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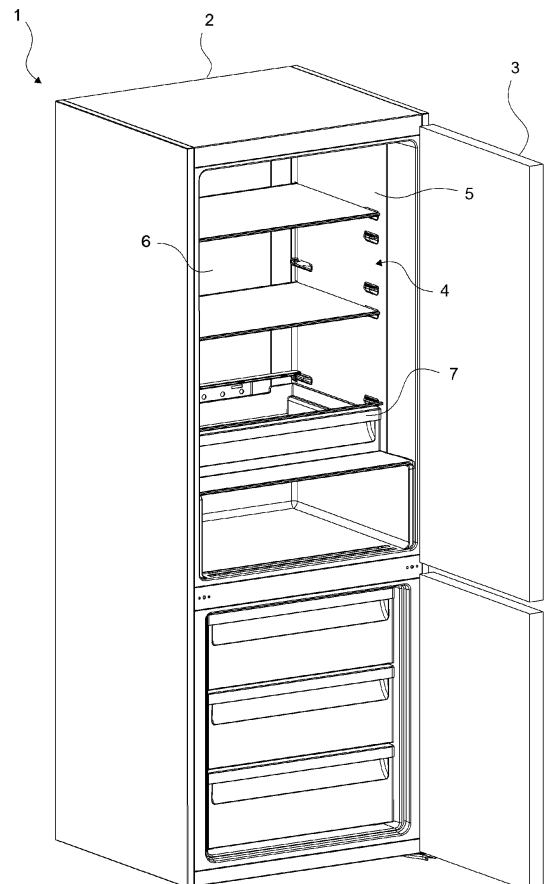
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(54) **A REFRIGERATOR COMPRISING A SELF-CLOSING DRAWER**

(57) The present invention relates to a cooler (1) comprising a body (2) wherein the beverages and food-stuffs are placed and that has an inlet port (4) enabling the user to access therein, two side walls (5) and a rear wall (6); one or more than one door (3) that prevents the heat transfer between the body (2) and the outer environment when closed, that enables the user to access the interior of the body (2) when opened and that is mounted to one side of the body (2); at least one drawer (7) that is disposed into the body (2) and that moves in the horizontal plane between the side walls (5),

Figure 1



Description

[0001] The present invention relates to a refrigerator comprising a drawer that automatically closes.

[0002] Refrigerators comprise a fresh food compartment wherein foods and beverages are stored and a freezing compartment that enables foods to be stored by being frozen. In recent years, to meet customer demands, the refrigerators comprise one or more than one drawer accessible from above. In order to enable the drawer to open/close easily, various movement mechanisms having rails, slides and/or wheels are used. In the refrigerators comprising drawers, leaving the drawer open causes the foodstuffs to spoil and the energy consumption to increase.

[0003] In the state of the art European Patent Application No. EP2659210, a drawer is disclosed, that moves forwards and backwards in the cooling device by means of a movement mechanism.

[0004] The aim of the present invention is the realization of a cooler wherein the open drawer is enabled to be automatically closed.

[0005] The cooling device realized in order to attain the aim of the present invention, explicated in the first claim and the respective claims thereof, by means of a connection member with one end connected to a spring and the other to a drawer, enables the drawer left open or not completely closed to be brought to the closed position by means of the spring and thus completely closed. Thus, in cases when the drawer is forgotten to be closed or not properly closed, the drawer is prevented from remaining open.

[0006] The connection member provides the connection between the spring and the drawer and the movement of the drawer is transferred to the spring by means of the said connection member.

[0007] The position information of the drawer is determined by means of a control unit according to the relative position of a sensor and a magnet. The sensor is a reed switch that detects magnetic fields.

[0008] A locking means moves as a motor is actuated according to the position information received from the control unit and locks or frees a pin. If the drawer is not closed in a period predetermined by the producer, the control unit operates the motor so as to rotate the locking means and thus the pin is freed. In this case, the coil spring that has compressed and stored energy during the opening of the drawer is freed when the pin is freed and the stored energy is spent to bring the drawer to the closed position.

[0009] By means of the present invention, by detecting that the drawer is left open or not properly closed by the user, the drawer is automatically closed.

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

Figure 1 - is the general view of a cooler and a drawer

therein.

Figure 2 - is the perspective view of the cooler without the drawer.

Figure 3 - is the sideways view of the cooler and the drawer therein.

Figure 4 - is the rear perspective view of the drawer.

Figure 5 - is the sideways detailed view of the rail, the sensor, the connection member, the coil spring and the locking means.

Figure 6 - is the sideways view of the coil spring when the drawer is open and closed.

