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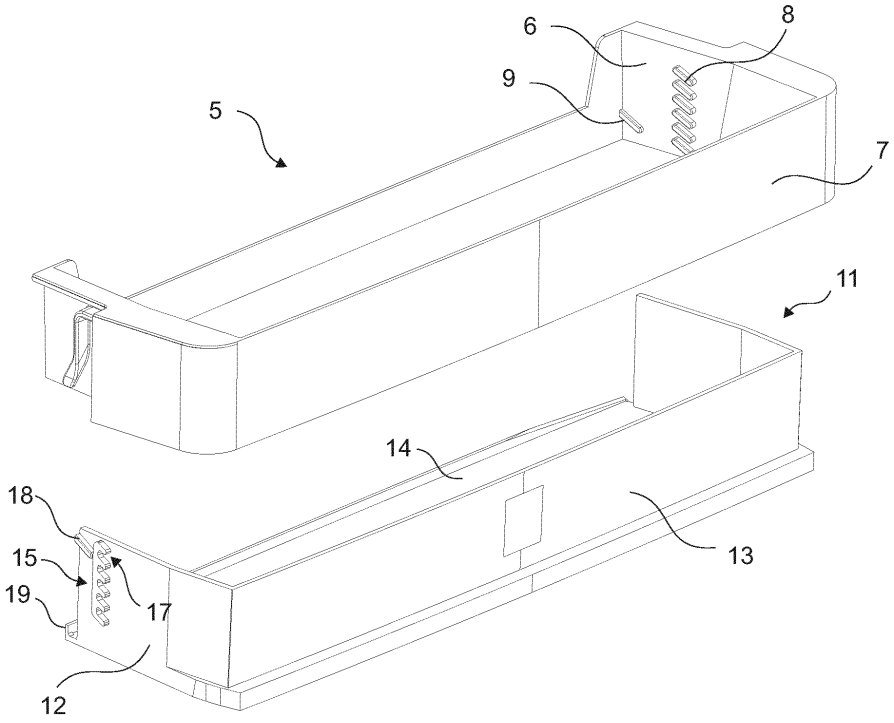
(54) **A DOOR SHELF WITH ADJUSTABLE DEPTH**

(57) The present invention relates to a refrigerator (1) comprising a body (2); a door (3); and a door shelf (4) placed onto the door (3) and having a shelf body (5) with open base having two opposite side walls (6) and a front wall (7) extending between the side walls (6), the door shelf (4) further having an inner receptacle (11) which is placed into the shelf body (5), which is suitable for being moved vertically in the shelf body and which has a base (14), two side supports (12) which extend perpendicular to the base (14) from the two sides of the base (14) and a front support (13) which extends between the side supports (12).

Figure 2

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## Description

**[0001]** The present invention relates to a refrigerator comprising a door shelf with adjustable depth.

**[0002]** In refrigerators, shelves of various widths, which are mounted on the door and whereon food and beverage containers are placed, are used. When placing tall containers onto the shelf, one or more than one shelf above the said shelf is required to be removed or displaced. When placing short containers onto the shelf, a dead volume is created between the said shelf and the shelf thereabove. In the state of the art, foldable or telescopic shelf systems are used in order to create flexible usage volumes that enable the containers with various sizes to be stored. Especially in the folding type door shelf, the carrying capacity of the doors shelves can be changed by increasing or decreasing the length or width thereof. However, when tall containers such as bottles, etc. are placed, the depth of the door shelf is usually insufficient, which may cause the bottles to tip over during the rapid opening of the door. To solve this problem, manufacturers are developing a variety of door shelves, the depth of which can be changed, for use in refrigerators. However, the state of the art shelves with adjustable depth do not allow the depth to be adjusted gradually according to the need. Moreover, complex adjustment mechanisms with many moving parts deform over time as a result of the load acting thereon, making production difficult and creating a disadvantage in terms of cost.

**[0003]** In the state of the art Patent Application No. WO2018224263A1, a refrigerator is disclosed, comprising an immobile outer shelf which is arranged on the inner lining of the door, a movable inner shelf which is placed into the outer shelf and a movement mechanism which, when triggered by the user, enables the inner shelf to be moved downwards and further enables the inner shelf to create an additional item storage volume below the outer shelf and increase the depth of the door shelf.

