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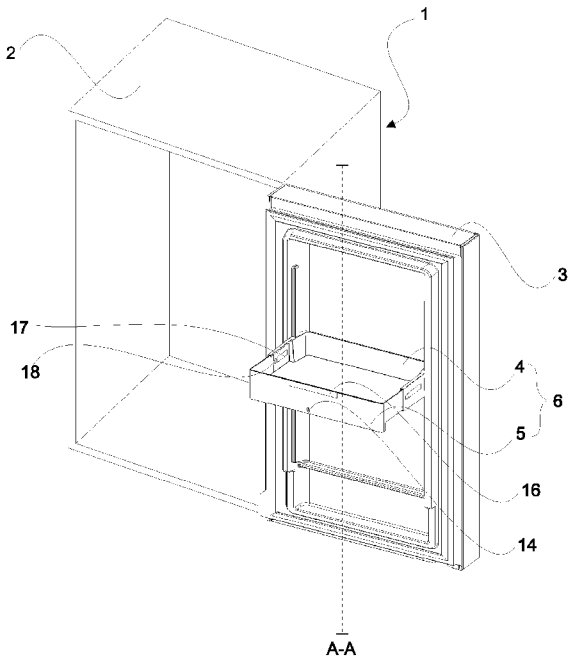
(54) Title: A COOLING DEVICE COMPRISING A DOOR SHELF WITH SCREW ADJUSTMENT

Figure 1



(57) Abstract: The present invention relates to a cooling device (1) comprising a body (2) a door (3) enabling access to the body (2), and a shelf (6) composed of a fixed piece (4) settling on the surface of the door (3) facing the interior of the body (2), and a movable piece (5) resting on the fixed piece (4).

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Description

A COOLING DEVICE COMPRISING A DOOR SHELF WITH SCREW ADJUSTMENT

[0001] The present invention relates to a cooling device comprising a door shelf with screw adjustment.

[0002] In some refrigerators, shelves are provided on the door, enabling users to place food products thereon. Said shelves are produced so as the storage area to be invariable. Therefore, in case the user desires to place food products larger than the storage area of the shelf, such items do not fit on the shelf and have to be placed on the body shelves. This leads to inefficient use of the volume in the body. Likewise, when the width of the shelf on the door is too large, small bottles and thin and long packages occupy an area larger than required, and they also become damaged as a result of the door being opened and closed roughly, leading to the cooling device becoming dirty.

[0003] Another major problem experienced with the cooling devices is door shelve being designed suitable for the ever-changing consumption habits of users. The door shelves are the primary preference of the users for storing items of varying sizes and dimensions, due to their easy accessibility. With large families, the sectional area of the products sold in economic or family size packages can be larger than the width of the shelf. In contrariwise cases, the unused volume of the door shelf can block the air flow in the cooling device. Companies provide door shelves of various depths and widths in order to meet the changing needs of the users, and material costs increase accordingly. Another similar problem is the increasing mold costs for producers. A high number of molds are produced for various door shelves provided on cooling devices of several models, and this is reflected to the users as cost.

[0004] State of the art international patent application no. WO2010076205 discloses a cooling device having a height adjustable door shelf.

[0005] State of the art international patent application no. WO2005003660 discloses a cooling device having a door shelf whose position is adjustable.

[0006] The aim of the present invention is gaining internal volume of the cooling devices by precisely adjusting the widths on the shelves provided on cooling device doors.

[0007] The cooling device provided to achieve the aim of the present invention and disclosed in the first claim and the dependent claims, comprises a body and a door enabling access to the body. The shelves on the door are the shelves the users place the most frequently used food products. The packages of food products and their sizes may vary according to differing shopping habits of the users. In this case, some of the food products are placed on the body shelves as they don't fit on the door shelves due to their sizes, which arises the problem of inefficient use of the internal volume of the cooling device. With the invention, the shelf is split into two separate pieces movable with respect to each other. The fixed piece provided on the door and placed so as to engage profile structures and so as to be fixed, acts as a base for the movable piece placed thereon. The movable piece placed on the fixed piece, moves freely by sliding on the fixed piece. A movement mechanism with one end provided on the lower surface of the movable piece, and the other end provided on the lower surface of the fixed piece, is used with the aims of supporting the weight of the food products placed on the fixed piece and the movable piece, preventing the shelf from being damaged under the weight of the food products, and as well as enabling the movable piece to move on the fixed piece. The movement mechanism supports the weight of the products placed on the shelf, and also enables the movable piece to be moved when the user wants to modify the storage area on the shelf.