Figure 7 - is the view of the relative positions of the pin and the locking means when the drawer is closed and open.

[0011] The elements illustrated in the figures are numbered as follows:

1. Refrigerator
2. Body
3. Door
4. Inlet port
5. Side wall
6. Rear wall
7. Drawer
8. Spring
9. Connection member
10. Pin
11. Locking means
12. Motor
13. Sensor
14. Magnet
15. Control unit
16. Slide
17. Rail

[0012] The refrigerator (1) comprises a body (2) wherein the beverages and foodstuffs are placed and that has an inlet port (4) enabling the user to access therein, two side walls (5) and a rear wall (6); one or more than one door (3) that prevents the heat transfer between the body (2) and the outer environment when closed, that enables the user to access the interior of the body (2) when opened and that is mounted to one side of the body (2); at least one drawer (7) that is disposed into the body (2) and that moves in the horizontal plane between the side walls (5),

- a spring (8) that is fixed to the side wall (5) and that enables the drawer (7) to automatically close when the force applied onto the drawer (7) in the open position is removed, and
- a connection member (9) with one end connected to the spring (8) and the other end to the drawer (7) (Figure 1, Figure 2 and Figure 3).

[0013] When the user wants to load or unload the drawer (7) by opening the door (3) of the refrigerator (1),

he/she holds and pulls the drawer (7). As a result of this pulling force, the drawer (7) disposed between the two opposing side walls (5) moves in the horizontal direction and gets close to the inlet port (4). In this case, the connection member (9) with one end connected to the spring (8) and the other end to the drawer (7) moves together with the drawer (7) and pulls the spring (8). After the drawer (7) is loaded or unloaded, the user releases the drawer (7) and by means of the spring (8) the connection member (9) and the drawer (7) where to the connection member (9) is fixed return to their initial position.

[0014] The spring (8), also called a coil spring, is a spring (8) in spiral form, that is produced from metal and that is wrapped on itself around the point where the same is fixed to the side wall (5). One end of the spring (8) is fixed to the side wall (5) and the other end to the connection member (9).

[0015] In an embodiment of the present invention, the refrigerator (1) comprises a magnet (14) that is fixed at the rear side of the drawer (7), a sensor (13) that detects if the drawer (7) is open or not, that is in the passive position upon detecting the magnet (14) when the drawer (7) is in the closed position and changes to the active position when the drawer (7) is opened, and a control unit (15) that evaluates the information received from the sensor (13) (Figure 4 and Figure 5). In an embodiment of the present invention, the sensor (13) is a reed switch that is mounted onto the rear wall (6) and that is activated by magnetic field. When the drawer (7) is closed, the magnet (14) triggers the reed switch and the information that the drawer (7) is closed is delivered to the control unit (15). Since the magnet (14) does not trigger the reed switch when the drawer (7) is open, the sensor (13) shifts to the active position and the information that the drawer (7) is open is delivered to the control unit (15).

[0016] In another embodiment of the present invention, the refrigerator (1) comprises a sensor (13) that is in the active position upon detecting the magnet (14) when the drawer (7) is closed and that changes to the passive position when the drawer (7) is opened.

[0017] In another embodiment of the present invention, the refrigerator (1) comprises a locking means (11) that is fixed to the side wall (5), a motor (12) that moves the locking means (11) and that is controlled by the control unit (15), and a pin (10) that is fixed to the side of the drawer (7) and that moves together with the drawer (7). The locking means (11) is a L-shaped pin with one end connected to the motor (12).

[0018] The magnet (14) moves away from the sensor (13) while the drawer (7) is being opened and the sensor (13) shifts to the active position and delivers the information that the drawer (7) is open. Consequently, the control unit (15) operates the motor (12) so as to rotate the locking means (11) and thus the pin (10), that remains between the rear wall (6) and the locking means (11) when the drawer (7) is closed, is enabled to pass to the other side of the locking means (11), in other words between the inlet port (4) and the locking means (11). After this

stage, the locking means (11) is rotated again and assumes the locking position and as long as the drawer (7) remains open, the pin (10) is enabled to remain attached to the locking means (11) and the drawer (7) is prevented from closing. When the drawer (7) is not closed properly or is left open, the sensor (13) detects that the drawer (7) is left open and delivers this information to the control unit (15). In this case, the control unit (15) operates the motor (12). When the motor (12) is operated, the locking means (11) with one end connected to the motor (12) starts to rotate around its own axis and enables the pin (10) to be freed from the locking means (11). As the pin (10) is freed from the locking means (11), the drawer (7) is pulled by the spring (8) and the connection member (9) by means of the energy stored in the spring (8) while the drawer (7) is being opened, and the drawer (7) is enabled to automatically change to the closed position (Figure 6 and Figure 7).

