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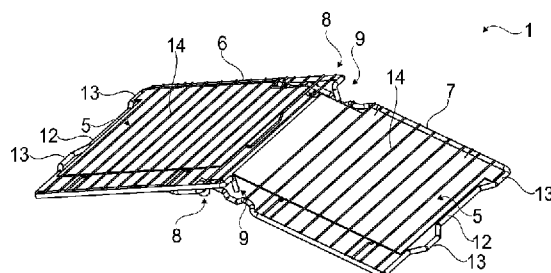
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(54) Title: FOLDABLE SHELF FOR USE IN A REFRIGERATOR

Fig. 1



(57) Abstract: The present invention relates to a shelf (1) for use in a refrigerator (2) which comprises: a refrigeration compartment (3) for refrigerating the articles; and an attachment means (4) for deattachably attaching the shelf (1) into the refrigeration compartment (3).



Description**FOLDABLE SHELF FOR USE IN A REFRIGERATOR**

- [0001] The present invention relates to a refrigerator. The present invention more particularly relates to the shelves of the refrigerator.
- [0002] Refrigerators are commonly known in the art. A refrigerator generally comprises one or more refrigeration compartments, in particular a fresh food compartment and/or a freezer compartment for respectively refrigerating the articles to different temperatures. The refrigerator generally comprises one or more attachment means for detachably attaching one or more shelves respectively into the refrigeration compartments. The attachment means generally comprises channels which are respectively formed into the side walls of the refrigeration compartment in order to slidably receive the shelf along the front-to-rear direction. These channels are generally integrally formed into the inner lining of the refrigeration compartment and extend from the front side to the rear side. The fresh food compartment is generally provided with a plurality of detachable shelves. In contrast thereto, the freezer compartment is generally smaller than the fresh food compartment, and thus provided with a single detachable shelf which divides the freezer compartment into two equal spaces. The user stores various articles into the freezer compartment by placing them side by side and one above the other onto the bottom of the freezer compartment and also onto the storage surface of the shelf inside freezer compartment.
- [0003] WO2015000525 (A1) discloses a refrigerator which comprises a fresh food compartment and a freezer compartment each with one or more detachable shelves.
- [0004] A problem with the prior art domestic refrigerator is that the storage space above and below the shelves in the refrigeration compartments are limited. Thus, there are instances where the user needs to detach the shelf in order to store larger articles. In such instances, the shelf cannot be easily stowed away in the household. Thus the shelf poses a risk to the safety of the user when it is stowed in the household. Moreover it can get easily lost.

- [0005] An objective of the present invention is to provide a shelf which overcomes the aforementioned problems of the prior art in a cost effective way and which enables the user to use the space inside the refrigeration compartments more efficiently and in accordance with his/her actual requirements.
- [0006] This objective has been achieved by the shelf as defined in claim 1, and the refrigerator as defined in claim 6. Further achievements have been attained by the subject-matters respectively defined in the dependent claims.
- [0007] The shelf of the present invention comprises a storage surface which is selectively foldable into a folded state and into an unfolded state, wherein in the folded state the storage surface is released from the attachment means, and in the unfolded state the storage surface is engaged with the attachment means.
- [0008] A major advantageous effect of the present invention is that the user can more easily detach or attach the shelf by way of folding or unfolding it respectively inside the refrigeration compartment. In particular the user can detach/attach the shelf even when the door (not shown) of the refrigeration compartment is not fully opened, and makes an oblique angle with front surface. Another major advantageous effect of the present invention is that the user can more safely stow away the shelf in the folded state in the household. Alternatively the user can stow away the shelf in the folded state within the refrigeration compartment. Another major advantageous effect of the present invention is that the user can personalize the space inside the refrigeration compartment to his/her exact requirements by selectively attaching/detaching the shelf. Another major advantageous effect of the present invention is that the space utilization efficiency of the refrigeration compartment has been improved through the foldable shelf. Thereby, the user satisfaction can be increased.
- [0009] In an embodiment, the left section and the right section of the support surface of the shelf are movably linked. The user can selectively move the left section and the right section between the unfolded state and the folded state. In alternative versions of this embodiment, the left section and the

right section are slidably linked or pivotably linked. In other alternative versions of this embodiment, the left section and the right section of the shelf are releasably linked or permanently linked. These embodiments are particularly advantageous as the user can easily detach /attach the shelf by way of folding/unfolding it respectively inside the refrigeration compartment. These embodiments are also particularly advantageous as the user can easily stow away the shelf in the folded state inside or outside the refrigeration compartment.