**[0004]** In the state of the art Chinese Utility Model Application No. CN203501642U, a refrigerator door is disclosed, comprising a door shelf of which the position can be adjusted with respect to the door.

**[0005]** The aim of the present invention is the realization of a refrigerator comprising a durable and simple door shelf with adjustable depth.

**[0006]** The refrigerator realized in order to attain the aim of the present invention, explicated in the first claim and the respective claims thereof, comprises a shelf body with open top and bottom, which is fixed to the door, which has two side walls forming a U and a front wall perpendicular to the side walls; a door shelf which is suitable to be moved vertically in the shelf body, which has a base, two opposite side supports extending perpendicular to the base and a front support extending between the side supports and which comprises an inner receptacle in the form of an open top box wherein food containers are placed; a plurality of carrier members which are arranged vertically one after the other on the side walls facing each other; and at least two holders which are disposed on the faces of the side supports facing the side walls, each having at least one housing suitable for hanging on the carrier embers so as to change the position of the inner receptacle relative to the shelf body. Thus, a refrigerator having a simple and durable door shelf, of which the depth can be changed according to the needs of the user, is obtained.

**[0007]** In an embodiment of the present invention, the carrier members have a linear protrusion form and extend in an inclined manner relative to the horizontal axis, and the housings have a U form suitable for receiving the carrier members. By means of the inclination of the carrier members relative to the horizontal axis, the inner receptacle is prevented from coming out of the shelf body by itself when the door is being opened/closed.

**[0008]** In an embodiment of the invention, the carrier members extend in an inclined manner relative to the horizontal axis, at an angle of 15 to 35 degrees with the horizontal axis. Thus, the engagement of the housings with the carrier members is facilitated.

**[0009]** In an embodiment of the present invention, there are a plurality of housings located one above the other on the side supports. By means of the large number of housings, a plurality of housings are seated on a plurality of carrier members in all the levels, except for the lowest level of the inner receptacle, where the depth of the door shelf is the greatest. Thus, the inner receptacle is supported in a safe and secure manner by means of a plurality of carrier members.

**[0010]** In an embodiment of the present invention, the holder comprises a bracket which is disposed on the side supports of the inner receptacle and which extends vertically to connect the housings to each other. By means of the bracket, the thickness of the part on which the housings are arranged is increased so as to be reinforced and the strength of the housings is improved.

**[0011]** In an embodiment of the present invention, there are a plurality of protrusions which are positioned on the front support of the inner receptacle facing the front wall of the shelf body. The protrusions are fitted into the recesses on the front wall of the shelf body. The engaging protrusions and recesses support the inner receptacle from the front, thus preventing the inner receptacle from tilting forward within the shelf body. Moreover, engaging protrusions and recesses enable the inner receptacle to bear against the shelf body, thus carrying load.

**[0012]** In an embodiment of the present invention, there is at least one stopper which extends from the bottom of the inner receptacle towards the door. The stopper reduces the distance between the inner receptacle and the door, and prevents the inner receptacle from tilting forward.

**[0013]** In an embodiment of the present invention, the door shelf comprises at least two limiting members which are disposed opposite each other on the side walls and at least two abutments which are disposed on the side

supports such that the limiting members and the abutments bear against each other when the inner receptacle is brought to the lowest level. The limiting members are located at the same level with the vertically lowest one of the carrier members on the side walls. Therefore, the user can easily understand that the shelf body of the inner receptacle is at the lowest level, when the abutment contacts the limiting member. Moreover, while being moved in the shelf body, the inner receptacle is prevented from coming out of the shelf body uncontrollably.

**[0014]** By means of the present invention, a refrigerator is realized, comprising a durable and simple door shelf, wherein the depth of the door shelf can be easily changed by means of the housings engaged with the carrier members.

**[0015]** The refrigerator realized in order to attain the aim of the present invention is illustrated in the attached figures, where:

Figure 1 - is the front view of the refrigerator related to an embodiment of the present invention.

Figure 2 - is the exploded view of the door shelf related to another embodiment of the present invention.

Figure 3 - is the view of the door shelf related to another embodiment of the present invention, wherein the inner receptacle is at the uppermost level in the shelf body.