[0008] In an embodiment of the invention, the cooling device comprises a seat arranged below the fixed piece and within a cylindrical space is provided. Said seat can be produced integrally with the fixed piece during molding, and it can also be mounted later on by engagement to the lower portion of the fixed piece. The inner walls of the space of said seat have grooved structure and a screw settles on said grooves and into the seat by rotary motion. The face of the movable piece facing the user, extends to a level lower than the base of the movable piece. A shelf holder mounted by

means of the fastening member and having a bore so as to allow placement of the other end of the screw within, is placed on said extending portion. The screw advances or retreats in the seat depending on its rotary motion and direction, therefore the distance between the shelf holder and the seat decreases or increases. Consequently, the distance between the movable piece to which the shelf holder is fixed, and the fixed piece decreases and the storage area of the shelf on which the food products are placed decreases. A cavity is provided at the end of the screw contacting the shelf holder. An end of the power transfer member settles into said cavity. The rotation of the power transfer member according to the force of the user is transmitted to the screw due to the power transfer member being settled so as not to have a relative movement with respect to the cavity, and the screw moves forth or back in the seat by rotating about its rotary axis.

[0009] In another embodiment of the invention, a plurality of screws are used between the rear part and the front part in the cooling device. When the width of the door and therefore the length of the shelf fixed on the door increases, the shelves can become deformed under the weight of the food products placed thereon, and can become damaged in time if this continues. The width of the shelf can be precisely adjusted as well as the bearing capacity of the shelf be increased by using a plurality of spins, and the problem of replacing the door shelf is avoided due to being damaged, thereby improving the maintenance costs of the cooling device.

[0010] In an embodiment of the invention, a bore is arranged on the face of the movable piece facing the user, and the user accesses the movement mechanism through said bore. The user removes the decorative panel produced detachably on the movable piece, inserts the protrusion of the decorative panel into said bore provided on the movable piece, and fastens it to the power transfer member. After fastening, the user rotates the decorative panel about its fastening axis, and during rotation the rotary motion is transmitted to the power transfer member and to the screw respectively. The screw moves inside the seat as a result of its rotation and according to its rotational direction, and consequently the movable

piece advances or retreats on the fixed piece. By this, it is not necessary for the user to rotate the screw from below the shelf, the storage area on the shelf can be adjusted while the shelf can be handled through the movable piece, thereby providing ease of use.

[0011] In an embodiment of the invention, two channels are provided on the lateral faces of the fixed piece. Two stoppers are arranged on the lateral faces of the movable piece so as to correspond to said channels. The stoppers settle in the channels and move back and forth in the channels during movement of the movable piece. While the screw rotates and the shelf expands, the screw can depart the seat if the user continues the motion in the same direction. As a result, the movable piece can detach from the fixed piece and it can become damaged by sliding from the fixed piece under the weight of the food products placed thereon. Two stoppers are used to prevent the movable piece being detached from the fixed piece due to user error. Said stopper move along the channel, and create a delimiting effect on the movement of the movable piece. The movable piece is thus prevented from being damaged.

[0012] Reducing or increasing the storage area of the shelf on which the food products are placed, is aimed with the present invention.

[0013] Figure 1 is a perspective view of the cooling device of the invention with the door open.

[0014] Figure 2 is a view of the A-A section of the door shown in figure 1.

[0015] Figure 3 is a side view of the shelf.

[0016] Figure 4 is a view of the shelf from below.

[0017] Figure 5 is an exploded perspective view of the shelf.

[0018] Figure 6 is an exploded view of the shelf from below.

[0019] The elements in the figures are numbered individually and the correspondence of these numbers are given hereinafter.

1. Cooling device
2. Body
3. Door
4. Fixed Piece
5. Movable Piece

6. Shelf
7. Movement Mechanism
8. Screw
9. Seat
10. Fastening Member
11. Shelf Holder
12. Cavity
13. Power Transfer Member
14. Bore
15. Protrusion
16. Decorative Panel
17. Channel
18. Stopper

[0020] The cooling device (1) comprises

- a body (2),
- a door (3) enabling access to the body (2), and
- a shelf (6) composed of a fixed piece (4) settling on the surface of the door (3) facing the interior of the body (2), and a movable piece (5) resting on the fixed piece (4).