[0019] In another embodiment of the present invention, the refrigerator (1) comprises rails (17) that are oppositely fixed to the side walls (5) and that enable the drawer (7) to be placed into the body (2) and to move forwards and backwards in the body (2), and a pair of slides (16) that are fixed to the side walls (5) of the drawer (7). The slides (16) seat into the rails (17) and move with respect to each other.

[0020] By means of the present invention, in case the drawer (7) is left open or not properly closed, the drawer (7) is enabled to be automatically closed. Thus, unfavorable situations that may occur due to the drawer (7) remaining open are prevented.

Claims

1. A refrigerator (1) comprising a body (2) wherein the beverages and foodstuffs are placed and that has an inlet port (4) enabling the user to access therein, two side walls (5) and a rear wall (6); one or more than one door (3) that prevents the heat transfer between the body (2) and the outer environment when closed, that enables the user to access the interior of the body (2) when opened and that is mounted to one side of the body (2); at least one drawer (7) that is disposed into the body (2) and that moves in the horizontal plane between the side walls (5), **characterized by**

- a spring (8) that is fixed to the side wall (5) and that enables the drawer (7) to automatically close when the force applied onto the drawer (7) in the open position is removed, and
- a connection member (9) with one end connected to the spring (8) and the other end to the drawer (7).

2. A refrigerator (1) as in Claim 1, **characterized by** the spring (8) in spiral form, that is produced from

metal and that is wrapped on itself around the point where the same is fixed to the side wall (5).

3. A refrigerator (1) as in Claim 1, **characterized by** a magnet (14) that is fixed at the rear side of the drawer (7), a sensor (13) that detects if the drawer (7) is open or not, that is in the passive position upon detecting the magnet (14) when the drawer (7) is in the closed position and changes to the active position when the drawer (7) is opened, and a control unit (15) that evaluates the information received from the sensor (13). 5
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4. A refrigerator (1) as in Claim 1, **characterized by** a sensor (13) that is in the active position upon detecting the magnet (14) when the drawer (7) is closed and that changes to the passive position when the drawer (7) is opened. 15
5. A refrigerator (1) as in Claim 3, **characterized by** the sensor (13) that comprises a reed switch that is activated by a magnetic field. 20
6. A refrigerator (1) as in any one of the above claims, **characterized by** a locking means (11) that is fixed to the side wall (5), a motor (12) that moves the locking means (11) and that is controlled by the control unit (15), and a pin (10) that is fixed to the side of the drawer (7) and that moves together with the drawer (7). 25
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7. A refrigerator (1) as in Claim 6, **characterized by** the locking means (11) that is a L-shaped pin with one end connected to the motor (12). 35
8. A refrigerator (1) as in Claim 6, **characterized by** the pin (10) that remains between the rear wall (6) and the locking means (11) when the drawer (7) is closed and remains between the inlet port (4) and the locking means (11) when the drawer (7) is open. 40
9. A refrigerator (1) as in Claim 1, **characterized by** rails (17) that are oppositely fixed to the side walls (5) and that enable the drawer (7) to be placed into the body (2) and to move forwards and backwards in the body (2), and a pair of slides (16) that are fixed to the side walls (5) of the drawer (7). 45
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Figure 1

