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(71) Applicant: **ARCELIK ANONIM SIRKETI** [TR/TR]; E5
Ankara Asfalti Uzeri, Tuzla, 34950 Istanbul (TR).

(72) Inventors: **AYGUN, Oktay**; E5 Ankara Asfalti Uzeri, Tuzla, 34950 Istanbul (TR). **TOMBULOGLU, Tamer**; E5 Ankara Asfalti Uzeri, Tuzla, 34950 Istanbul (TR). **MERIC, Davut**; E5 Ankara Asfalti Uzeri, Tuzla, 34950 Istanbul (TR). **SUNEL, Gurbuz**; E5 Ankara Asfalti Uzeri, Tuzla, 34950 Istanbul (TR). **AKYUZ, Ercan**; E5 Ankara Asfalti Uzeri, Tuzla, 34950 Istanbul (TR).

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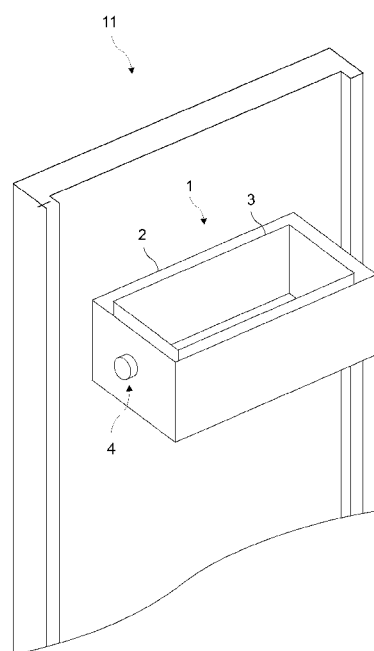
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(54) Title: A REFRIGERATOR COMPRISING A DOOR RACK WITH ADJUSTABLE DEPTH

Figure 1



(57) Abstract: The present invention relates to a refrigerator comprising an immobile outer rack (2) that is arranged on the inner lining of the door (11) and that is adjacent to the inner lining of the door (11); a movable inner rack (3) that is placed into the outer rack (2), and a movement mechanism (4) that, when triggered by the user, enables the inner rack (3) to be moved downwards and further enables the inner rack (3) to create an additional item storage volume below the outer rack (2) and increase the depth of the door rack (1).



Description

A REFRIGERATOR COMPRISING A DOOR RACK WITH ADJUSTABLE DEPTH

[0001] The present invention relates to a refrigerator comprising a door rack with a depth that can be increased and decreased.

[0002] Refrigerators comprise racks attached to the door or the body, whereon food and beverage containers are placed. When placing tall containers onto the rack, one or more than one rack above the said rack is required to be removed or displaced. When placing short containers onto the rack, a dead volume is created between the said rack and the rack thereabove. In the state of the art, foldable or telescopic rack systems are used in order to create flexible usage volumes that enable the containers with various sizes to be stored.

[0003] On the inner surface of the door, the refrigerator door generally comprises door racks extending along the width of the door, arranged one above the other. In some embodiments, the door racks are in the form of boxes, wherein the food items to be cooled/frozen are placed. Especially in folding door racks, the storage capacities thereof can be changed by increasing/decreasing the length and the width of the door rack; however, when tall containers such as bottles, etc. are placed, the bottles may tumble when the door is opened fast since the depth of the door rack is generally insufficient.

[0004] The International Patent Application No. WO2010020622 (A2) discloses a door rack composed of a fixed rack and a movable rack that can be folded towards the side of the fixed rack facing the inner volume of the refrigerator.

[0005] In the Utility Model Application No. CN101025325 (A) an extendable bottle refrigerator cold storage bottle base is disclosed.

[0006] The aim of the present invention is the realization of a refrigerator wherein the depth of the door rack is increased so as to provide the user with flexibility of usage.

[0007] The refrigerator realized in order to attain the aim of the present invention is explicated in the claims.