[0021] The cooling device (1) of the invention comprises a shelf (6) having a movement mechanism (7) increasing or decreasing the storage area of the shelf (6) by moving the movable piece (5) further from or closer to the door (3) respectively.

[0022] In an embodiment of the invention, the cooling device (1) has a fixed piece (4) placed on the door (3). The fixed piece (4) can be placed on and detached from the door (3) by means of recesses arranged on the side walls of said fixed piece (4). After fixing of the fixed piece (4) on the door (3), the movable piece (5) is placed thereon. The shelf (6) structure forms as a result of the movable piece (5) being placed on the fixed piece (4). The motion of the movable piece (5) movable back and forth on the fixed piece (4) is executed by the movement mechanism (7) and consequently the storage area of the shelf (6) increases or decreases. While the movement mechanism (7) enables movement of the movable piece (5) on

the fixed piece (4), it also supports the shelf (6) structure, and prevents the shelf (6) from being deformed under the weight of the food products placed thereon. By this, the movable piece (5) can move on the fixed piece (4) by sliding, and it is also prevented from being damaged by dropping due to sliding from the fixed piece (4) or colliding to the other parts inside the cooling device (1), thereby decreasing spare part costs. Another advantage of the invention is presenting the facility of adjusting the shelf (6) area according to different consumption needs of the user varying in time, thanks to the shelf (6) structure whose storage area can be modified, thus improving user satisfaction. (Figures 1 and 2)

[0023] In an embodiment of the invention, the cooling device (1) comprises a movement mechanism (7) having a screw (8) with one end fixed below the fixed piece (4) and with the other end fixed below the movable piece (5), decreasing or increasing the distance between the fixed piece (4) and the movable piece (5) by means of its rotary motion about its axis; a seat (9) arranged below the fixed piece (4), having an inner surface of grooved structure into which one end of the screw (8) enters by rotating; a shelf holder (11) fixed on the lower side of the movable piece (5) by means of at least one fastening member (10), having a perforated structure enabling the other end of the screw (8) to settle; a power transfer member (13) extending from the front surface of the movable piece (5) to the screw (8) and settling in a cavity (12) provided on the screw (8), enabling the screw (8) to rotate as a result of rotating about its axis. The inner surface of the seat (9) arranged below the fixed piece (4) is produced in a grooved structure so as to allow the screw (8) to advance as a result of its rotary motion about its axis. Two consecutive grooves on the seat (9) are so produced that the distance in between has to be equal to the distance between two threads of the screw (8). One end of the screw (8) settled in the seat (9) moves forth or back in the seat (9) by rotary motion. A shelf holder (11) is provided fixed to the lower portion of the front face of the movable piece (5) by means of the fastening members (10). The bore structure in the middle of the shelf holder (11) enables the screw (8) to settle. A cavity (12) is arranged on the end of the screw (8) settling on the

shelf holder (11). A power transfer member (13) is provided extending between said cavity (12) and the movable piece (5). The other end of the power transfer member (13) can be driven by the user through the front surface of the movable piece (5). As the user rotates the power transfer member (13), said rotation is transferred to the screw (8) by the power transfer member (13). Consequently, the screw (8) moves inside the seat (9), and the movable piece (5) moves forth or back on the fixed piece (4) depending on the direction of said movement, and thus the storage area of the shelf (6) increases or decreases. By means of using the power transfer member (13) in adjustment of the shelf (6) width, the user is able to precisely adjust the width of the storage area, and also it is no more necessary for the user to lean below the shelf 86) when making width adjustment, and shelf (6) width adjustment can easily be performed through the movable piece (5) at front of the shelf (6), providing ease of use. (Figure 4)

[0024] In another embodiment of the invention, two screws (8) extend below the movable piece (5) and the fixed piece (4). Said screws (8) are provided on the right and left side of the lower portion of the shelf (6) base. The storage area on the shelf (6) can thus be increased and decreased as a result of the rotary motion of the screws (8). Another advantage of using two screws (8) is increasing the load bearing capacity due to the shelf (6) exhibiting a high strength when heavy food products are placed thereon.