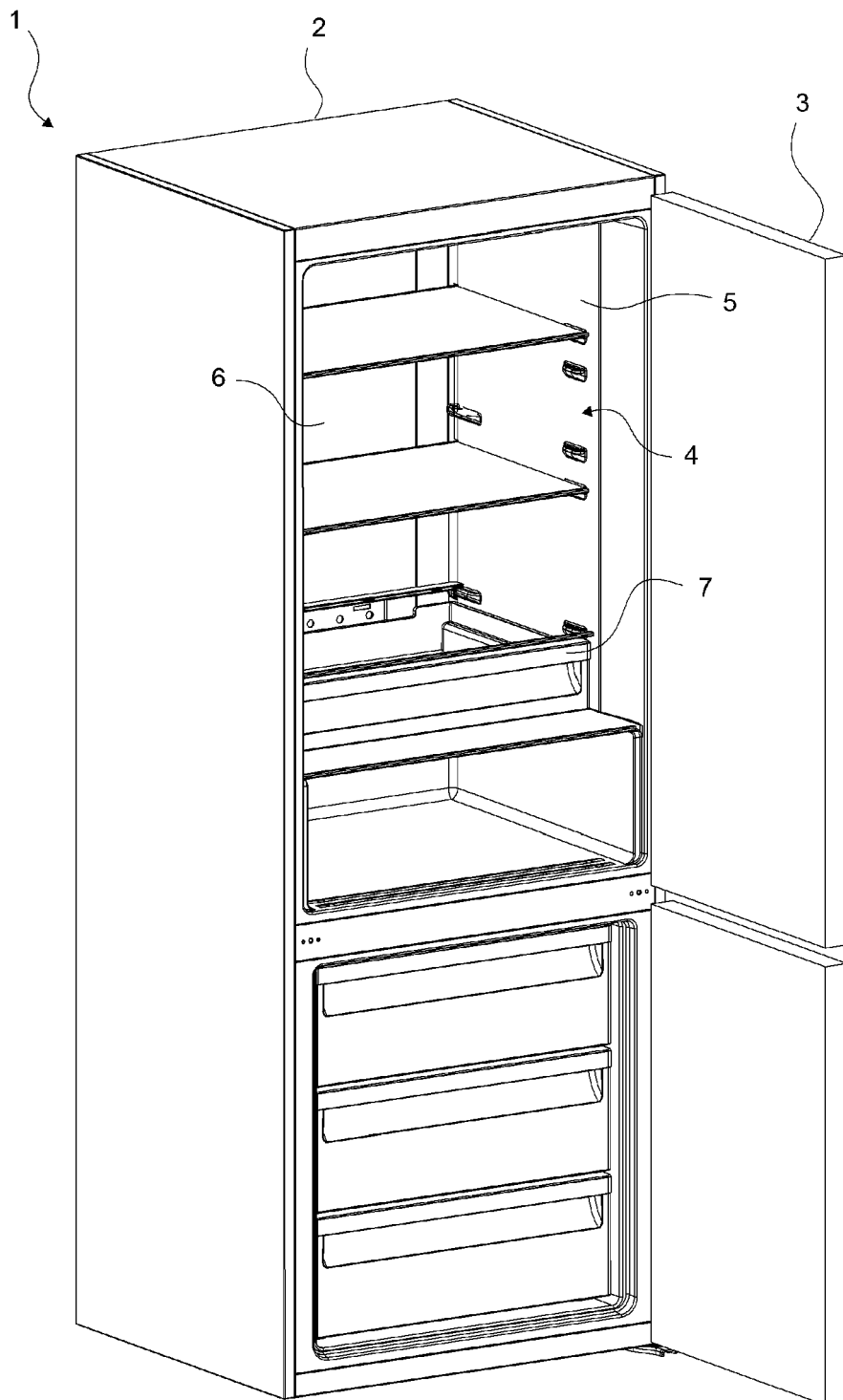


Figure 2

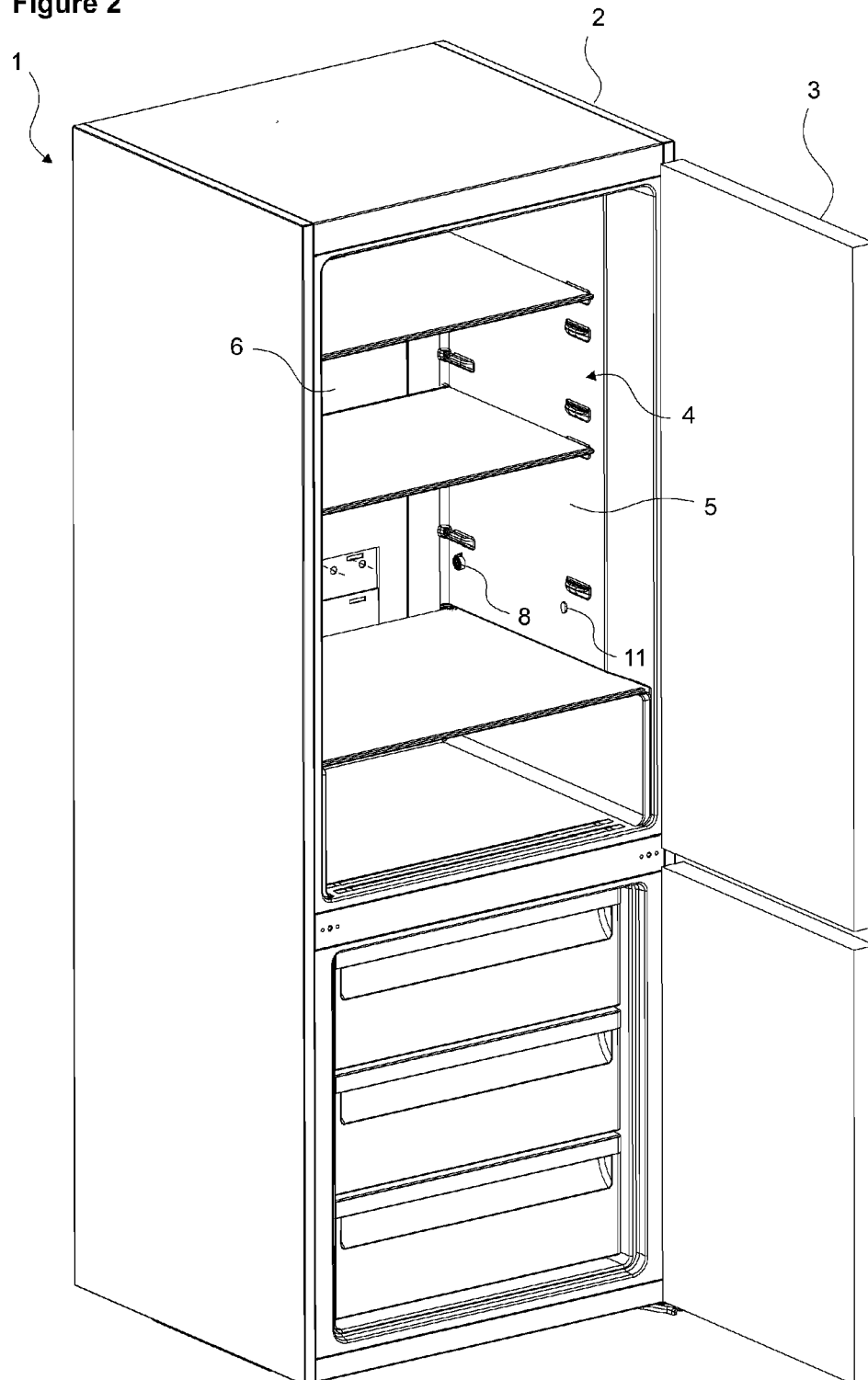