[0008] The door rack used in the refrigerator of the present invention has a

two-piece structure and comprises an outer rack the base section of which is open and a movable inner rack of which the base section is closed, that is placed into the outer rack. On the side walls of the outer rack, at least one movement mechanism is provided, that enables the inner rack to be moved downwards with the effect of gravity and the depth of the door rack to be increased when triggered by the user.

[0009] The outer rack stands immobile on the inner lining of the door. When the movement mechanism is triggered by the user, the inner rack moves downwards with the effect of gravity through the open base of the outer rack, and the movement of the inner rack stops when the upper side of the inner rack aligns with the base of the outer rack. When the door rack is needed to be brought to the initial position, the inner rack is pushed upwards from the base thereof until the inner rack is within the outer rack and the inner rack is automatically locked in the outer rack.

[0010] The refrigerator realized in order to attain the aim of the present invention is illustrated in the attached figures, where:

[0011] Figure 1 - is the schematic view of the door rack that is arranged on a refrigerator door and that is composed of an outer rack and an inner rack that is positioned in the outer rack.

[0012] Figure 2 - is the schematic view of the door rack the depth of which is increased by moving the inner rack downwards.

[0013] Figure 3 - is the exploded view of the door rack and the movement mechanism.

[0014] Figure 4 - the cross-sectional view of the door rack and the movement mechanism.

[0015] Figure 5 - is the perspective view of the door rack wherein the inner rack is in the outer rack.

[0016] Figure 6 - is the perspective view of the door rack wherein the inner rack is lowered to a level below the outer rack.

[0017] The elements illustrated in the figures are numbered as follows:

1. Door rack
2. Outer rack
3. Inner rack

4. Movement mechanism
5. Pin
6. Spring
7. Locking element
8. Locking hole
9. Channel
10. Flap
11. Door

[0018] The refrigerator comprises a body; at least one door (11) that allows access into the body, and a door rack (1) that is arranged on the inner lining of the door (11).

[0019] The door rack (1) used in the refrigerator of the present invention is composed of two parts and comprises

[0020] - a box-shaped immobile outer rack (2) with an open base,

[0021] - a box-shaped movable inner rack (3) having a closed base, that is placed into the outer rack (2), and

[0022] - at least one movement mechanism (4) that is disposed on the outer rack (2), that extends towards the inner rack (3), that, when triggered by the user, enables the inner rack (3) to be released and move downwards with the effect of gravity and that enables said inner rack (3) to form an additional item storage volume below the outer rack (2) increase the depth of the door rack (1).

[0023] The door rack (1) is composed of an outer rack (2) and an inner rack (3) that is placed telescopically into the outer rack (2) The outer rack (2) stands immobile on the inner lining of the door (11). When the movement mechanism (4) is triggered by the user, the inner rack (3) moves downwards with the effect of gravity through the open base of the outer rack (2). When the upper side of the inner rack (3) aligns with the base of the outer rack (2), the downwards movement of the inner rack (3) stops. Thus, the inner rack (3) forms an additional storage volume below the outer rack (2), increasing the depth of the door rack (1). When the door rack (1) is needed to be brought to the initial position, the inner rack (3) is pushed upwards from the base thereof until the inner rack (3) is within the

outer rack (2).

[0024] In an embodiment of the present invention, the door rack (1) comprises two movement mechanisms (4) each arranged on one side wall of the outer rack (2). The movement mechanisms (4) are triggered by the user simultaneously on the right and left sides and enable the inner rack (3) to be moved downwards stably inside the outer rack (2) without causing any jamming.

[0025] The movement mechanism (4) comprises a pin (5) that extends from the outer rack (2) to the inner rack (3) and that is pushed in the horizontal direction by the user from the outer rack (2) towards the inner rack (3) when the inner rack (3) is needed to be moved downwards; a spring (6) that is placed around the pin (5) and that enables the pin (5) to return to the initial position after being pushed, and a locking element (7) that is arranged at the end of the pin (5) connected to the inner rack (3), that enables the inner rack (3) to be kept in the outer rack (2) when the pin (5) is not triggered and that, by being disconnected from the inner rack (3) when the pin (5) is pushed, enables the inner rack (3) to be released so as to move downwards.