[0025] In an embodiment of the invention, the cooling device (1) comprises a decorative panel (16) detachably arranged on the movable piece (5), having a protrusion (15) with a structure suitable for placement so as not to move with respect to the power transfer member (13) which the user can interact through a bore (14) provided on the front surface of the movable piece (5), enabling rotating of the power transfer member (13) and therefore the screw (8) by means of its rotary motion about its placement axis. The decorative panel (16) detachably arranged on the shelf (6) is removed from its seat (9) on the shelf (6) by being detached by the user, and is placed through the bore (14) on the power transfer member (13) by means of its protrusion (15). Afterwards, by the decorative

panel (16) being rotated about its placement axis by the user, first the power transfer member (13) is triggered, then the movement mechanism (7) triggered by the power transfer member (13), transmits the rotary motion to the screw (8). The screw (8) advances or retreats inside the seat (9) as a result of rotation and according to its rotary direction, consequently the width of the storage area of the shelf (6) can be adjusted, and food products of separate widths can be placed on the shelf (6). By means of the decorative panel (16), it is not required for the user to look for a penetrant object suitable for placement in the recess (14) when the user wants to adjust the width of the storage area of the shelf (6), the user can detach the decorative panel (16) from the shelf (6) and place it in the recess (14), can easily adjust the storage area on the shelf (6) by rotating the panel (16), and thus ease of use is provided to the user. (Figure 5)

[0026] In an embodiment of the invention, the cooling device (1) comprises a shelf (6) having two mutual channels (17) arranged on the side walls of the fixed piece (4), and two stoppers (18) suitable for moving on said channels (17), arranged on corresponding side walls of the movable piece (5) and preventing the movable piece (5) to be completely detached from the fixed piece (4). When the width of the storage area of the shelf (6) is desired to be adjusted, the user places the decorative panel (16) or another object which can function similarly in the bore (14), and rotates the movement mechanism (7). The movement mechanism (7) transfers the rotary motion to the screw (8), and the movable piece (5) moves by sliding on the fixed piece (4) as a result of the screw (8) being rotated in the suitable direction, thereby increasing the width of the storage area of the shelf (6). Niche shaped channels (17) are provided on the lateral walls of the fixed piece (4) in order to prevent the screw (8) from escaping the seat (9) due to being over-rotated. Bulge shaped stoppers (18) are arranged on the portion of the movable piece (5) corresponding to said channels (17) provided on the fixed piece (4). Said stoppers (18) rest on the respective end of the channels (17) when the width of the shelf (6) is increased more than the predetermined limit, and the shelf (6) is consequently prevented

from expanding any more. By this, the user erroneously rotating the screw (8) to the extent that it escapes the seat (9), and the movable piece (5) falling by escaping the fixed piece (4) are prevented, thereby avoiding material and spare part costs likely to arise due to breaking and physical damage. (Figures 2, 3, and 6)

[0027] With the invention, the width of the shelves (6) positioned on the door (3) can be adjusted in cooling devices (1), and thus the user is enabled to be able to place food products of various sizes to the cooling device (1) shelf (6) without difficulty by using a single shelf (6). Another advantage achieved with the invention is in that, molding and production costs are reduced by means of a single type of shelf (6) structure which can meet many demands, and the user is supplied with shelves (6) having improved appearance and use.

Claims

1. A cooling device (1) **comprising**
   - a body (2),
   - a door (3) enabling access to the body (2),
   - a shelf (6) composed of a fixed piece (4) settling on the surface of the door (3) facing the interior of the body (2), and a movable piece (5) resting on the fixed piece (4), **characterized by**
   - the shelf (6) having a movement mechanism (7) increasing or decreasing the storage area of the shelf (6) by moving the movable piece (5) further from or closer to the door (3) respectively.
2. A cooling device (1) according to claim 1, **characterized by** a movement mechanism (7) having,
   - a screw (8) with one end fixed below the fixed piece (4) and with the other end fixed below the movable piece (5), decreasing or increasing the distance between the fixed piece (4) and the movable piece (5) by means of its rotary motion about its axis,
   - a seat (9) arranged below the fixed piece (4), having an inner surface of grooved structure into which one end of the screw (8) enters by rotating,
   - a shelf holder (11) fixed on the lower side of the movable piece (5) by means of at least one fastening member (10), having a perforated structure enabling the other end of the screw (8) to settle, and
   - a power transfer member (13) extending from the front surface of the movable piece (5) to the screw (8) and settling in a cavity (12) provided on the screw (8), enabling the screw (8) to rotate as a result of rotating about its axis.
3. A cooling device (1) according to claim 2, **characterized by** a decorative panel (16) detachably arranged on the movable piece (5), having a protrusion (15) with a structure suitable for placement so as not to move with respect to the power transfer member (13) which the user can interact through a bore (14) provided on the front surface of the movable piece (5), enabling rotating of the power transfer member (13) and therefore the screw (8) by means of its rotary motion about its placement axis.
4. A cooling device (1) according to any one of the preceding claims, **characterized by** the shelf (6) having two mutual channels (17) provided on the