Figure 3

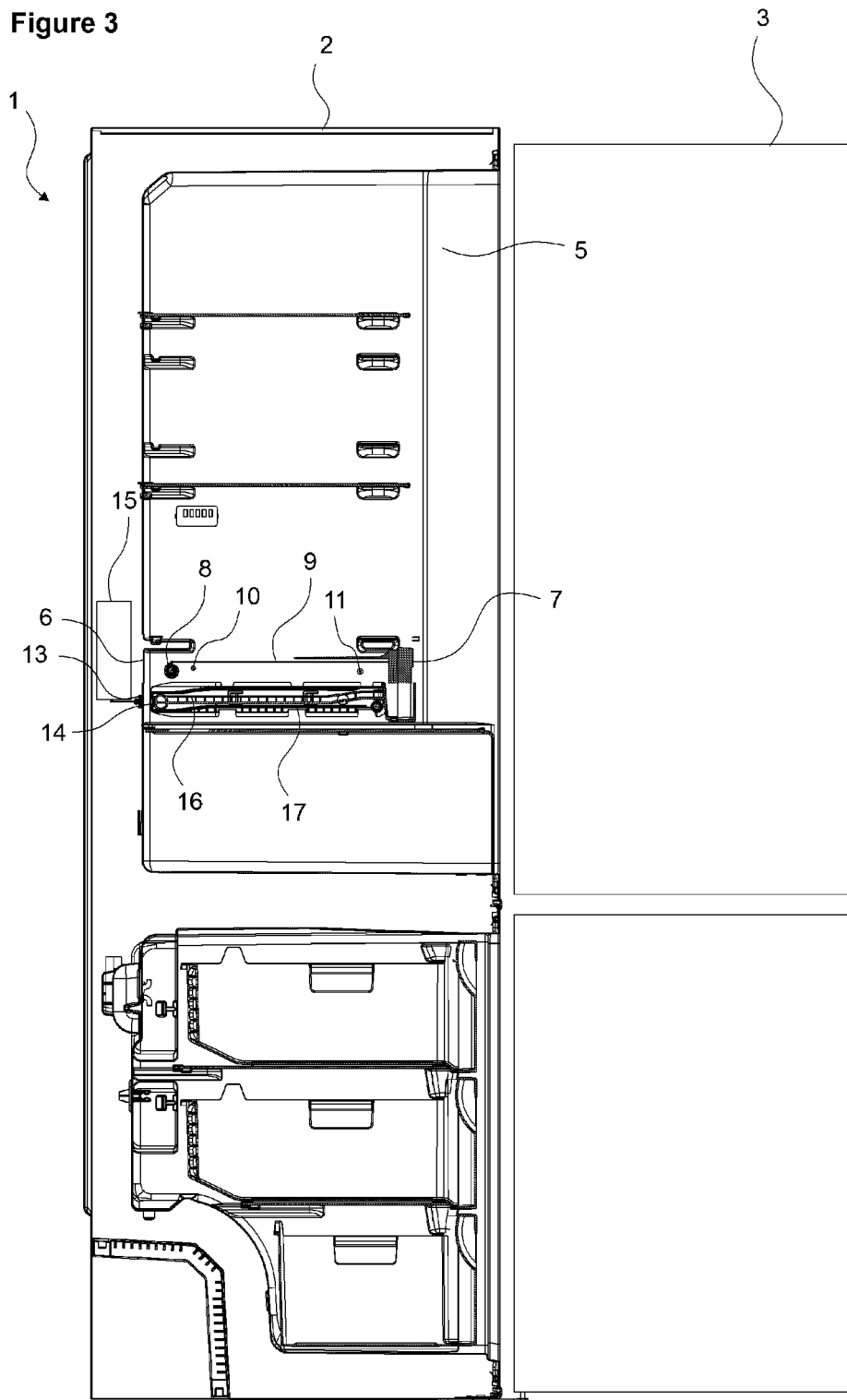


Figure 4

