(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 2 431 691 A1

(12) **EUROPEAN PATENT APPLICATION**
published in accordance with Art. 153(4) EPC

(43) Date of publication:
21.03.2012 Bulletin 2012/12

(21) Application number: **09844684.2**

(22) Date of filing: **03.09.2009**

(51) Int Cl.:
F25D 25/00 *(2006.01)*

(86) International application number:
PCT/KR2009/004964

(87) International publication number:
WO 2010/131810 (18.11.2010 Gazette 2010/46)

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO SE SI SK SM TR

(30) Priority: **12.05.2009 KR 20090041053**

(71) Applicant: **LG Electronics Inc.**
Seoul 150-721 (KR)

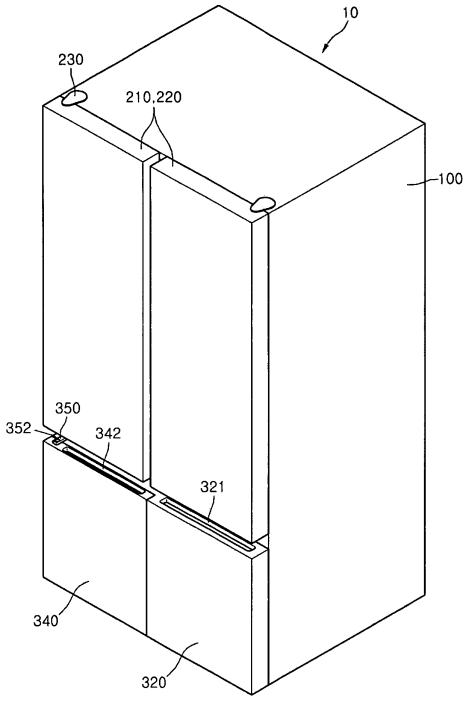
(72) Inventors:
- **LEE, Su Won**
  Changwon-si
  Gyeongsangnam-do 641-940 (KR)
- **HWANG, Jung Yeon**
  Seoul 142-063 (KR)
- **KIM, Sung Eun**
  Seoul 137-049 (KR)

(74) Representative: **Urner, Peter**
ter Meer Steinmeister & Partner GbR
Mauerkircherstrasse 45
D-81679 München (DE)

(54) REFRIGERATOR

(57) The embodiment relates to a refrigerator. The refrigerator allows a user to easily draw in and out foods stored in a storage chamber.

Fig.1



EP 2 431 691 A1

Description

BACKGROUND

Technical Field

[0001] The embodiment relates to a refrigerator.

Description of the RIeated Art

[0002] In general, a refrigerator is an apparatus that stores foods in a low-temperature state.

[0003] The refrigerator includes a main body having a storage chamber and a door that is movably connected to the main body to open and close the storage chamber.

[0004] The storage chamber can be partitioned into, for example, a refrigerating chamber and a freezing chamber. The door includes a refrigerating chamber door that opens and closes the refrigerating chamber and a freezing chamber door that opens and closes the freezing chamber.

[0005] Therefore, a user should open the freezing chamber door or the refrigerating chamber door so as to draw out foods stored in the refrigerating chamber or the freezing chamber.

SUMMARY

[0006] It is an object of an embodiment to provide a refrigerator that allows a user to draw out foods stored in a storage chamber with small power.

[0007] According to an aspect, a refrigerator includes: a main body having a storage chamber; a main door that is movably connected to the main body to open and close the storage chamber; a sub-door that is rotatably connected to the main door to open and close a part of the storage chamber; and a receiving member that is joined to the sub-door, and is drawn out from the storage chamber while moving together with the sub-door when the sub-door is opened.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008]

FIG. 1 is a perspective view of a refrigerator according to a first embodiment;

FIG. 2 is a partial exploded perspective view of a refrigerator according to a first embodiment;

FIG. 3 is a partial perspective view of a state where a sub-door is opened according to a first embodiment;

FIG. 4 is a partial perspective view of a state where a sub-door is closed according to a first embodiment;

FIG. 5 is a perspective view of a refrigerator according to a second embodiment;

FIG. 6 is a perspective view of a state where a sub-door is opened according to a second embodiment; and

FIG. 7 is a perspective view of a refrigerator according to a third embodiment.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0009] Hereinafter, embodiments will be described in detail with reference to the accompanying drawings.