[0026] The door rack (1) comprises a locking hole (8) on each side wall of the inner rack (3) and wherein the locking element (7) is fitted when the inner rack (3) is in the outer rack (2).

[0027] In another embodiment of the present invention, the door rack (1) comprises a channel (9) that is arranged on each side wall of the inner rack (3), that extends upwards from the locking hole (8) and that acts as a guide for smooth linear movement of the inner rack (3) by sliding up and down on the pin (5) when the inner rack (3) is moved.

[0028] In an embodiment of the present invention, the door rack (1) comprises at least one flap (10) that is provided on each side wall of the outer rack (2), that supports the movement mechanism (4), that stretches in the horizontal direction when the movement mechanism (4) is triggered to lower the inner rack (3) and that enables the movement mechanism (4) to be easily triggered by increasing the surface area that can be manually pushed by the user. In order to move the inner rack (3), the user presses

onto and stretches the flaps (10) on both sides of the outer rack (2) inwards and the movement mechanism (4) on both sides of the door rack (1) are enabled to be triggered and the inner rack (3) is released.

[0029] In the door rack (1) of the present invention, by means of the movement mechanisms (4) that are arranged on the side walls of the outer rack (2) and that are triggered on both sides inwards from right and left by the user, the inner rack (3) is released and moves below the outer rack (2). Only the depth of the door rack (1) in the direction parallel to the surface of the door (11) is increased and the tall items such as bottles, etc. can be safely placed vertically into the door rack (1) the depth of which is increased, and said items are prevented from tumbling down.

[0030] In the refrigerator of the present invention, only the depth of the door rack (1) is increased and decreased. Since the dimensions of the door rack (1) are not changed in transverse and longitudinal directions, the door (11) is enabled to be easily closed without being obstructed.

Claims

1. A refrigerator comprising a body, at least one door (11) that allows access into the body and a door rack (1) that is arranged on the inner lining of the door (11), characterized by the door rack (1) having
 - an immobile outer rack (2) with an open base,
 - a movable inner rack (3) having a closed base, that is placed into the outer rack (2), and
 - at least one movement mechanism (4) that is disposed on the outer rack (2) and extends towards the inner rack (3), and that, when triggered by the user, enables the inner rack (3) to be released and moved downwards with the effect of gravity.
2. A refrigerator as in Claim 1, characterized by the door rack (1) comprising two movement mechanisms (4) each provided on one side wall of the outer rack (2).
3. A refrigerator as in Claim 1 or 2, characterized by the movement mechanism (4) comprising a pin (5) that is pushed in the horizontal direction from the outer rack (2) towards the inner rack (3); a spring (6) that is fitted over the pin (5) and that enables the pin (5) to return to the initial position after being pushed, and a locking element (7) that is arranged at the end of the pin (5) connected to the inner rack (3), that enables the inner rack (3) to be kept inside the outer rack (2) and that enables the inner rack (3) to be released by being disconnected from the inner rack (3) when the pin (5) is pushed.
4. A refrigerator as in Claim 3, characterized by the door rack (1) comprising a locking hole (8) on each side wall of the inner rack (3) and wherein the locking element (7) is fitted when the inner rack (3) is in the outer rack (2).
5. A refrigerator as in Claim 3 or 4, characterized by the door rack (1) comprising a channel (9) that is arranged on each side wall of the inner rack (3), that extends upwards from the locking hole (8) and that guides the upwards/downwards sliding movement on the pin (5) when the inner rack (3) is moved.
6. A refrigerator as in any one of the above claims, characterized by the door rack (1) comprising at least one flap (10) that is provided on each side wall of the outer rack (2), that supports the movement mechanism (4) and that stretches

in the horizontal direction when the movement mechanism (4) is triggered.