Figure 4 - is the view of the door shelf related to another embodiment of the present invention, wherein the inner receptacle is at the lowermost level in the shelf body.

Figure 5 - is the view of the inner receptacle and the shelf body related to another embodiment of the present invention, while the depth of the door shelf is being changed.

**[0016]** The elements illustrated in the figures are numbered as follows:

1. Refrigerator
2. Body
3. Door
4. Door shelf
5. Shelf body
6. Side wall
7. Front wall
8. Carrier member
9. Limiting member
10. Recess
11. Inner receptacle
12. Side support
13. Front support
14. Base
15. Holder
16. Bracket
17. Housing
18. Abutment
19. Stopper
20. Protrusion

**[0017]** The refrigerator (1) comprises a body (2); a door (3); and a door shelf (4) placed onto the door (3) and having a shelf body (5) with open base having two opposite side walls (6) and a front wall (7) extending between the side walls (6), the door shelf (4) further having an inner receptacle (11) which is placed into the shelf body (5), which is suitable for being moved vertically in the shelf body and which has a base (14), two side supports (12) which extend perpendicular to the base (14) from the two sides of the base (14) and a front support (13) which extends between the side supports (12).

**[0018]** The refrigerator (1) of the present invention comprises a plurality of carrier members (8) which are oppositely arranged on the side walls (6) and which are positioned one above the other in the vertical direction; and at least two holders (15) which are provided on the side supports (12) and which each have at least one housing (17) engaging with the aligning carrier members (8) at the level of the inner receptacle (11) and enabling the position of the inner receptacle (11) on the shelf body (5) to be fixed. The inner receptacle (11) is suitable for being moved up and down by the user in the shelf body (5) with an open base. The holders (15) on the side supports (12) of the inner receptacle (11) are placed on the carrier members (8) arranged on the side wall (6) of the shelf body (5), and thus the inner receptacle (11) is attached to the shelf body (5).. When the user wants to change the depth of the door shelf (4), he/she lifts the inner receptacle (11) and pushes the same towards the door (2) such that the housings (17) on the holder (15) are released from the carrier members (8) and become movable in the vertical axis. The user moves the inner

receptacle (11) in the shelf body (5) on the vertical axis and pulls forward and attaches the inner receptacle on the carrier members (8) corresponding to the desired depth level of the housing (17). Thus, the depth of the door shelf (4) of the inner receptacle (11) can be easily adjusted.

**[0019]** In an embodiment of the present invention, the carrier members (8) are in the form of a rib and extend in an inclined manner relative to the horizontal axis, and the housings (17) have a U form suitable for receiving the carrier members (8). The carrier members (8) are in the form of linear protrusions on the shelf body (5) and extend vertically in an inclined manner. The symmetry axis of the housings (17) attached to the carrier members (8) also has the same inclination angle as the carrier members (8). Thus, when the housings (17) are fitted over the carrier members (8), the housings (17) sit on the carrier members (8) on their own, and the carrier members (8) carry the inner receptacle (11) both horizontally and vertically. Thanks to the inclination of the carrier members (8) relative to the horizontal axis, it is ensured that the inner receptacle (11) is supported in the opening and closing direction of the door (3) while the door (3) is being opened/closed, thus preventing the housings (17) from coming out of the carrier members (8) by themselves.

**[0020]** In an embodiment of the invention, the carrier members (8) extend in an inclined manner relative to the horizontal axis, at an angle of 15 to 40 degrees with the horizontal axis. In case the angle is below 15 degrees, the inner receptacle (11) may come out of the shelf body (5) with the closing movement of the door (2). In cases where the angle is above 40 degrees, the user has difficulty while attaching and removing the inner receptacle (11) to/from the shelf body (5). By means of the extension of the carrier members (8) at an angle of between 15 and 40 degrees relative to the horizontal axis, it is ensured that the inner receptacle (11) slide into the shelf body (5) by itself and the inner receptacle (11) is easily removed from the shelf body (5), and is prevented from being detached from the shelf body (5) during the movement of the door (3).