- [0010] In another embodiment, the left section and the right section of the shelf are pivotably linked through a hinge. The pivotal movement of the left section and the right section are blocked in the unfolded state through a lock. This embodiment is particularly advantageous as the user can easily install the shelf into the refrigeration compartment.
- [0011] In another embodiment, the lateral sides of the storage surface each comprises one or more protrusions which respectively engage along the left-right direction with one or more indents which are respectively formed into the side walls of the refrigeration compartment. The indents are concealed by the side walls from the front side, and are accessible through the shelf only in the left-right direction which is normal to the side walls. This embodiment is particularly advantageous as the appearance of the refrigeration compartment can be improved in comparison with the aforementioned prior art channels which are exposed to the front side and slidably receive the shelf along the front-to-rear direction. This embodiment is also particularly advantageous as the indents can be formed comparatively shorter in the front-to-rear direction, and thus the shelf can be more securely held in place. Moreover, the amount of thermal insulating foam material behind the side walls can be comparatively increased in the vicinity of the comparatively shorter indents, and thus the refrigeration performance and the energy efficiency of the refrigerator can be further improved.
- [0012] In another embodiment, the shelf has a wire mesh. This embodiment is particularly advantageous as the wire mesh is cost effective and robust. This embodiment is also particularly advantageous as the shelf can be

more securely stowed away in the household.

- [0013] In another embodiment, the shelf is disposed immediately between an upper drawer and a lower drawer which are removably disposed into the refrigeration compartment one above the other. Herein the user can remove the upper drawer, and subsequently attach the shelf into the refrigeration compartment in order to store the articles directly on the storage surface of the shelf. This embodiment is particularly advantageous as the user can use the storage space more efficiently by removing the bulky upper drawer out of the refrigeration compartment and by using the shelf instead.
- [0014] In another embodiment, the refrigerator has a thermal insulating foam material which is disposed behind the inner lining which defines the side walls of the refrigeration compartments. This embodiment is particularly advantageous as the region behind the attachment means can be thermally insulated. Thereby, the refrigeration performance and the energy efficiency of the refrigerator can be further improved.
- [0015] In other alternative embodiments, one or more shelves are disposed into the freezer compartment and/or into the fresh food compartment. This embodiment is particularly advantageous as the shelf can be used for storing fresh food and/or frozen food. Thereby, the usability of the shelf can be further increased.
- [0016] Additional features and additional advantageous effects of the shelf and the refrigerator of the present invention will become more apparent with the detailed description of the embodiments with reference to the accompanying drawings in which:
- [0017] Figure 1 – is a schematic perspective view of a shelf according to an embodiment of the present invention, wherein the shelf is in a partly folded state;
- [0018] Figure 2 – is a schematic side view of the shelf of Fig. 1, wherein the shelf is in a partly folded state;
- [0019] Figure 3 – is a schematic side view of the shelf of Fig. 1, wherein the shelf is in the unfolded state;
- [0020] Figure 4 – is a schematic top view of the shelf of Fig. 1, wherein the shelf

is in the unfolded state;

[0021] Figure 5 – is a schematic partial perspective view of a refrigerator which has a shelf according to an embodiment of the present invention, wherein the shelf is in the unfolded state;

[0022] Figure 6 – is a schematic partial front view of the refrigerator of Fig. 5;

[0023] Figure 7 – is a schematic partial front view of the refrigerator of Fig. 5, wherein the shelf is partly in the folded state;

[0024] Figure 8 – is a schematic perspective view of the refrigerator of Fig. 5, wherein the upper drawer and the lower drawer have been removed from the refrigeration compartment.

[0025] The reference signs appearing on the drawings relate to the following technical features.

1. Shelf
2. Refrigerator
3. Refrigeration compartment
4. Attachment means
5. Storage surface
6. Left section
7. Right section
8. Hinge
9. Lock
10. Indent
11. Side wall
12. Lateral side
13. Protrusion
14. Wire mesh
15. Upper drawer
16. Lower drawer
17. Inner lining

[0026] The shelf (1) is suitable for use in the refrigerator (2) (Fig. 5).

[0027] The refrigerator (2) comprises: a refrigeration compartment (3) for refrigerating the articles; and an attachment means (4) for deattachably attaching the shelf (1) into the refrigeration compartment (3) (Fig. 5).