[0010] FIG. 1 is a perspective view of a refrigerator according to a first embodiment and FIG. 2 is a partial exploded perspective view of a refrigerator according to a first embodiment.

[0011] Referring to FIGS. 1 and 2, the refrigerator 10 according to the embodiment includes a main body 100 having a storage chamber and a door that is movably joined to the main body 100, and opens and closes the storage chamber.

[0012] The storage chamber includes a refrigerating chamber 200 and a freezing chamber 300 that is positioned below the refrigerating chamber 200 and is partitioned from the refrigerating chamber 200.

[0013] The door includes a plurality of refrigerating chamber doors 210 and 220 for opening and closing the refrigerating chamber 200 and a freezing chamber door 320 for opening and closing the freezing chamber 300.

[0014] The plurality of freezing doors 210 and 220 is rotatably connected to the main body 100 by a hinge assembly 230.

[0015] The freezing door 320 is slidably connected to the main body 100 by a rail assembly 400 provided in the main body 100.

[0016] A basket 360 for receiving foods is joined onto a rear surface of the freezing chamber door 320. The basket 360 connected to the rear surface of the freezing chamber door 320 is connected to the rail assembly 400. The rail assembly 400 includes a rail unit 410 of which the length is adjustable in the front and rear direction of the refrigerator 10 and a joining unit 420 that is provided on a front surface of the rail unit 410 and joined onto the rear surface of the freezing chamber door 320.

[0017] Meanwhile, a sub-door 340 that allows a user to draw out foods stored in the freezing chamber 300 without opening the freezing chamber door is provided in the freezing chamber door 320.

[0018] Therefore, when the freezing chamber door 320 is opened, all foods received in the basket 360 are drawn out from the freezing chamber 300.

[0019] In contrast, when the sub-door 340 is opened, some foods received in the basket 360 can be drawn out from the freezing chamber 300.

[0020] Accordingly, in the embodiment, the freezing chamber door 320 itself may be referred to as a main door.

[0021] The sub-door 340 can be rotatably connected to the freezing chamber door 320 by, for example, the hinge assembly. The hinge assembly can include a hinge bracket 350 fixed onto the top and the bottom of the freezing chamber door 340 and a hinge shaft 352 providing a

rotation center of the sub-door 340.

[0022] A vertical length of the sub-door 340 can be the same as a vertical length of the freezing chamber door 320. Accordingly, the integrity of the sub-door 340 and the freezing chamber door 320 can be increased.

[0023] In addition, a holder 322 for holding the sub-door 340 is recessed at a part of the front surface of the freezing chamber door 320. Therefore, the front and rear direction of the freezing door 320 can be maintained the same in left and right directions in a state where the sub-door 340 is joined by the holder 322.

[0024] A main door groove 321 and a sub-door groove 342 for providing a handle are formed on the top of the freezing chamber door 320 and the top of the sub-door 340. In contrast, an additional handle can be joined to each of the freezing chamber door 320 and the sub-door 340.

[0025] Therefore, when the freezing chamber door 320 is pulled in a state where the hand is put in the main door groove 321, the freezing chamber door 320 is opened together with the sub-door 340. In contrast, when the sub-door 340 is pulled in a state where the hand is put in the sub-door groove 342, only the sub-door 340 is opened in a state where the freezing chamber door 320 is closed.

[0026] Meanwhile, an inner space of the basket 360 can be partitioned into a plurality of spaces by a partitioning part 362. For example, the inner space of the basket 360 can be divided into a left space and a right space by the partitioning part 362.