Figure 1

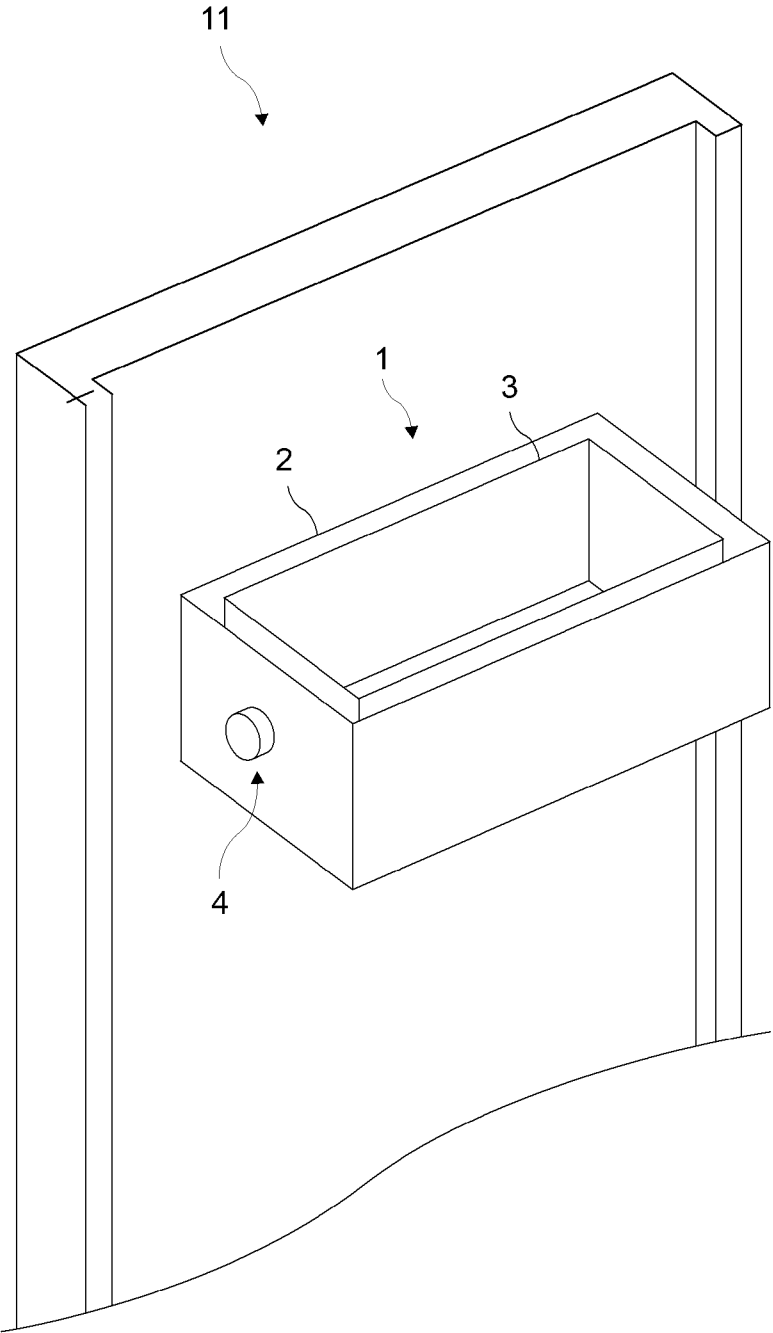


Figure 2

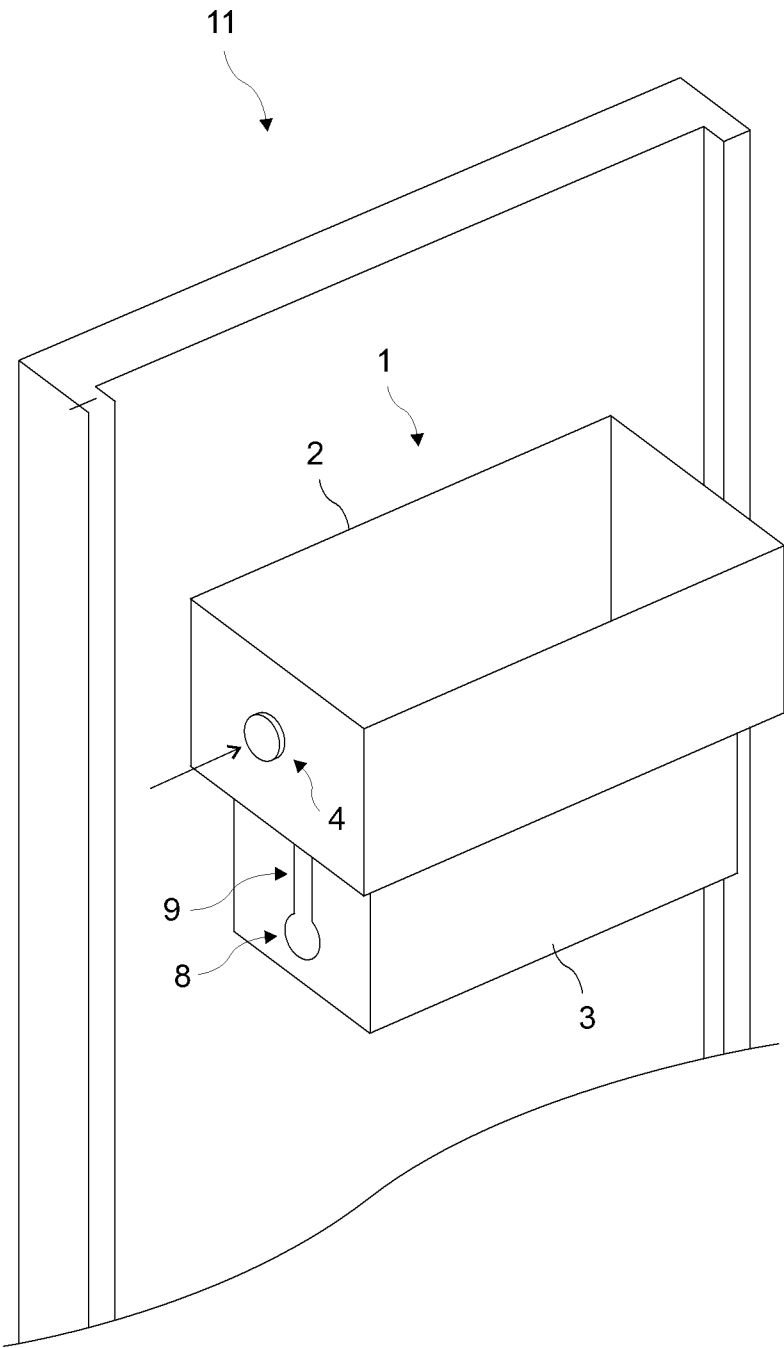


Figure 3

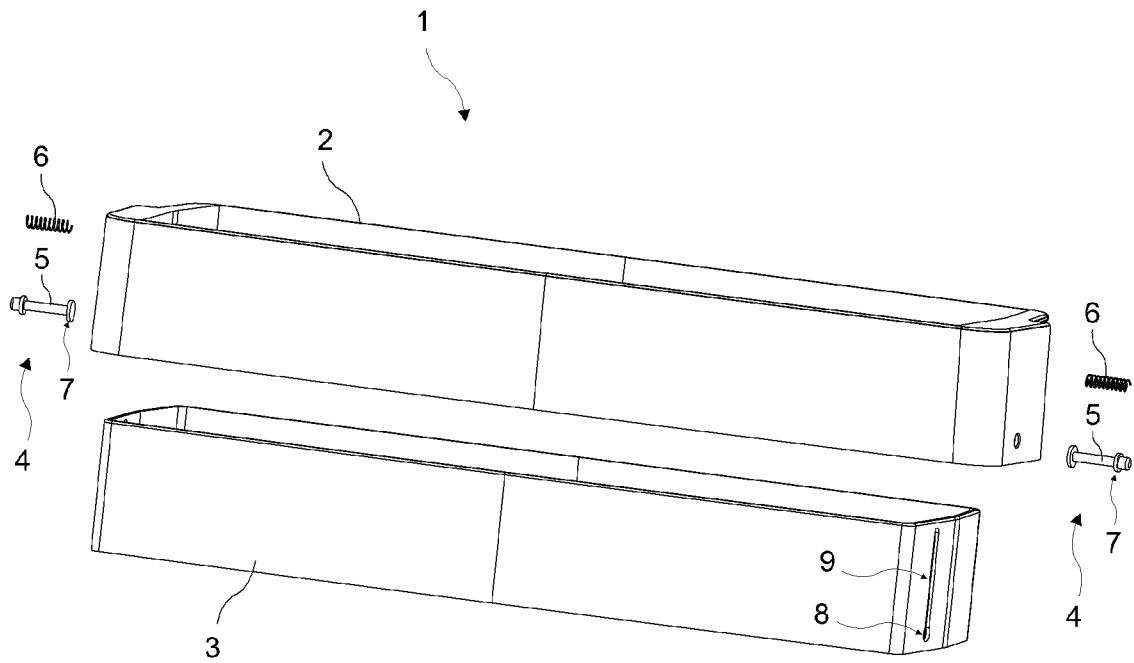


Figure 4

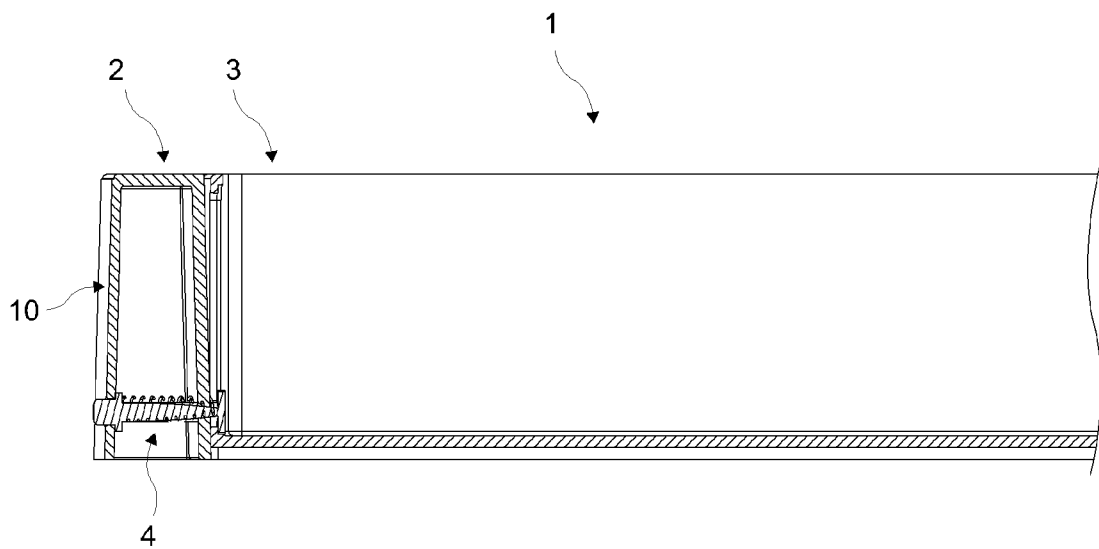


Figure 5

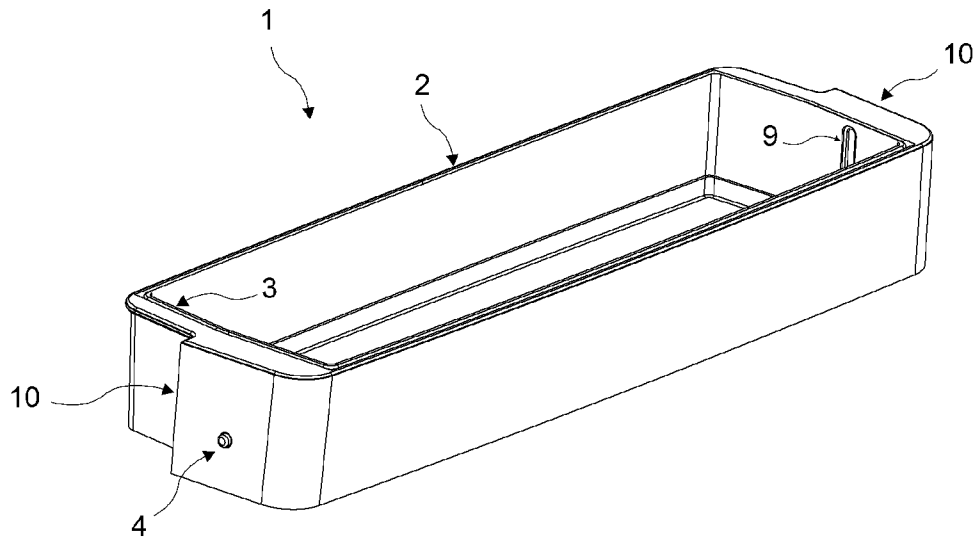
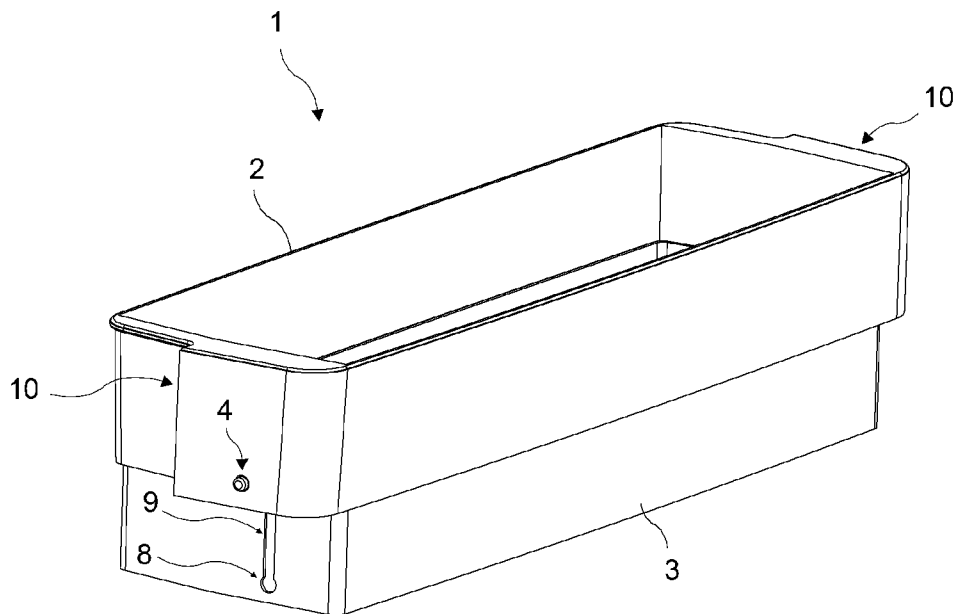


Figure 6



INTERNATIONAL SEARCH REPORT

International application No

PCT/EP2018/062731

A. CLASSIFICATION OF SUBJECT MATTER

INV. F25D23/04 A47B96/16
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	CN 104 990 330 A (HISENSE RONSHEN GUANGDONG REFRIGERATORS CO LTD) 21 October 2015 (2015-10-21)	1,2,6
Y	paragraph [0032]; figures 1-3,10,12 -----	3-5
X	CN 205 580 089 U (HEFEI HUALING CO LTD; MIDEA GROUP CO LTD) 14 September 2016 (2016-09-14) figures 1,2,5,6 -----	1,2
Y	CN 202 371 967 U (SUZHOU SAMSUNG ELECTRONICS CO) 8 August 2012 (2012-08-08) figures 3-5,9 -----	3-5



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/

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040,
Fax: (+31-70) 340-3016

Authorized officer

Kuljis, Bruno

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2018/062731

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
CN 104990330	A	21-10-2015	NONE	
CN 205580089	U	14-09-2016	NONE	
CN 202371967	U	08-08-2012	NONE	