- [0028] The shelf (1) of the present invention comprises a storage surface (5) which is selectively foldable into a folded state and into an unfolded state (Fig. 1 to Fig. 4). In the folded state the storage surface (5) is released from the attachment means (4) (Fig. 7). In the unfolded state the storage surface (5) is engaged with attachment means (4) (Fig. 6).
- [0029] The refrigerator (2) of the present invention comprises the shelf (1) (Fig. 5 to Fig. 8).
- [0030] In an embodiment, the storage surface (5) comprises a left section (6) and a right section (7) which are movably linked (Fig 1 to 4). In this embodiment, the left section (6) and the right section (7) are adapted to be selectively moved between the unfolded state and the folded state (Fig. 2 and Fig. 3).
- [0031] In another embodiment, the shelf (1) further comprises a hinge (8) which pivotably links the left section (6) and the right section (7) (Fig.1 and Fig. 2). In this embodiment, the shelf (1) further comprises a lock (9) for blocking the pivotal movement of the left section (6) and the right section (7) in the unfolded state (Fig. 3 and Fig. 4).
- [0032] In another embodiment, the attachment means (4) comprises one or more indents (10) which are respectively formed into the side walls (11) of the refrigeration compartments (3) (Fig. 5 and Fig. 8). In this embodiment, the indents (10) are accessible through the shelf (1) only in the left-right direction which is normal to the side walls (11) (Fig. 6 and Fig. 7). In this embodiment, the lateral sides (12) of the storage surface (5) each comprises one or more protrusions (13) which respectively engage along the left-right direction with the indents (10) in the unfolded state (Fig. 1 and Fig. 4).
- [0033] In another embodiment, the storage surface (5) comprises a wire mesh (14) (Fig.1 and Fig. 4).
- [0034] In another embodiment, the refrigerator (2) further comprises: an upper drawer (15) and a lower drawer (16) which are removably disposed into the refrigeration compartment (3) one above the other (Fig. 8). In this embodiment, the attachment means (4) is disposed at a level between the upper drawer (15) and the lower drawer (16) (Fig. 8).

- [0035] In another embodiment, the refrigerator (2) further comprises: an inner lining (17) which defines the side walls (11) (Fig. 5). In this embodiment, a thermal insulating foam material is disposed behind the side walls (11).
- [0036] In another embodiment, the refrigeration compartment (3) is adapted to freeze the articles.
- [0037] A major advantageous effect of the present invention is that the user can more easily detach or attach the shelf (1) by way of folding or unfolding it respectively inside the refrigeration compartment (3). In particular the user can detach/attach the shelf (1) even when the door (not shown) of the refrigeration compartment is not fully opened, and makes an oblique angle with front surface. Another major advantageous effect of the present invention is that the user can more safely stow away the shelf (1) in the folded state in the household. Alternatively the user can stow away the shelf (1) in the folded state within the refrigeration compartment (3). Another major advantageous effect of the present invention is that the user can personalize the space inside the refrigeration compartment (3) to his/her exact requirements by selectively attaching/detaching the shelf (1). Another major advantageous effect of the present invention is that the space utilization efficiency of the refrigeration compartment (3) has been improved through the foldable shelf (1). Thereby, the user satisfaction can be increased. Other advantageous effects of the present invention can be taken from the above-described embodiments.

Claims

1. A shelf (1) for use in a refrigerator (2), comprising: a refrigeration compartment (3) for refrigerating the articles; and an attachment means (4) for detachably attaching the shelf (1) into the refrigeration compartment (3), the shelf (1) being characterized by comprising a storage surface (5) which is selectively foldable into a folded state and into an unfolded state, wherein in the folded state the storage surface (5) is released from the attachment means (4), and in the unfolded state the storage surface (5) is engaged with the attachment means (4).
2. The shelf (1) according to claim 1, characterized in that the storage surface (5) comprises a left section (6) and a right section (7) which are movably linked and adapted to move between the unfolded state and the folded state.
3. The shelf (1) according to claim 2, characterized by further comprising: a hinge (8) which pivotably links the left section (6) and the right section (7); and a lock (9) for blocking the pivotal movement of the left section (6) and the right section (7) in the unfolded state.
4. The shelf (1) according to any one of claims 1 to 3, wherein the attachment means (4) comprises one or more indents (10) which are respectively formed into the side walls (11) of the refrigeration compartments (3), wherein the indents (10) are accessible by the shelf (1) only in the left-right direction which is normal to the side walls (11), the shelf (1) being further characterized in that the lateral sides (12) of the storage surface (5) each comprises one or more protrusions (13) which respectively engage along the left-right direction with the indents (10) in the unfolded state.
5. The shelf (1) according to any one of claims 1 to 4, characterized in that the storage surface (5) comprises a wire mesh (14).
6. A refrigerator (2), comprising: a refrigeration compartment (3) for refrigerating the articles, characterized by further comprising: the shelf (1) as defined in any one of claims 1 to 5; and an attachment means (4) for deattachably attaching the shelf (1) into compartment (3).
7. The refrigerator (2) according to claim 6, characterized by further comprising: an upper drawer (15) and a lower drawer (16) which are removably disposed into the refrigeration compartment (3) one above the other, wherein the