side walls of the fixed piece (4), and two stopper (18) provided on mutual side walls of the movable piece (5), suitable for moving on said channels (17), and preventing the movable piece (5) from being completely detached from the fixed piece (4).

Figure 1

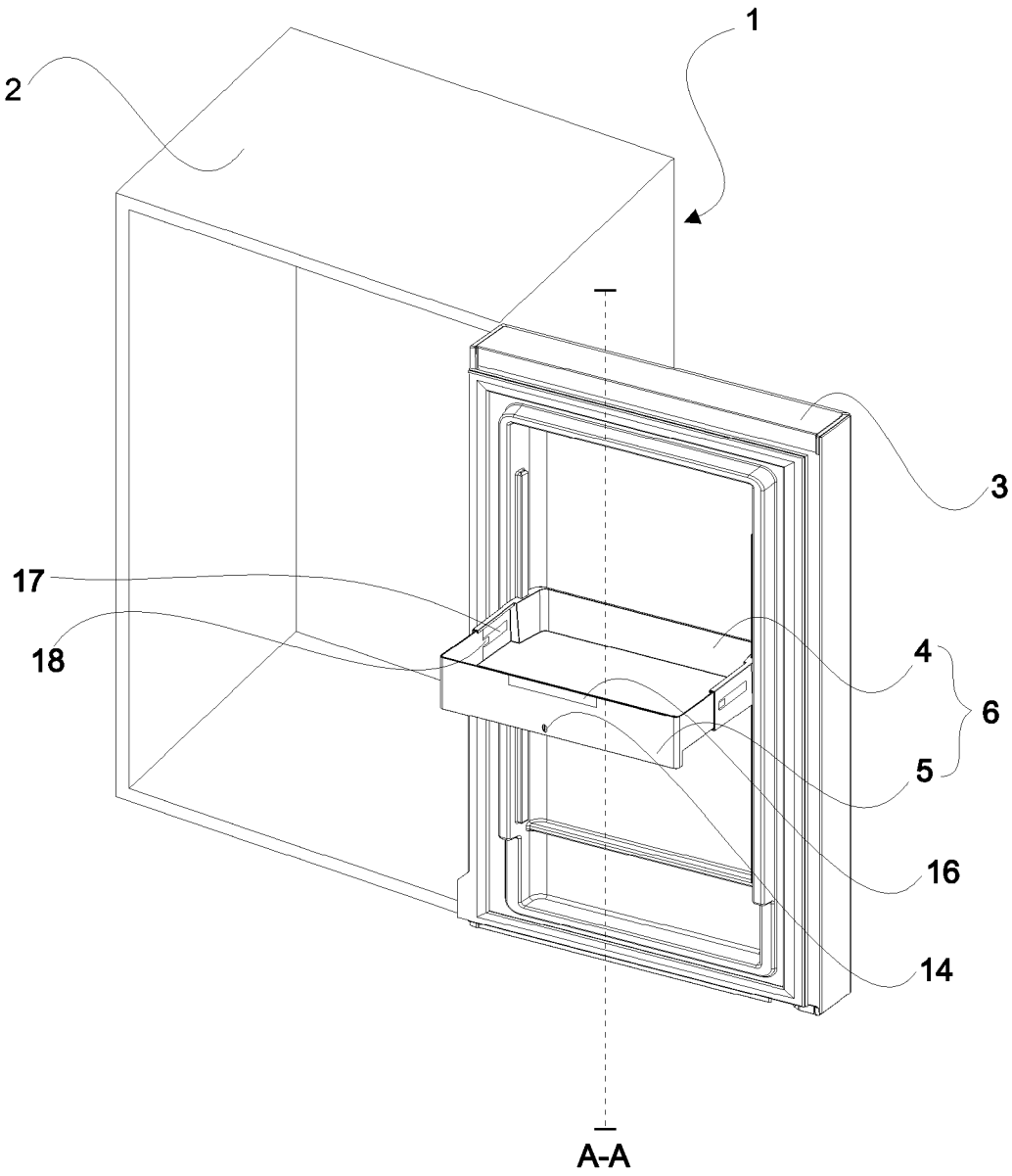


Figure 2

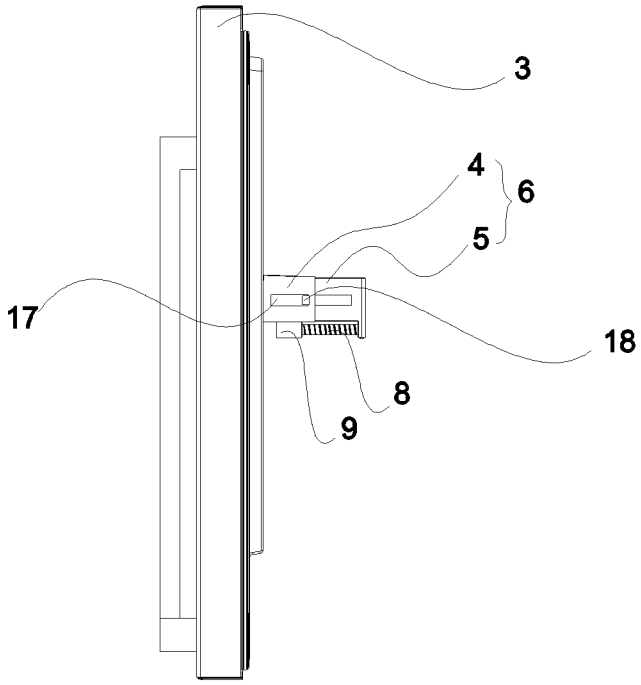


Figure 3

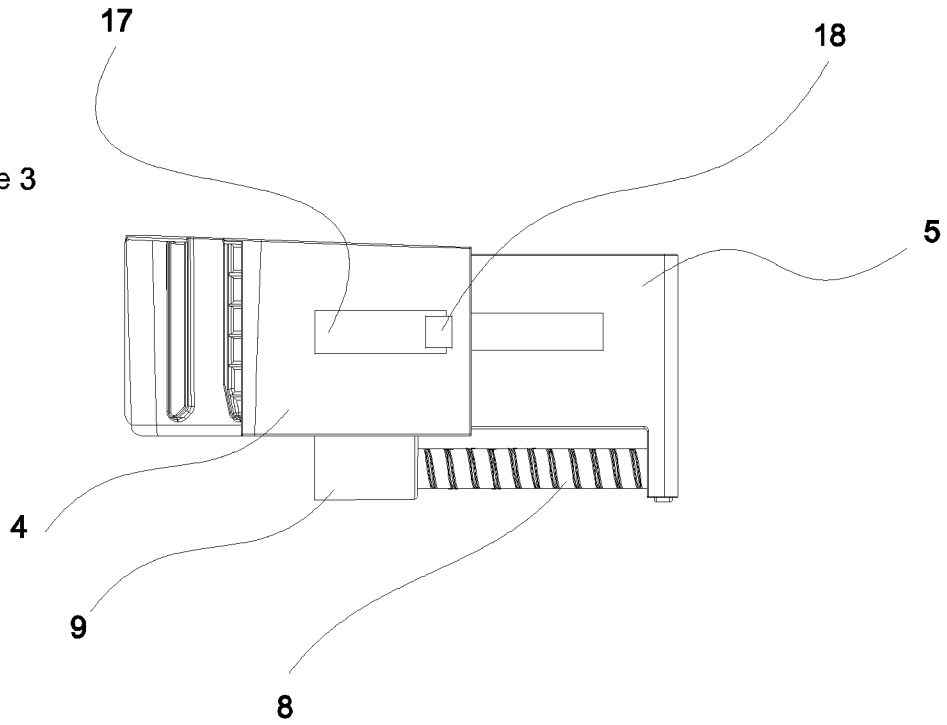