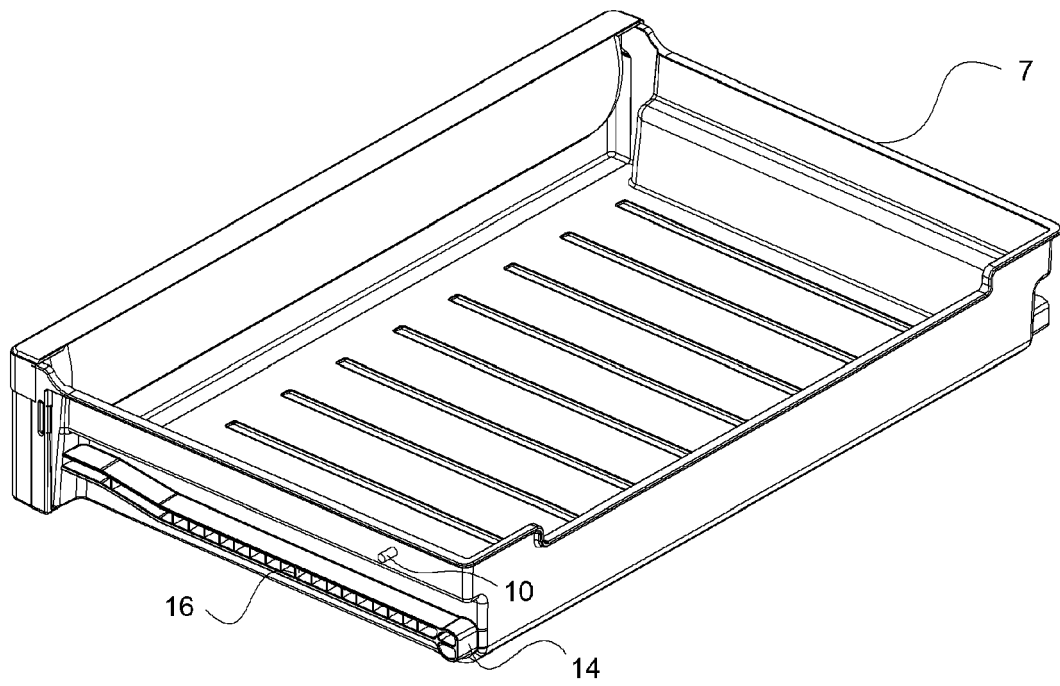


Figure 5

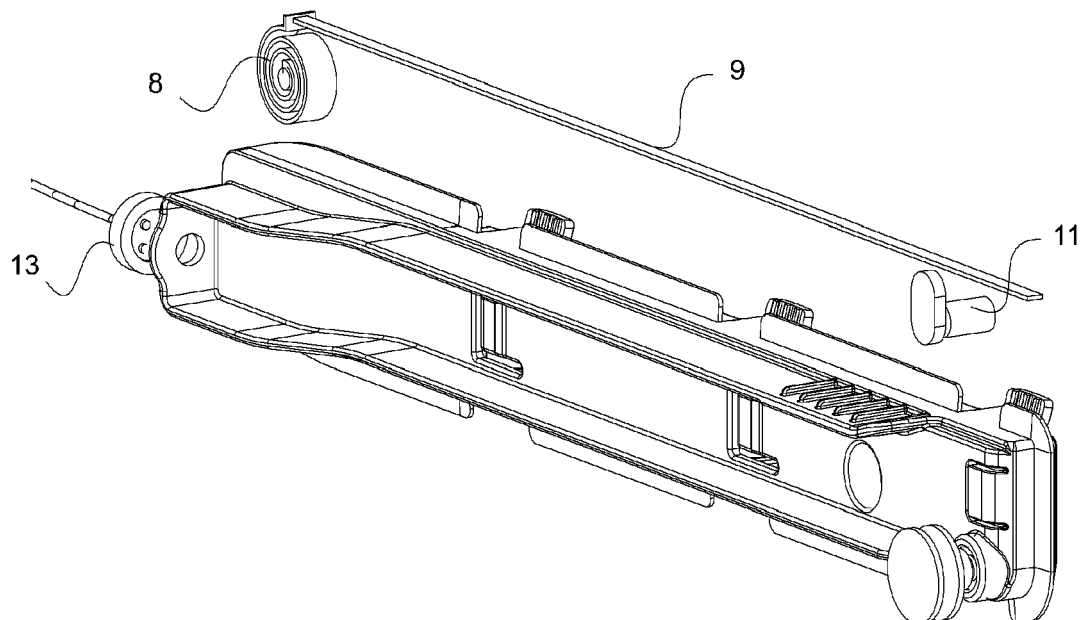


Figure 6