[0027] In addition, an opening portion 364 for allowing the foods to be drawn in and out is formed on a front surface of the basket 360.

[0028] FIG. 3 is a partial perspective view of a state where a sub-door is opened according to a first embodiment and FIG. 4 is a partial perspective view of a state where a sub-door is closed according to a first embodiment.

[0029] Referring to FIGS. 1 to 4, a receiving member 370 for receiving the foods is provided on a rear surface of the sub-door 340. Although not shown, the receiving member 370 can be removably joined to, for example, the sub-door 340 by a hook scheme.

[0030] Accordingly, the receiving member 370 can rotate with the sub-door 340.

[0031] In the embodiment, when the sub-door 340 rotates, the sub-door 340 rotates together with the receiving member 370. Therefore, the rotation center of the sub-door 340 extends in the upper and lower direction of the refrigerator in order to prevent shaking or falling-down of the foods while the receiving member 370 rotates. That is, the sub-door 340 and the receiving member 370 horizontally rotate.

[0032] A sealer 346 for preventing cool air from being leaked can be provided on the rear surface of the sub-door 340. In addition, a magnet (not shown) for joining the sub-door 340 and the freezing chamber door 320 to each other can be provided in the sealer 346.

[0033] In addition, an opening portion 326 providing a space in which the receiving member 370 can move while the sub-door 340 is opened and closed is formed in the freezing chamber door 320.

[0034] The receiving member 370 includes a joining unit 371 joined to the rear surface of the sub-door 340, an extension unit 372 substantially vertically extending from the joining unit 371, one or more support unit 374 for supporting the foods, and a connection unit 373 for preventing the foods from being dropped by connecting the joining unit 371 and the extension unit 372 to each other.

[0035] In addition, in order to prevent interferences of the receiving member 370, the freezing chamber door 320, and the basket 360 while the sub-door 340 is opened and closed, vertical lengths and horizontal lengths of the extension unit 372 and the joining unit 371 are smaller than vertical lengths and horizontal lengths of the opening portions 326 and 364, respectively.

[0036] Further, in order to prevent interferences of the connection unit 373, the freezing chamber door 320, and the basket 360 while the sub-door 340 is opened and closed, the connection unit 373 may have a round shape.

[0037] Therefore, when viewed from the upper side of the receiving member 370, the receiving member 370 can have a fanwise shape having an angel of approximately 90 degrees.

[0038] Of course, the shape of the receiving member 370 described above is exemplary and as long as the receiving member 370 does not interfere with the basket and the freezing chamber door in a state where the receiving member 370 is joined to the sub-door, the shape of the receiving member is not limited.

[0039] Therefore, referring to FIG. 4, the receiving member 370 is positioned in the basket 360 by passing through the opening portion 326 of the freezing chamber door 320 and the opening portion 364 of the basket 360 in a state where the sub-door 340 is closed. For example, the receiving member may be positioned at a left space of the basket 360.

[0040] In contrast, referring to FIG. 3, the receiving member 370 positioned in the basket 360 is drawn out from the refrigerating chamber (or freezing chamber) together with the sub-door 340 by passing through the opening portions 326 and 364 in a state where the sub-door 340 is opened.

[0041] For example, frequently used foods, foods for children, etc. can be received in the receiving member 370. In this case, since the user can draw out desired foods by opening the sub-door 340 without opening the freezing chamber door 320, user convenience is improved.

[0042] That is, since power for opening the sub-door 340 is smaller than power for opening the freezing chamber door 320, the user can draw out the foods stored in the freezing chamber (or basket) with small power.

[0043] Further, since the receiving member 370 is joined onto the rear surface of the sub-door 340, the foods

received in the receiving member 370 may be drawn out from the freezing chamber (or basket) at the time of opening the sub-door 340. As a result, the user needs not to draw out the foods by putting his/her hand into the opening portions 326 and 364.