Figure 4

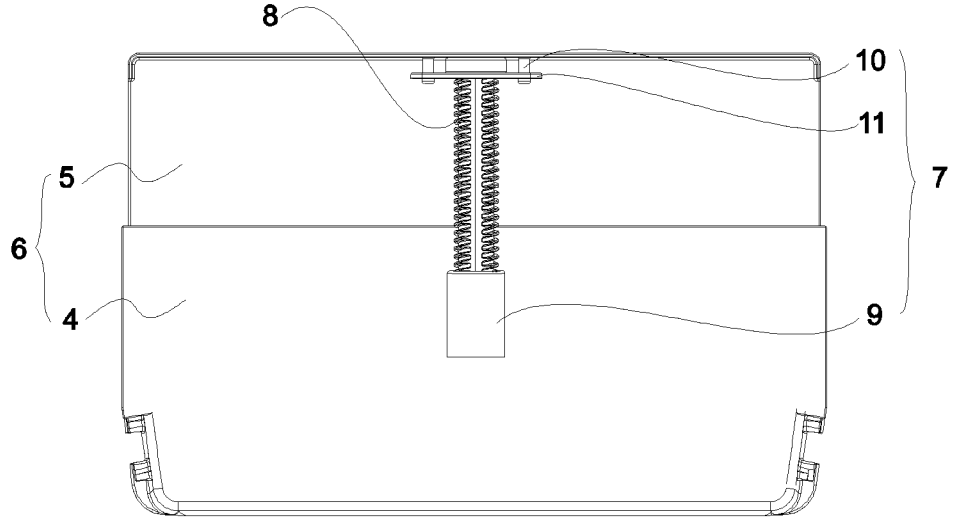


Figure 5

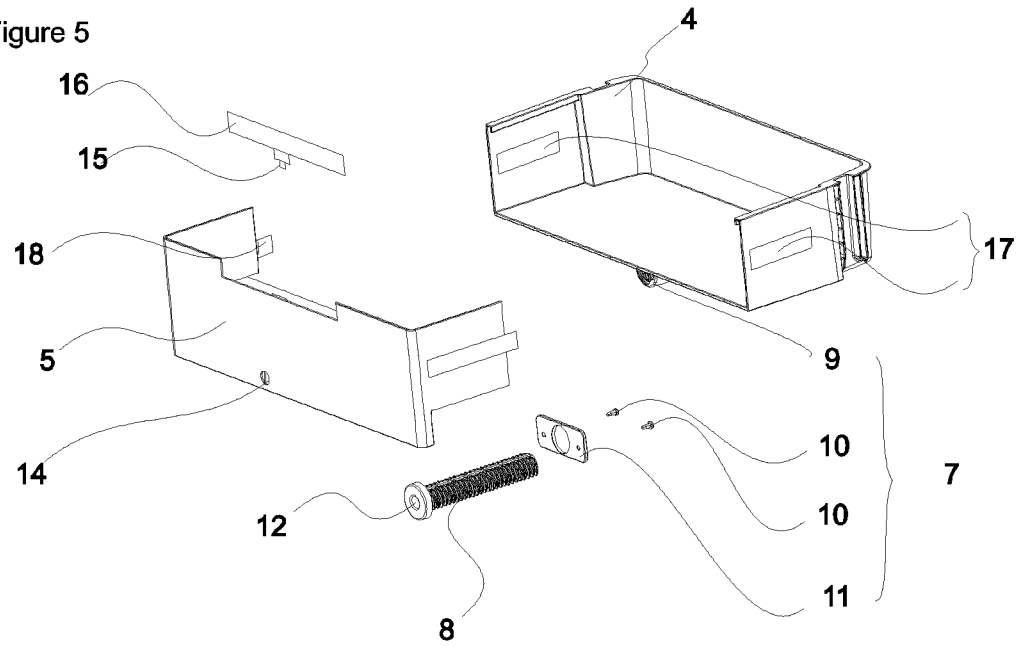
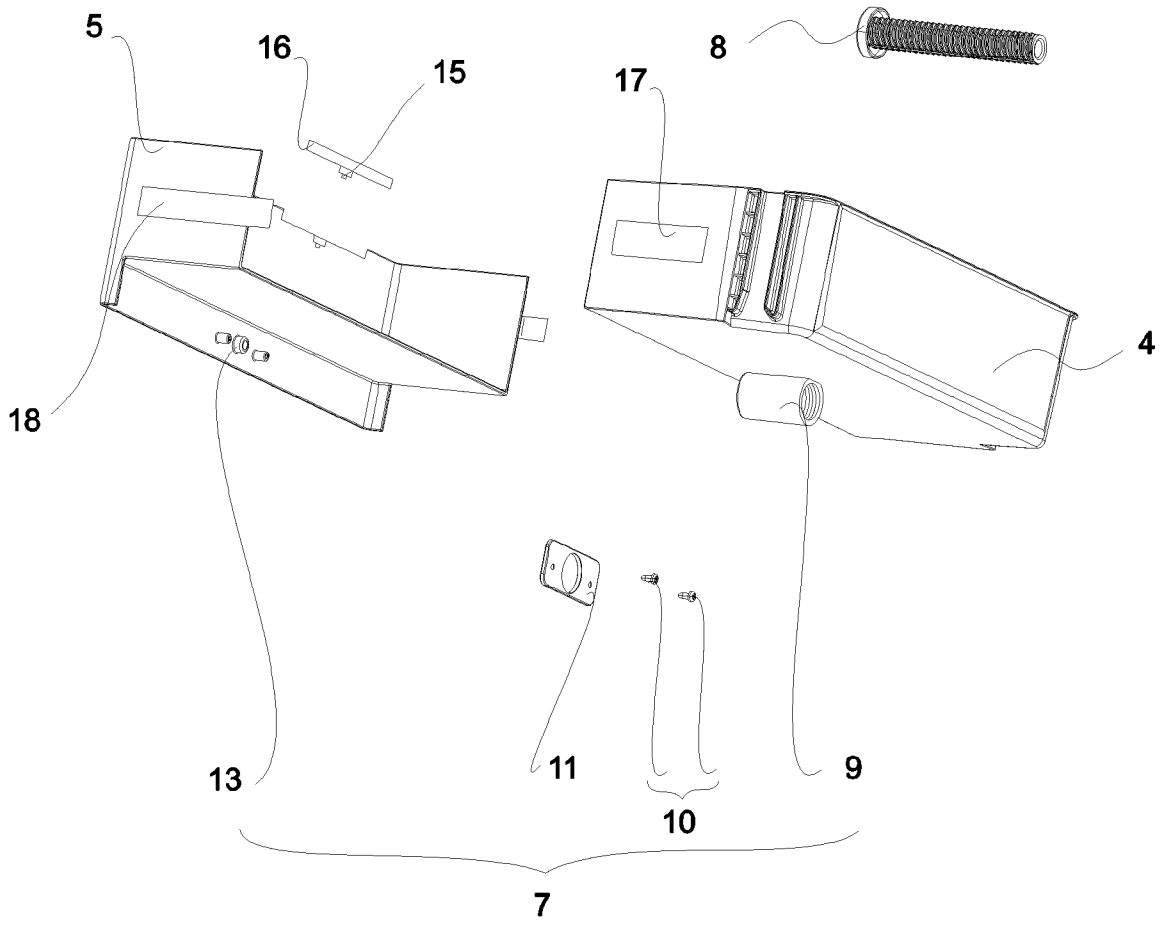


Figure 6



INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2017/080073

A. CLASSIFICATION OF SUBJECT MATTER
INV. F25D23/04
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	JP H06 40788 U (SANSHIN ELECTRONICS CO., LTD.) 31 May 1994 (1994-05-31) claims 1-4; figures 1-8	1,4
X	KR 2004 0054931 A (SAMSUNG ELECTRONICS CO LTD) 26 June 2004 (2004-06-26) claim 1; figures 3a,3b,4a,4b	1
A	US 2013/081421 A1 (KWON HONGSIK [KR] ET AL) 4 April 2013 (2013-04-04) figure 16	2,3

☐ 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	Date of mailing of the international search report
12 February 2018	21/02/2018

Name and mailing address of the ISA/	Authorized officer
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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/EP2017/080073

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
JP H0640788 U	31-05-1994	NONE	
KR 20040054931 A	26-06-2004	NONE	
US 2013081421 A1	04-04-2013	US 2013081421 A1	04-04-2013
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		US 2015123532 A1	07-05-2015