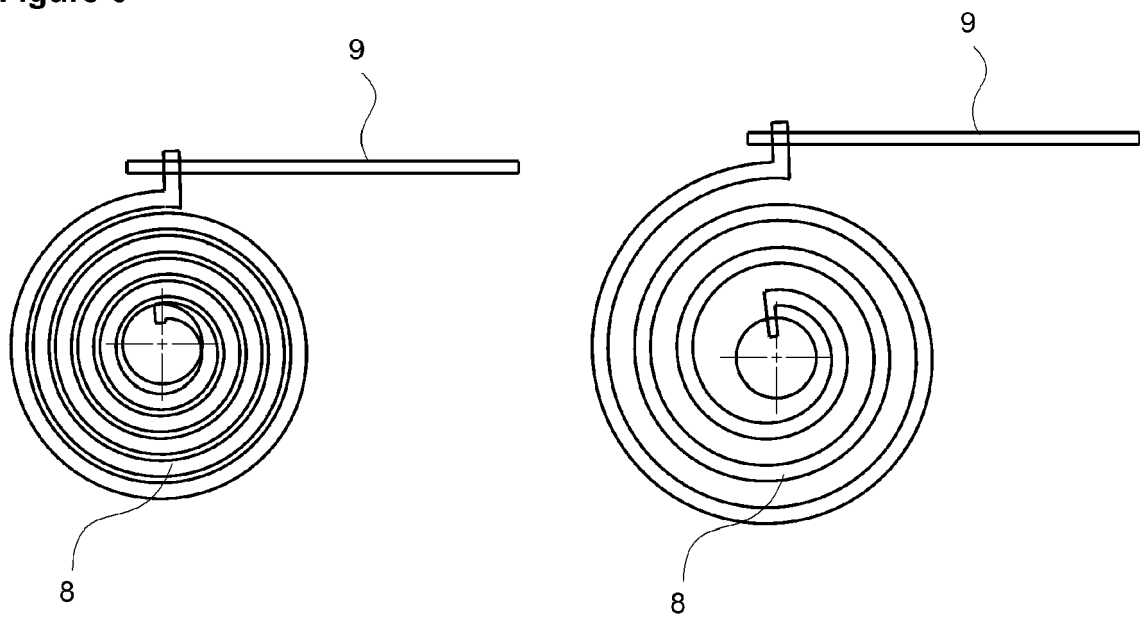
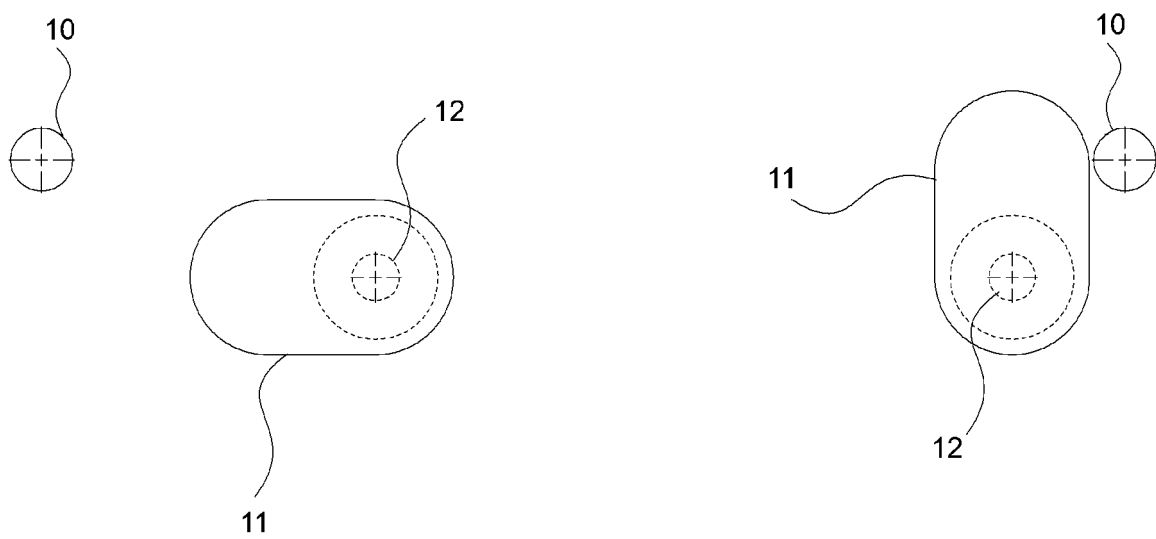


