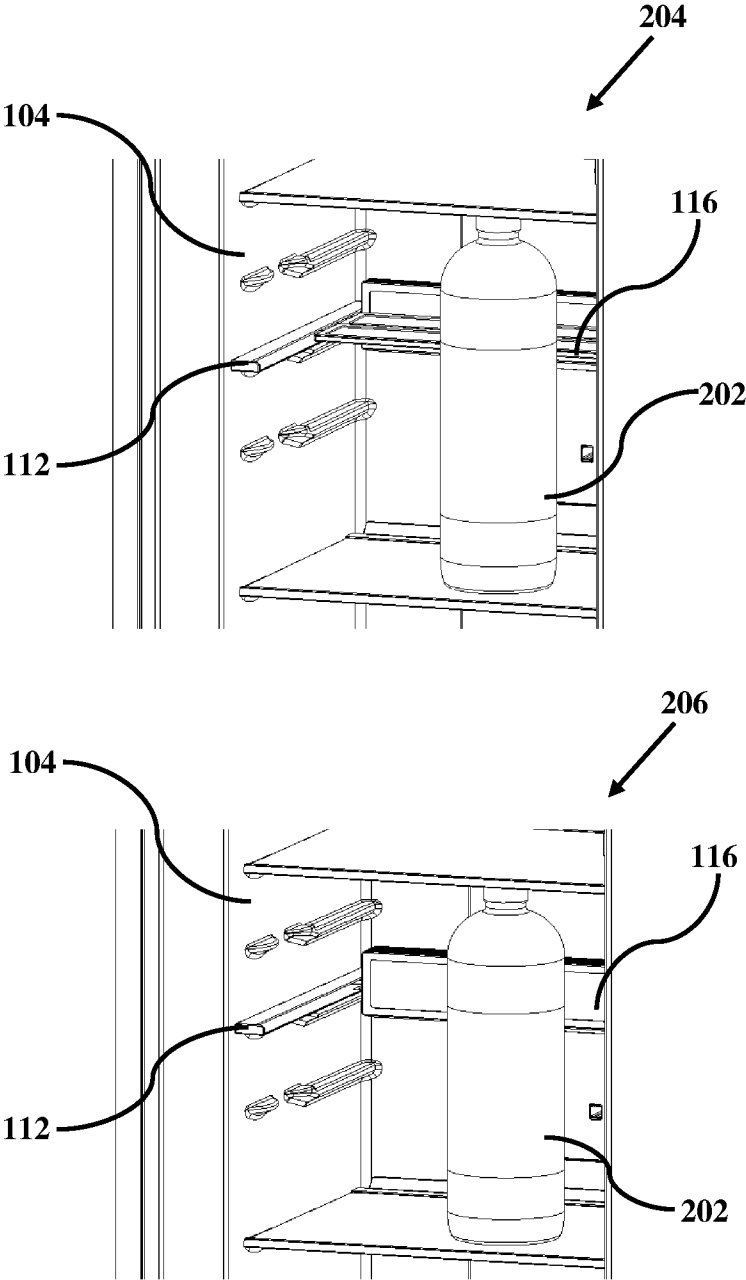


FIG. 2

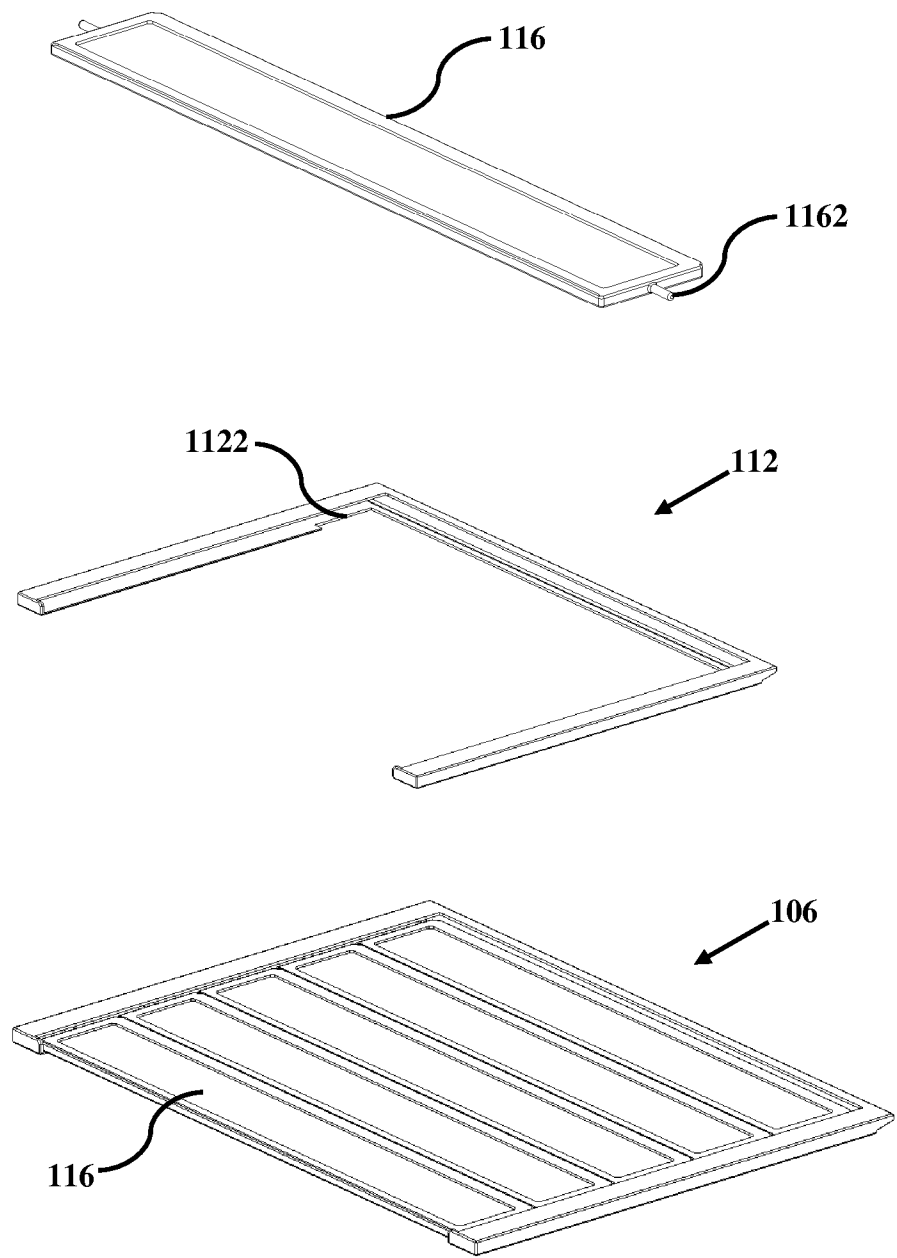


FIG. 3

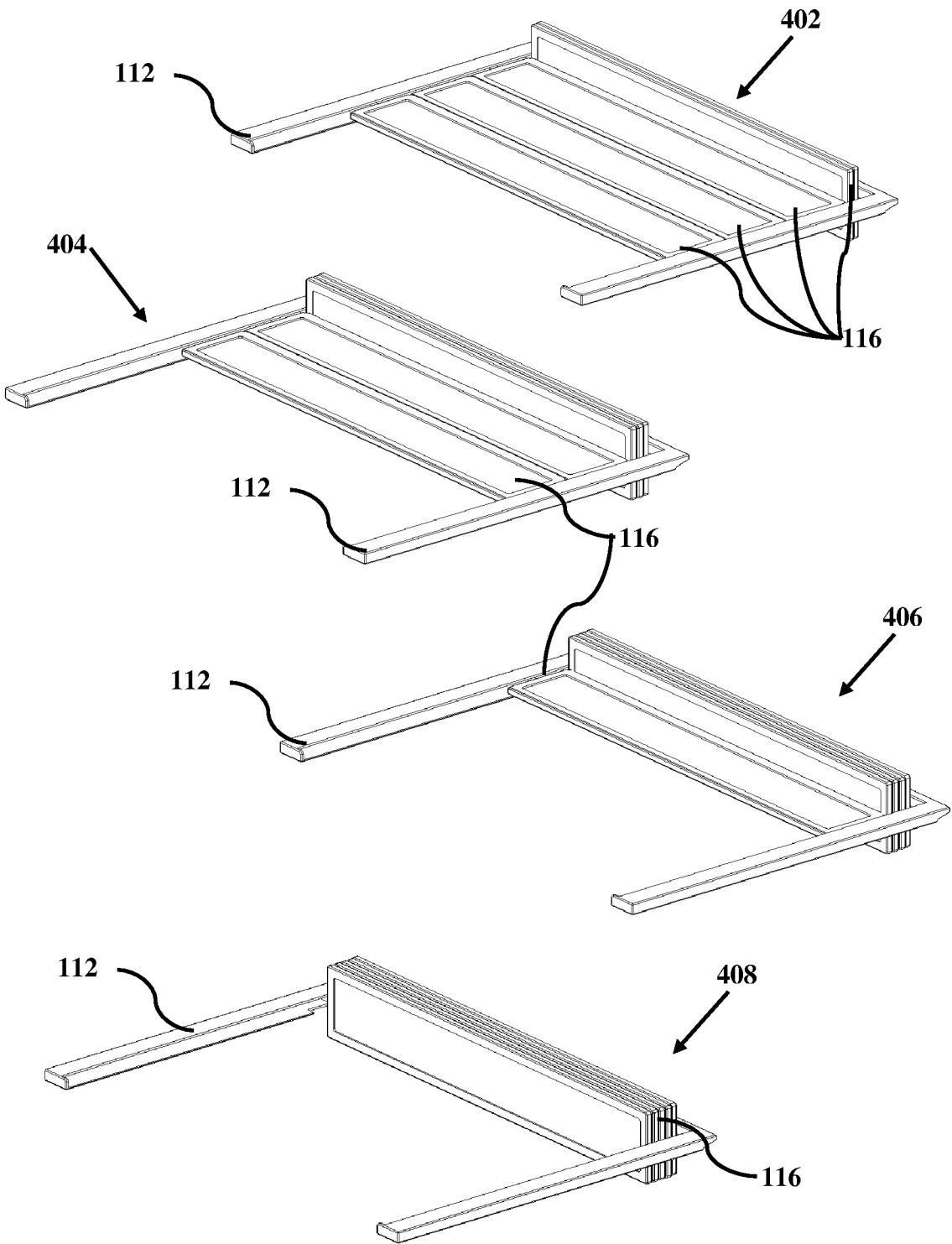


FIG. 4

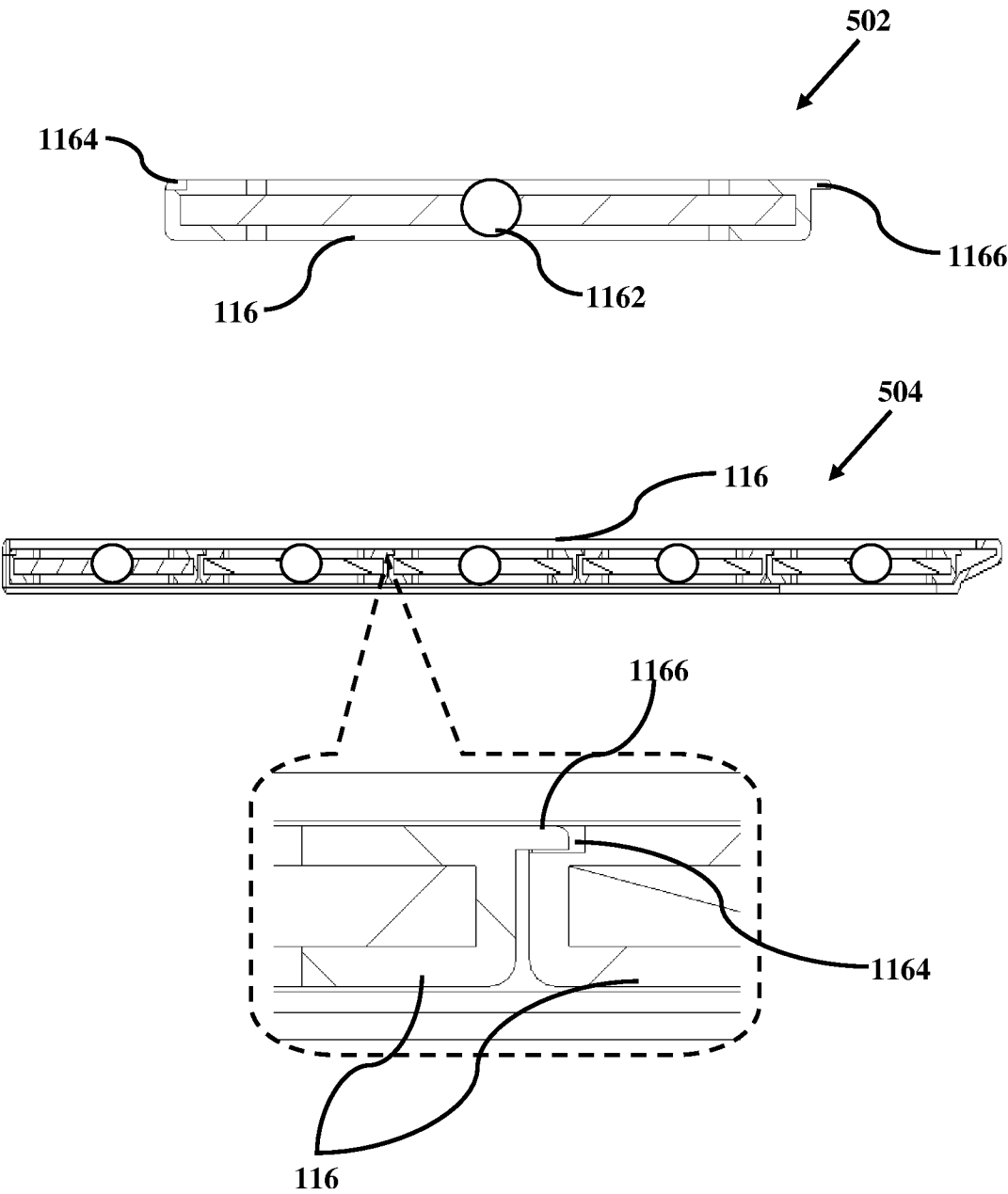


FIG. 5

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2018/059356

A. CLASSIFICATION OF SUBJECT MATTER
INV. F25D25/02 A47B96/02
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
F25D A47B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2008/080943 A1 (ARCELIK AS [TR]; ORUNDU LEVENT [TR]; OZPOLAT BURAK [TR]; AYHAN CAN [TR]) 10 July 2008 (2008-07-10) abstract; figures 1-3 -----	1-5,8-10
X	JP H02 20089 U (N.N.) 9 February 1990 (1990-02-09) figure 1 -----	1-5,8-10
X	DE 197 50 473 A1 (AEG HAUSGERAETE GMBH [DE]) 20 May 1999 (1999-05-20) abstract; figures 1-3 -----	1,4-7,9, 10
X	CN 203 036 995 U (HISENSE BEIJING ELECTRICAL APPLIANCES CO LTD) 3 July 2013 (2013-07-03) figures 1-6 -----	1,4,5,9, 10



Further documents are listed in the continuation of Box C.



See patent family annex.

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Date of the actual completion of the international search

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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