**[0021]** In an embodiment of the present invention, the side supports (12) have a plurality of housings (17) located one above the other thereon. By means of the large number of housings (17), at all the levels except for the lowest level where the housings (17) of the inner receptacle (11) engage with the carrier members (8) at the lowermost level, a plurality of housing (17) pairs, which are arranged at the same level on the side walls (6), are seated on a plurality of carrier members (8) positioned at the same level. Thus, the inner receptacle (11) is supported in a safe and secure manner from both sides by means of a plurality of carrier members (8).

**[0022]** In another embodiment of the present invention, the holder (15) comprises a bracket (16) which is disposed on the side support (12) and which extends vertically to connect the housings (17) to each other. The bracket (16) is in the form of a vertically extending protrusion formed on the side support (12) so as to remain behind the housings (17). By means of the bracket (16), the housings (17) create a monolithic form such that the strength of the housings (17) is improved by increasing the thickness thereof at the rear side.

**[0023]** In another embodiment of the present invention, there are a plurality of protrusions (20) on the front support (13) and a plurality of recesses (10) on the front wall (7), wherein the protrusions (20) are seated. By means of the plurality of recesses (10) and the plurality of protrusions (20), the recesses (10) and the protrusions (20) can bear against each other in more than one depth adjustment. Therefore, at least one protrusion (20) bear against at least one recess (10) in every position where the depth of the inner receptacle (11) is changed. Thus, the inner receptacle (11) is supported by the shelf body (5), allowing the same to carry more load and preventing the same from tilting forward under load.

**[0024]** In another embodiment of the present invention, the inner receptacle (11) comprises a stopper (19) which extends from the base (14) of the inner receptacle (11) towards the door (3). The stopper (19) extends along the rear edge of the base (14) between the side supports (12) and bears against the door (3). By means of the stopper (19), the rotation of the inner receptacle (11) is limited by reducing the distance between the inner receptacle (11) and the door (3) during the vertical movement thereof within the shelf body (5).

**[0025]** In another embodiment of the present invention, there are at least two limiting members (9) which extend opposite to each other on the side walls (6) and at least two abutments (18) on the inner chamber (11) which bear against the limiting members (9) so as to limit the vertical movement of the inner receptacle (11) in the shelf body (5). The limiting member (9) is in the form of a protrusion and aligns with the lowermost one of the carrier members (8) located one above the other on the side wall (6) of the shelf body (5). Therefore, when the abutment (18) comes into contact with the limiting member (9), the user can easily understand that the inner receptacle (11) is aligned with the lowest carrier member (8) that determines the lowermost level at which the inner receptacle (11) is attached to the shelf body (5).

**[0026]** By means of the present invention, a refrigerator (1) is realized, comprising a simple and durable door shelf (4) wherein by means of the carrier members (8), each opposing pair thereof defining a level, and the housings (17) seated onto the carrier members (8), the inner receptacle (11) is enabled to be fixed at different levels on the shelf body (5) and the user is enabled to easily adjust the depth of the door shelf (4).

## Claims

1. A refrigerator (1) **comprising** a body (2); a door (3); and a door shelf (4) placed onto the door (3) and

having a shelf body (5) with open base having two opposite side walls (6) and a front wall (7) extending between the side walls (6), the door shelf (4) further having an inner receptacle (11) which is placed into the shelf body (5), which is suitable for being moved vertically in the shelf body and which has a base (14), two side supports (12) which extend perpendicular to the base (14) from the two sides of the base (14) and a front support (13) which extends between the side supports (12), **characterized by** a plurality of carrier members (8) which are oppositely arranged on the side walls (6) and which are positioned one above the other in the vertical direction; and at least two holders (15) which are provided on the side supports (12) and which each have at least one housing (17) engaging with the aligning carrier members (8) at the level of the inner receptacle (11) and enabling the position of the inner receptacle (11) on the shelf body (5) to be fixed.

2. A refrigerator (1) as in Claim 1, **characterized by** the carrier members (8) which are in the form of a rib and extend in an inclined manner relative to the horizontal axis, and the housings (17) which have a U form suitable for receiving the carrier members (8).

3. A refrigerator (1) as in Claim 2, **characterized by** the carrier members (8) which extend in an inclined manner relative to the horizontal axis, at an angle of 15 to 40 degrees with the horizontal axis.

4. A refrigerator (1) as in any one of the above claims, **characterized by** a plurality of housings (17) located one above the other on the side supports (12).