Figure 7





EUROPEAN SEARCH REPORT

 Application Number
 EP 16 18 4912

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	WO 2006/006707 A1 (MATSUSHITA ELECTRIC IND CO LTD [JP]; HAMADA KAZUYUKI; HIRAI TSUYOKI; A) 19 January 2006 (2006-01-19)	1,2,9	INV. F25D25/02
Y	* paragraphs [0009], [0010], [0020],	3-7	
A	[0091] - [0093], [0105]; figure 12 * * figure 11 *	8	
X	US 2006/087208 A1 (OH SEUNG H [KR] ET AL) 27 April 2006 (2006-04-27)	1,2,9	
Y	* abstract; figures 1-7 *	3-7	
X	JP H05 317133 A (SUGATSUNE KOGYO) 3 December 1993 (1993-12-03)	1,9	
Y	* abstract; figures 1-6 *	3-7	
X,P	US 2016/138851 A1 (KIM LYUNSU [KR]) 19 May 2016 (2016-05-19) * the whole document *	1,9	
Y	EP 2 267 386 A2 (SAMSUNG ELECTRONICS CO LTD [KR]) 29 December 2010 (2010-12-29) * the whole document *	3-5	TECHNICAL FIELDS SEARCHED (IPC)
Y	EP 2 354 735 A2 (SAMSUNG ELECTRONICS CO LTD [KR]) 10 August 2011 (2011-08-10) * paragraphs [0017], [0018], [0089] - [0093]; figure 13 *	3-5	F25D
Y	US 2008/302114 A1 (KELLY PAUL H [US] ET AL) 11 December 2008 (2008-12-11) * abstract; figures 1-9 *	6,7	
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 14 February 2017	Examiner Bidet, Sébastien
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 16 18 4912

5

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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40

45

50

55

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2006006707 A1	19-01-2006	CN 1985063 A WO 2006006707 A1	20-06-2007 19-01-2006
US 2006087208 A1	27-04-2006	US 2006087208 A1 US 2009167131 A1	27-04-2006 02-07-2009
JP H05317133 A	03-12-1993	JP 2712135 B2 JP H05317133 A	10-02-1998 03-12-1993
US 2016138851 A1	19-05-2016	KR 20160059230 A US 2016138851 A1	26-05-2016 19-05-2016
EP 2267386 A2	29-12-2010	CN 101949627 A EP 2267386 A2 US 2010320890 A1	19-01-2011 29-12-2010 23-12-2010
EP 2354735 A2	10-08-2011	EP 2354735 A2 EP 3096099 A1 KR 20110088360 A US 2011181163 A1 US 2015069899 A1 US 2015323243 A1 US 2016102904 A1	10-08-2011 23-11-2016 03-08-2011 28-07-2011 12-03-2015 12-11-2015 14-04-2016
US 2008302114 A1	11-12-2008	AU 2008262156 A1 CN 101711332 A EP 2156115 A2 JP 2010529404 A KR 20100037578 A RU 2009149665 A US 2008302114 A1 US 2015153053 A1 WO 2008154174 A2	18-12-2008 19-05-2010 24-02-2010 26-08-2010 09-04-2010 20-07-2011 11-12-2008 04-06-2015 18-12-2008

EPO FORM P0459

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

- EP 2659210 A [0003]