attachment means (4) is disposed at a level between the upper drawer (15) and the lower drawer (16).

8. The refrigerator (2) according to claim 6 or 7, characterized in that the attachment means (4) comprises one or more indents (10) which are respectively formed into the side walls (11) of the refrigeration compartments (3), wherein the indents (10) are accessible by the shelf (1) only in the left-right direction which is normal to the side walls (11).
9. The refrigerator (2) according to any one of claim 6 to 8, characterized by further comprising: an inner lining (17) which defines the side walls (11); and a thermal insulating foam material behind the side walls (11).
10. The refrigerator (2) according to any one of claim 6 to 9, characterized in that the refrigeration compartment (3) is adapted to freeze the articles.

Fig. 1

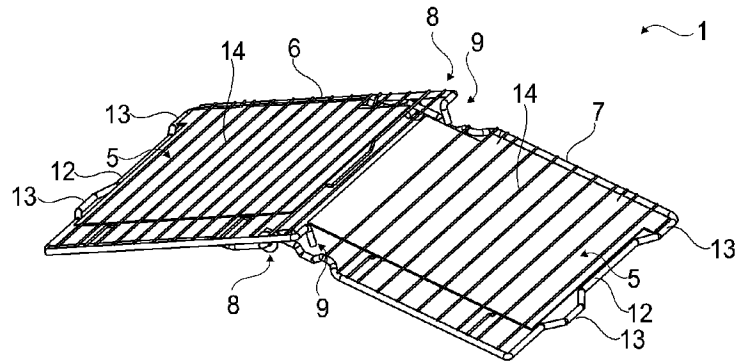


Fig. 2

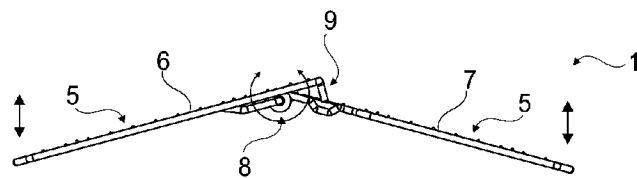


Fig. 3

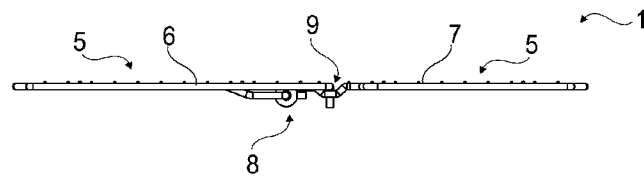


Fig. 4

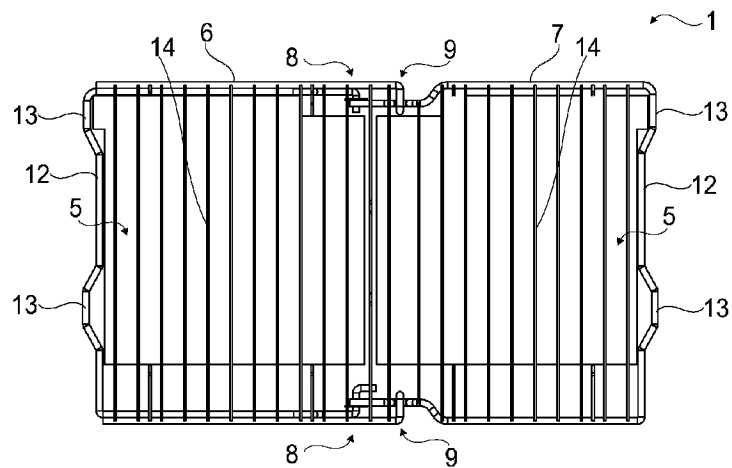


Fig. 5

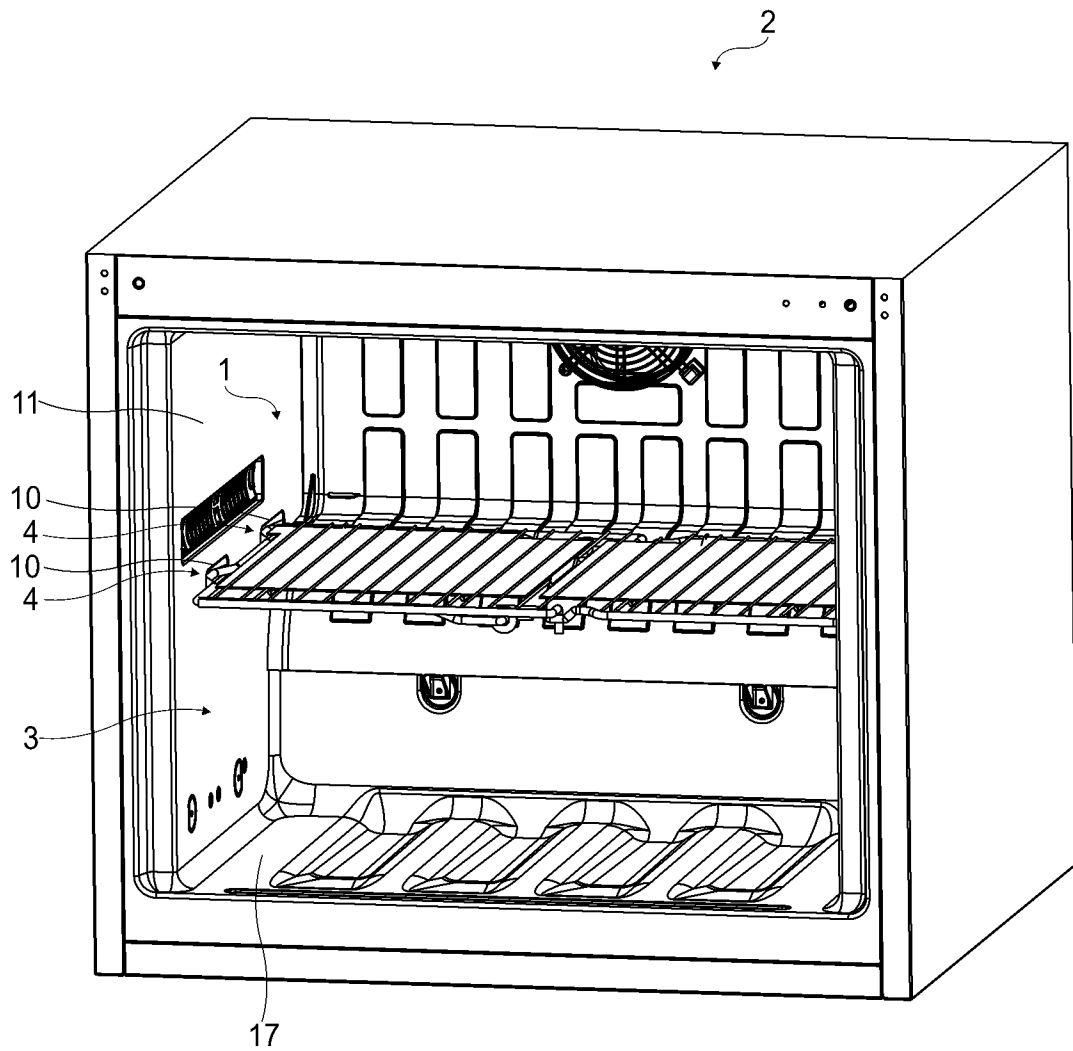


Fig. 6

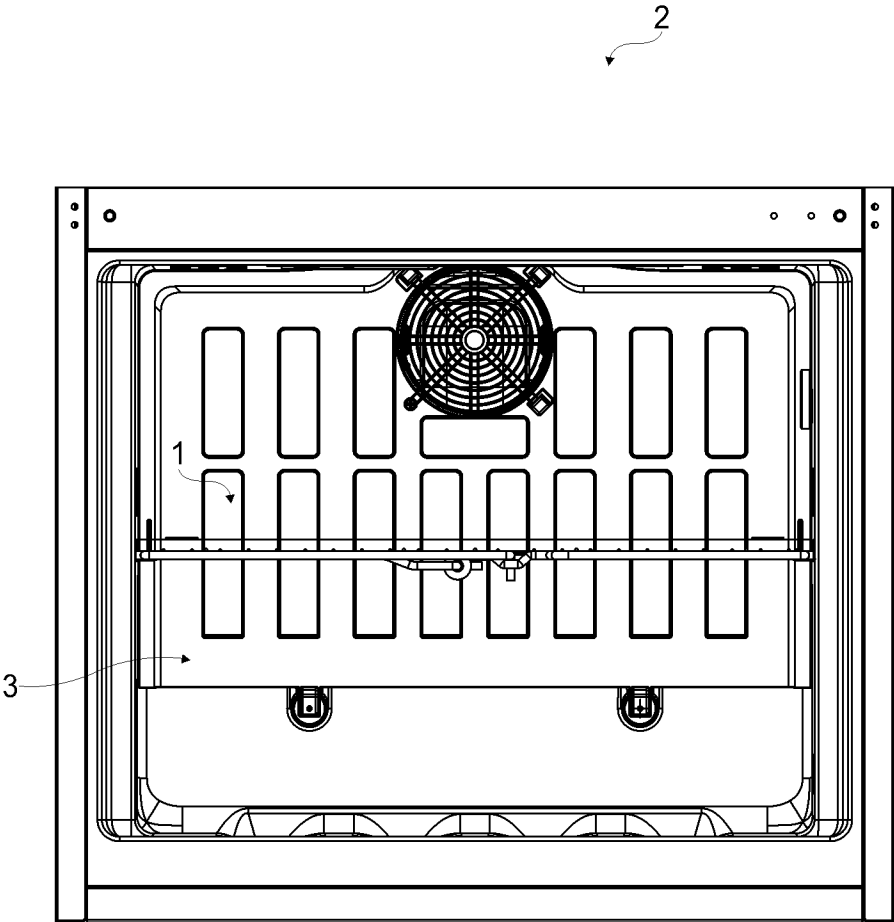


Fig. 7

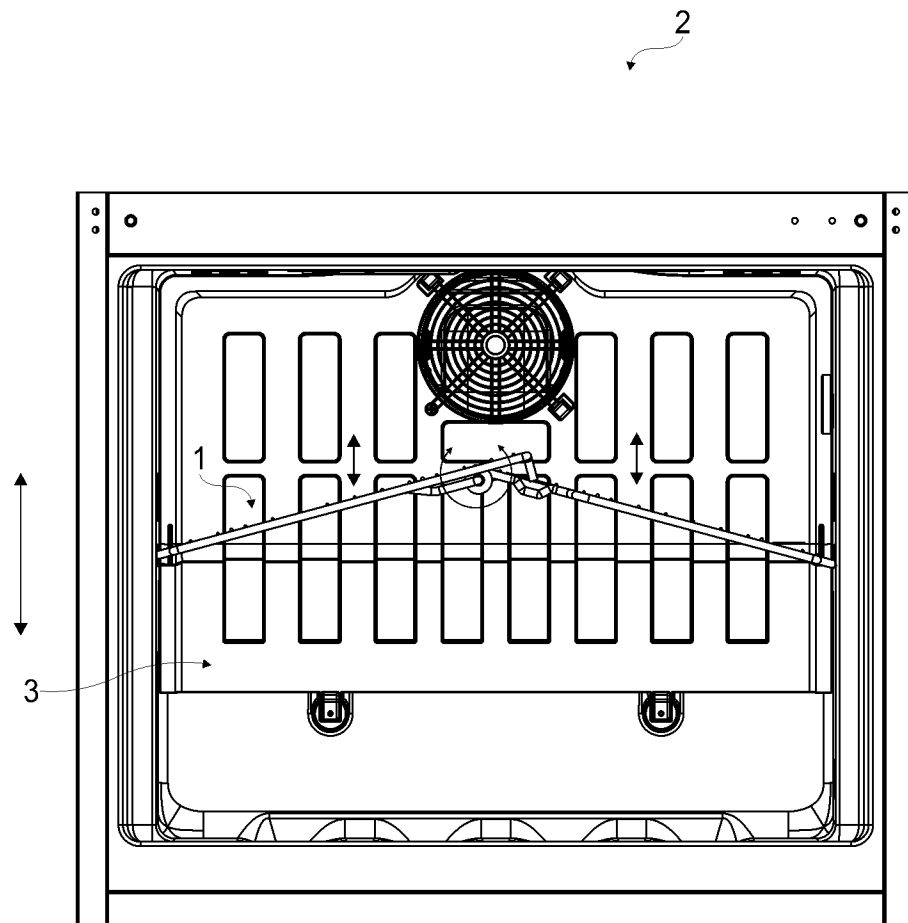
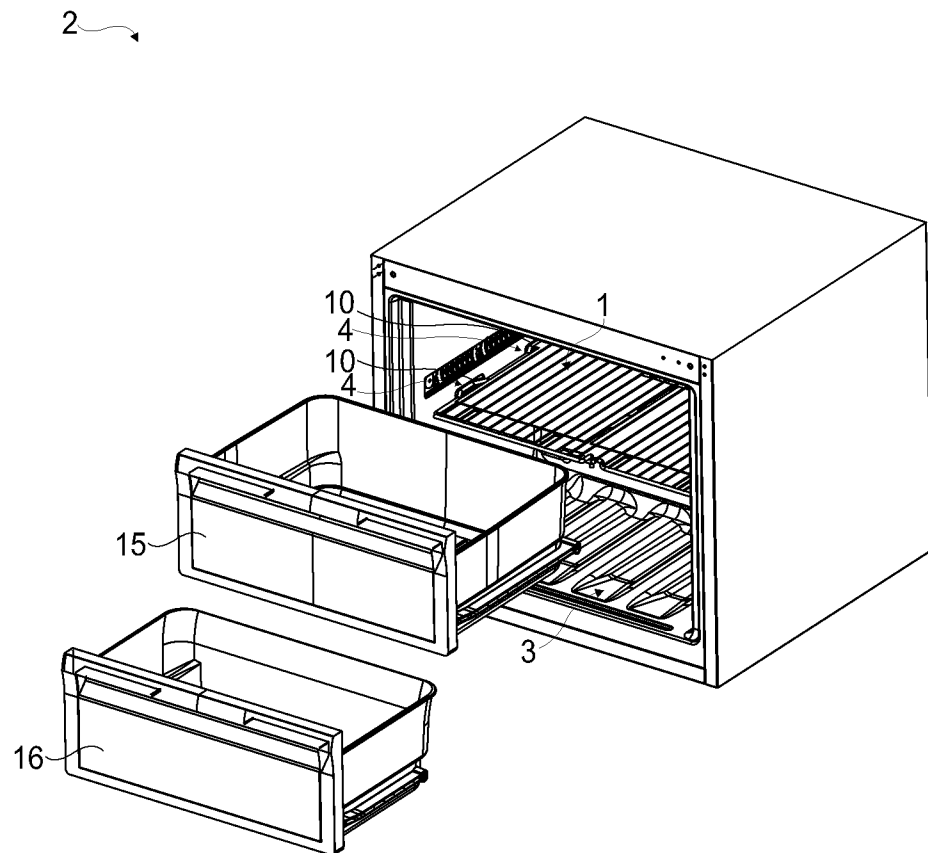


Fig. 8



INTERNATIONAL SEARCH REPORT

International application No

PCT/EP2016/063002

A. CLASSIFICATION OF SUBJECT MATTER
INV. F25D25/02
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

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	GB 934 745 A (LICENTIA GMBH) 21 August 1963 (1963-08-21)	1,2
A	page 1, line 13 - line 43; figures 1-4 -----	6
X	JP S56 130693 U (N.N.) 3 October 1981 (1981-10-03) figures 1-3 -----	1-10
X	JP S48 54553 U (N.N.) 13 July 1973 (1973-07-13)	1-3,5,6, 9,10
A	figures 1-3 -----	4,7,8
X	KR 2003 0039246 A (LG ELECTRONICS INC [KR]) 17 May 2003 (2003-05-17) figures 1-6 -----	1-10
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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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Name and mailing address of the ISA/

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INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2016/063002

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JP S63 87494 U (N.N.) 7 June 1988 (1988-06-07) figures 1-4	1,6
X	----- US 1 876 494 A (A.C. FUR0) 6 September 1932 (1932-09-06) the whole document -----	1

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2016/063002

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US 1876494	A	06-09-1932	NONE	