5. A refrigerator (1) as in Claim 1, **characterized by** the holder (15) comprising a bracket (16) which is disposed on the side support (12) and which extends vertically to connect the housings (17) to each other.

6. A refrigerator (1) as in any one of the above claims, **characterized by** a plurality of protrusions (20) on the front support (13) and a plurality of recesses (10) on the front wall (7), wherein the protrusions (20) are seated.

7. A refrigerator (1) as in any one of the above claims, **characterized by** a stopper (19) which extends from the base (14) of the inner receptacle (11) towards the door (3).

8. A refrigerator (1) as in any one of the above claims, **characterized by** at least two limiting members (9) which extend opposite to each other on the side walls (6) and at least two abutments (18) on the inner chamber (11) which bear against the limiting members (9) so as to limit the vertical movement of the inner receptacle (11) in the shelf body (5).

Figure 1

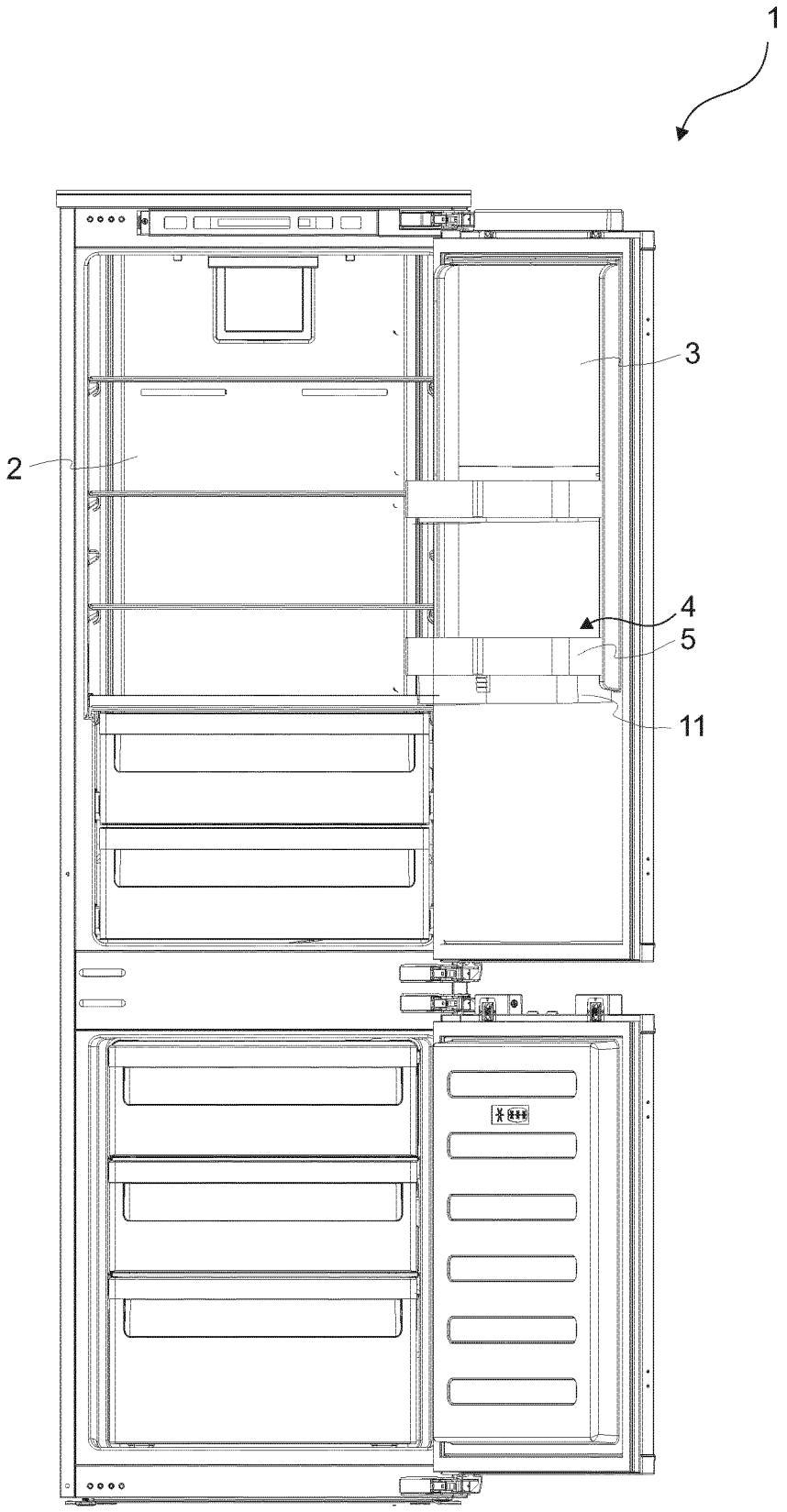


Figure 2

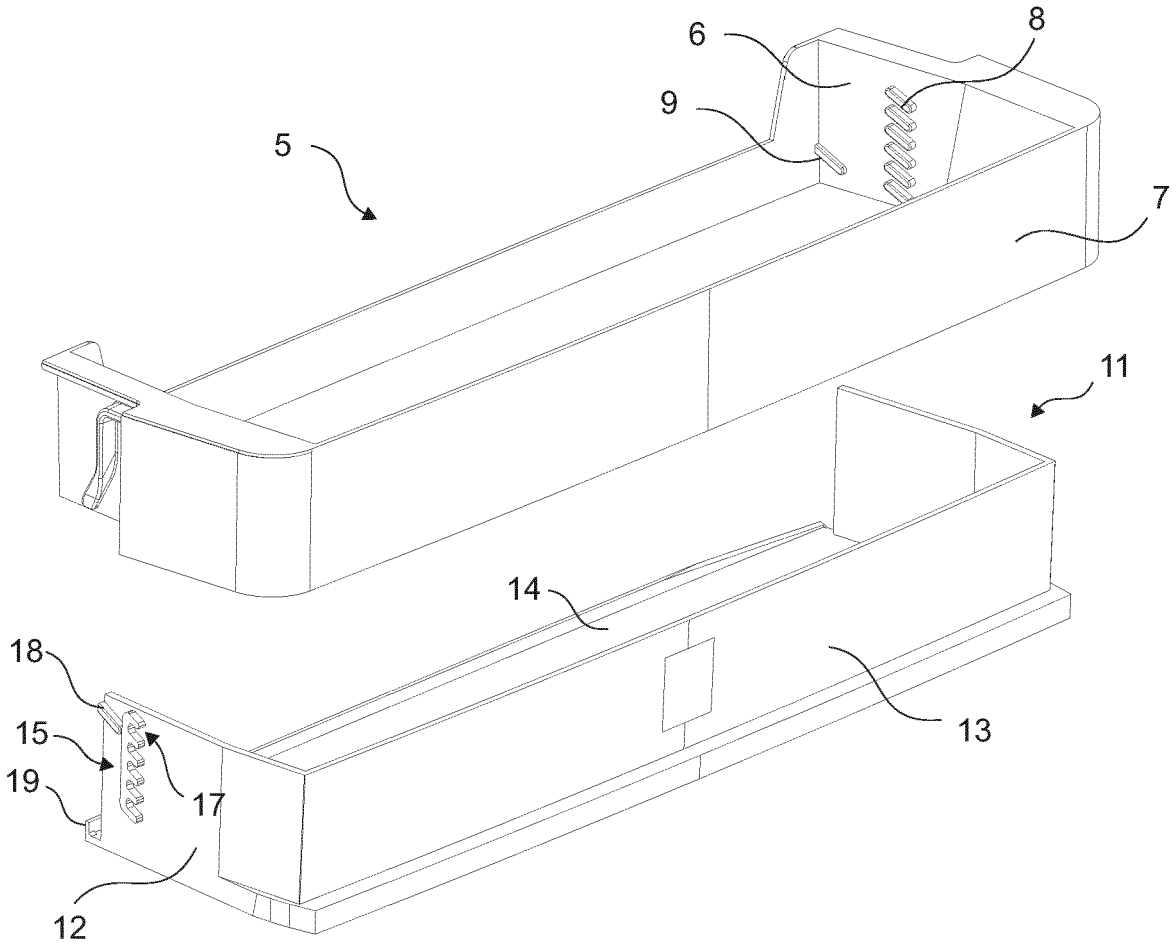



Figure 3

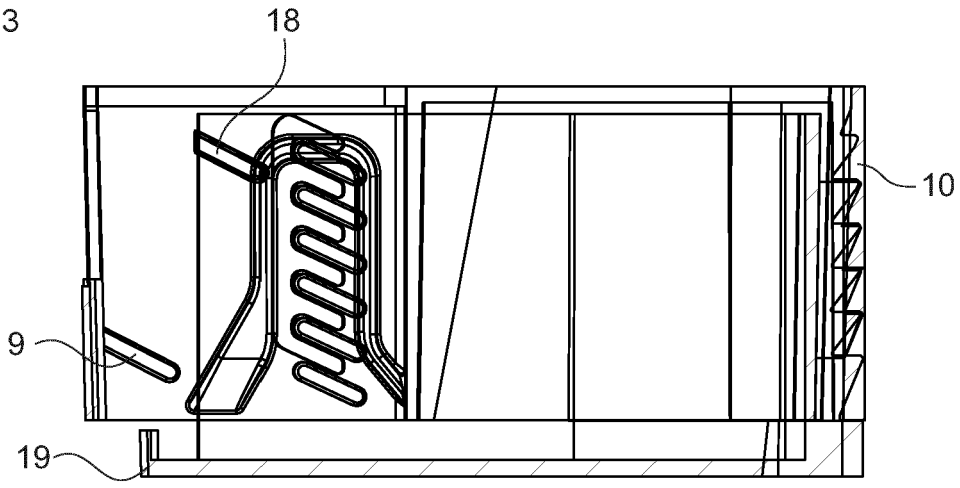


Figure 4

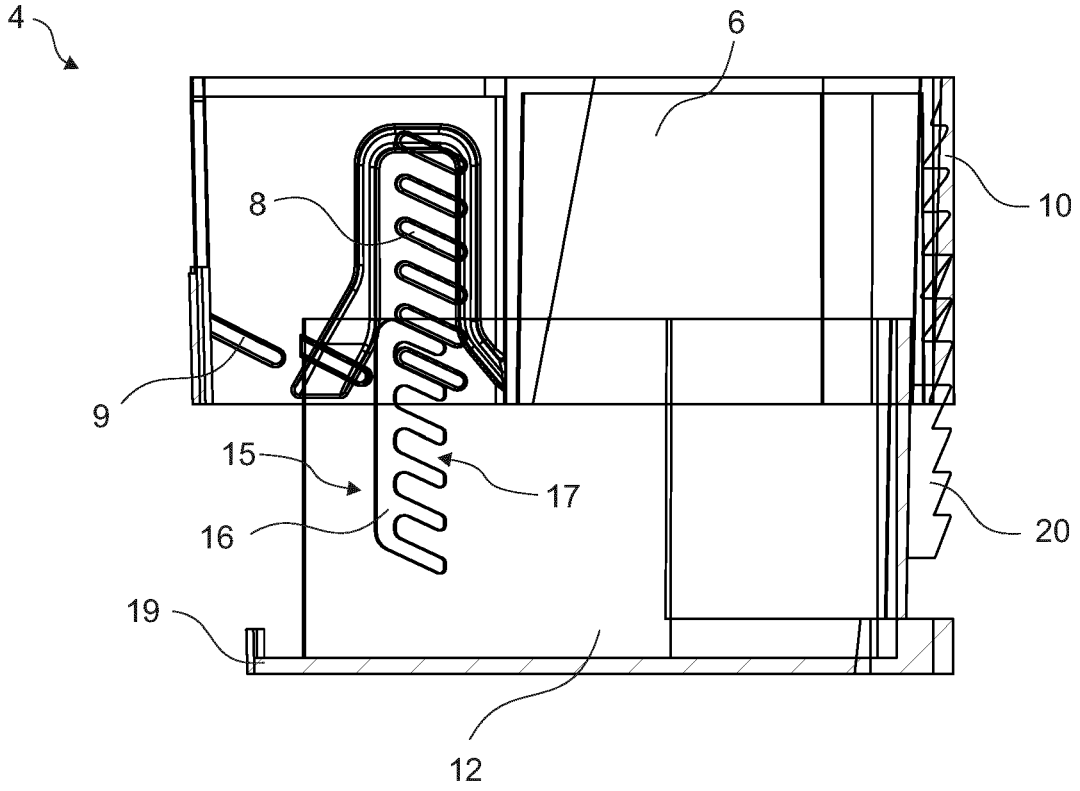
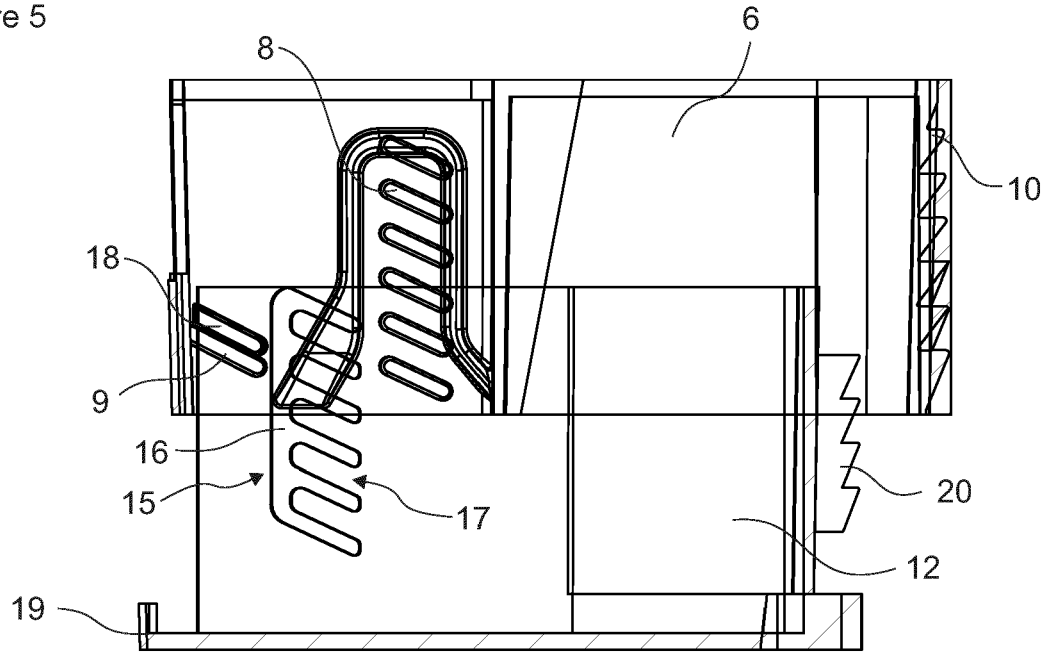