[0044] Moreover, since the freezing chamber door 320 is positioned below the refrigerating chamber doors 210 and 220, the height of the sub-door 340 from the bottom of the refrigerator 10 is decreased, such that the children can easily open and close the sub-door 340.

[0045] In the embodiment, the receiving member 370 is positioned in the basket 360 by passing through the opening portion 364 of the basket 360 in the state where the sub-door 340 is closed.

[0046] Unlike this, an avoidance space is formed in the basket 360 as large as the shape of the receiving member 370, such that the receiving member 370 may be positioned outside of the basket 360 in the state where the sub-door 340 is closed. Of course, even in this case, the foods received in the receiving member 370 can be cooled by the cool air of the freezing chamber 300.

[0047] FIG. 5 is a perspective view of a refrigerator according to a second embodiment and FIG. 6 is a perspective view of a state where a sub-door is opened according to a second embodiment.

[0048] Most elements of the embodiment are the same as those of the first embodiment. However, the embodiment is different from the first embodiment in the shape and joining scheme of the sub-door. Therefore, hereinafter, only specific elements of the embodiment will be described and the same elements as the first embodiment refer to the descriptions and reference numerals of the first embodiment.

[0049] Referring to FIGS. 5 and 6, a sub-door 540 of the embodiment is provided in the freezing chamber door 320 to be horizontally rotatable. In addition, a vertical length of the sub-door 540 is smaller than the vertical length of the freezing chamber door 320.

[0050] A hinge shaft 542 is connected to the top and the bottom of the sub-door 540 so as to horizontally rotate the sub-door 540.

[0051] In addition, a latch hook 544 for joining the sub-door 540 to the freezing chamber door 320 is formed on the rear surface of the sub-door 540 and a latch slot 546 for joining the latch hook 544 is formed in the freezing chamber door 320.

[0052] Since structures of the latch hook 544 and the latch slot 546 can use the known structures, a detailed description thereof will be omitted.

[0053] Therefore, when a front surface of the sub-door 540 corresponding to a part where the latch hook 544 is formed is pressed in a state where the sub-door 540 is closed, the latch hook 544 and the latch slot 546 are disjoined from each other, such that the sub-door 540 is opened. In contrast, when the sub-door 540 is closed by rotation, the latch hook 544 and the latch slot 546 are joined to each other.

[0054] According to the embodiment, since the user presses the sub-door just once in order to open the sub-door 540, the user convenience is improved.

[0055] FIG. 7 is a perspective view of a refrigerator according to a third embodiment.

[0056] Most elements of the embodiment are the same as those of the third embodiment. However, the embodiment is different from the third embodiment in the type of refrigerator.

[0057] Referring to FIG. 7, the refrigerator 60 according to the embodiment includes a main body 600 that is formed by horizontally partitioning a freezing chamber (not shown) and a refrigerating chamber (not shown), and a freezing chamber door 620 and a refrigerating chamber door 610 for opening and closing the freezing chamber and the refrigerating chamber, respectively.

[0058] In addition, a sub-door 630 having the same structure and rotation scheme as the first embodiment or the second embodiment is provided in the freezing chamber door 620. For example, the sub-door 630 having the same structure as the second embodiment is shown in FIG. 7.

[0059] In the embodiment, since the freezing chamber door 620 and the refrigeration door 610 are horizontally disposed, the sub-door 630 is disposed in the freezing chamber door 620 so that a height H2 to the center of the sub-door 630 is smaller than a height H1 to the center of the freezing chamber door 620 in order to allow the user, particularly, the children to easily open the sub-door 630.

[0060] According to a proposed embodiment, as an additional sub-door is provided in a freezing chamber door, a user can draw out desired foods by opening the sub-door without opening the freezing chamber door, thereby improving user convenience.

[0061] Further, since a receiving member is joined onto a rear surface of the sub-door, foods received in the receiving member may be drawn out from the freezing chamber (or basket) at the time of opening the sub-door. As a result, the user needs not to draw out the foods by putting his/her hand into an opening portion.