Figure 5



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# EUROPEAN SEARCH REPORT

Application Number
EP 22 20 4776

## DOCUMENTS CONSIDERED TO BE RELEVANT

| Category | Citation of document with indication, where appropriate, of relevant passages | Relevant to claim | CLASSIFICATION OF THE APPLICATION (IPC) |
|---|---|---|---|
| A | WO 2018/224263 A1 (ARCELIK AS [TR])<br>13 December 2018 (2018-12-13)<br>* figures 1-4 * | 1-8 | INV.<br>F25D23/04<br>F25D25/04 |
| A | KR 100 814 692 B1 (DAE CHANG CO LTD [KR])<br>18 March 2008 (2008-03-18)<br>* figures 1-3 * | 1 | |
| A | US 5 715 962 A (MCDONNELL SANDRA J [US])<br>10 February 1998 (1998-02-10)<br>* figures 3-5 * | 1 | |

TECHNICAL FIELDS SEARCHED (IPC)

F25D
B65D

The present search report has been drawn up for all claims

| Place of search | Date of completion of the search | Examiner |
|---|---|---|
| The Hague | 9 May 2023 | Canköy, Necdet |

CATEGORY OF CITED DOCUMENTS

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09-05-2023

| Patent document cited in search report | Publication date | Patent family member(s) | Publication date |
|---|---|---|---|
| WO 2018224263 A1 | 13-12-2018 | NONE | |
| KR 100814692 B1 | 18-03-2008 | NONE | |
| US 5715962 A | 10-02-1998 | NONE | |

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

## REFERENCES CITED IN THE DESCRIPTION

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### Patent documents cited in the description


- WO 2018224263 A1 **[0003]**
- CN 203501642 U **[0004]**