[0062] In addition, since the sub-door horizontally rotates around a rotation center extending in a horizontal direction of the refrigerator, it is possible to minimize shaking and falling-down of the foods while the sub-door and the receiving member rotate.

Claims

1. A refrigerator, comprising:

a main body having a storage chamber;
a basket that is selectively positioned in the storage chamber and slidably provided in the main body in the front and rear direction;
a main door that is connected to the basket and moves together with the basket;
a sub-door that is rotatably connected to the

main door to open and close a part of the storage chamber; and

a receiving member that is joined to the sub-door, and is drawn out from the storage chamber while moving together with the sub-door when the sub-door is opened.

2. The refrigerator according to claim 1, wherein the sub-door horizontally rotates around a vertical central axis.

3. The refrigerator according to claim 1, wherein the storage chamber is a freezing chamber and the main door is a freezing chamber door.

4. The refrigerator according to claim 1, wherein an opening portion through which the receiving member passes is formed in the basket and the receiving member is selectively positioned in the basket through the opening portion.

5. The refrigerator according to claim 1, wherein the receiving member is positioned outside of the basket in a state where the sub-door is closed.

6. The refrigerator according to claim 1, wherein a vertical height of the sub-door is the same as a vertical height of the main door.

Fig.1

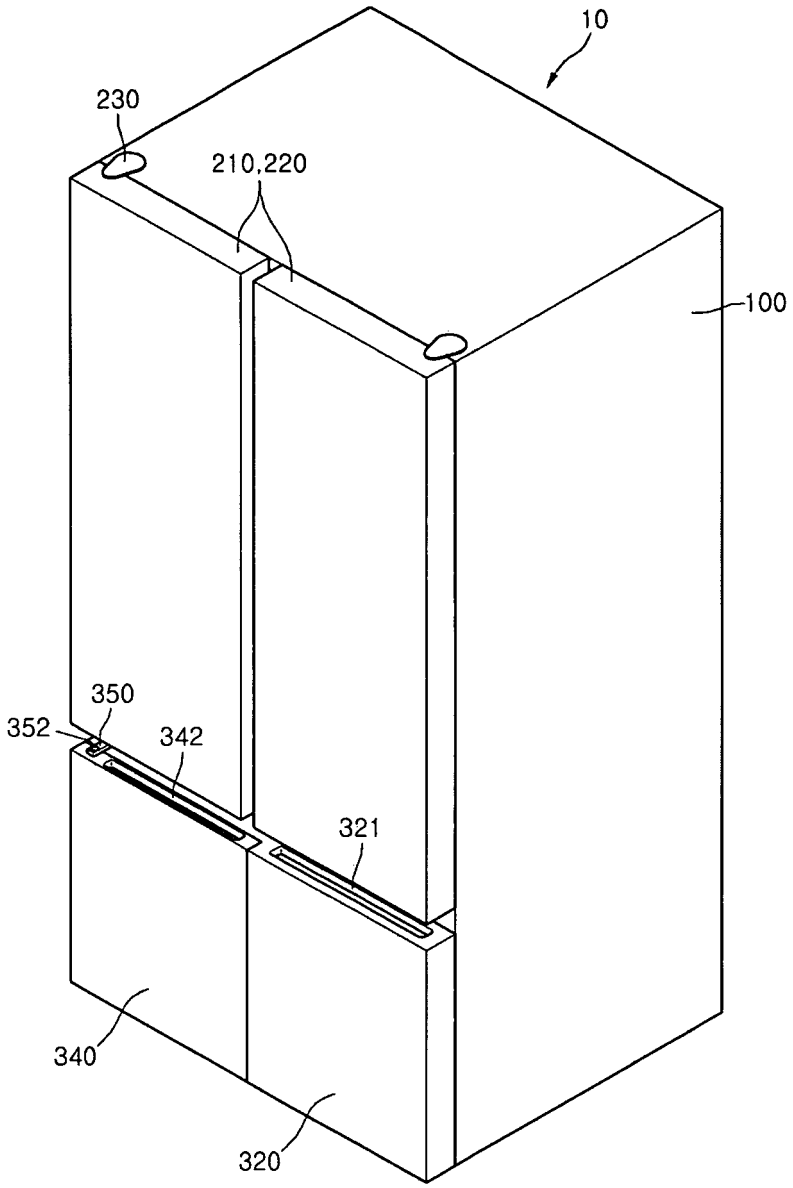


Fig.2

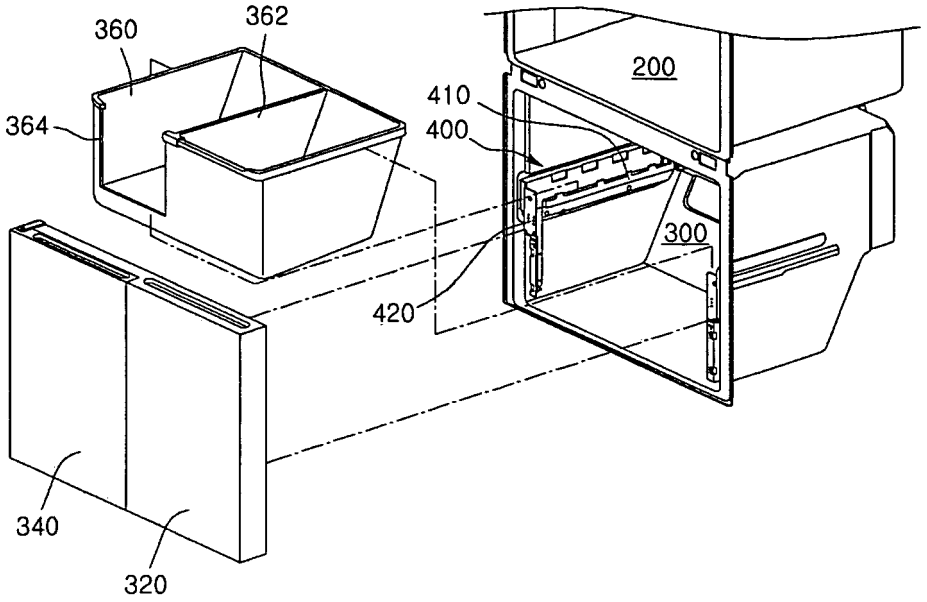


Fig.3

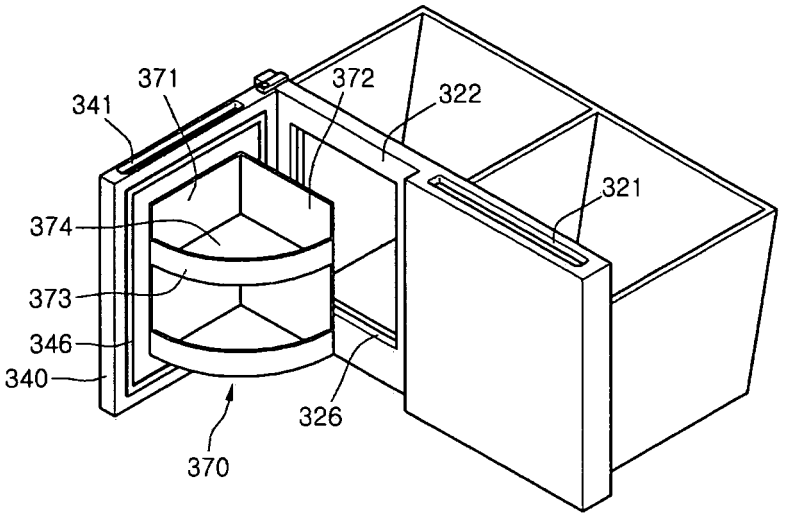


Fig.4

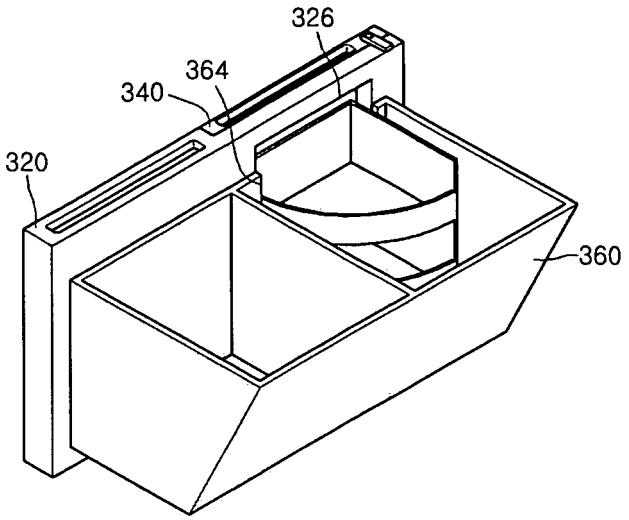


Fig.5

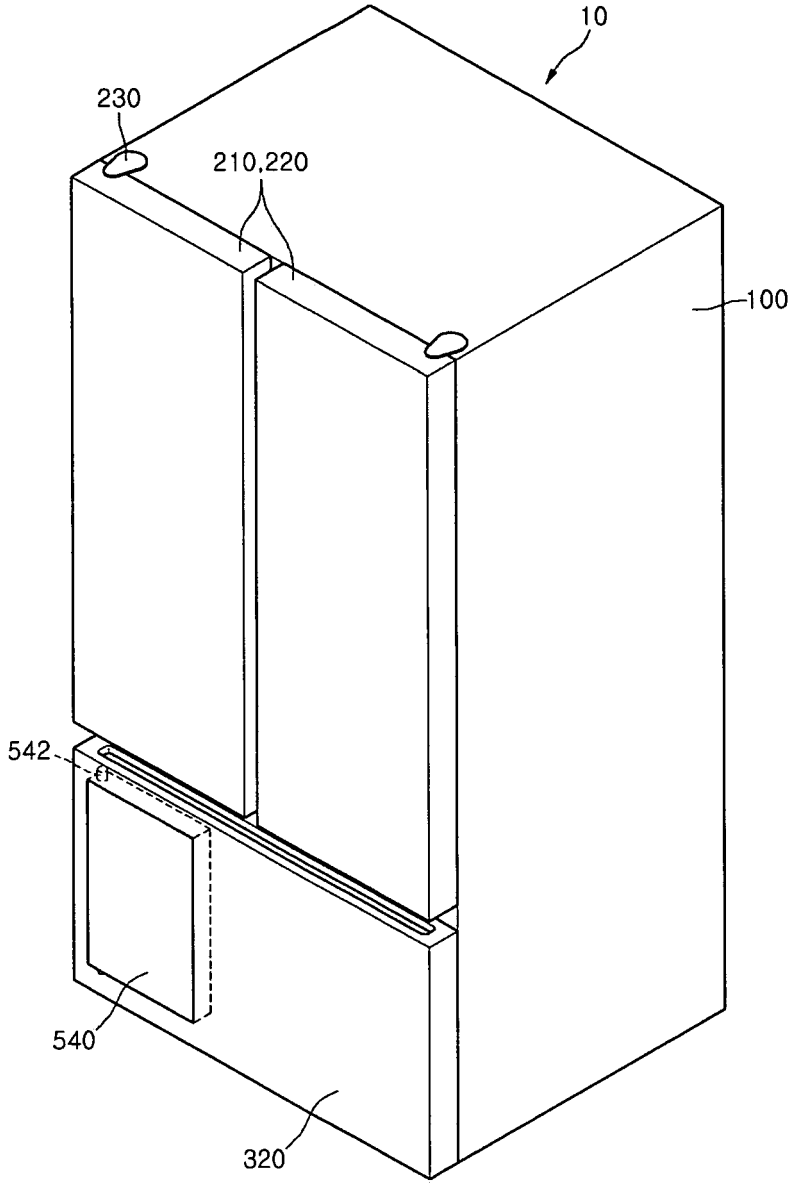


Fig.6

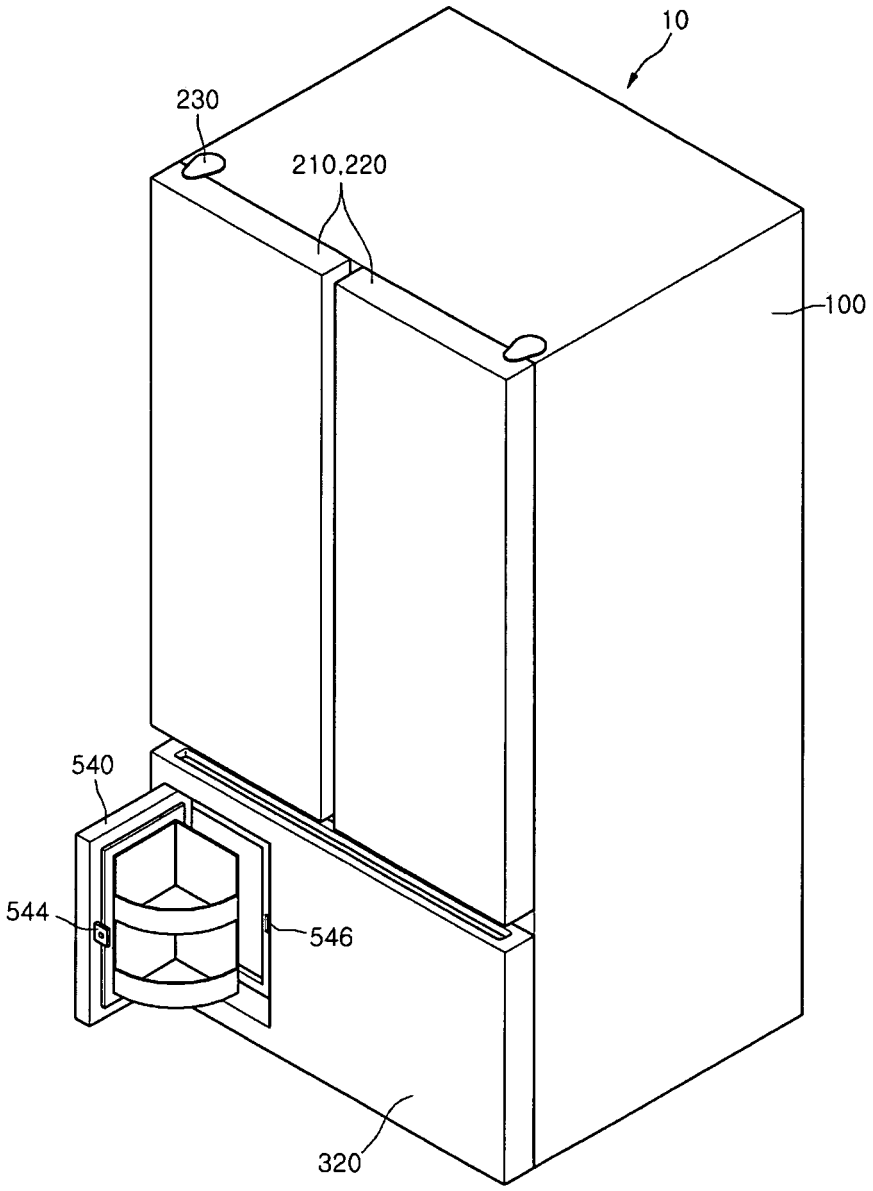
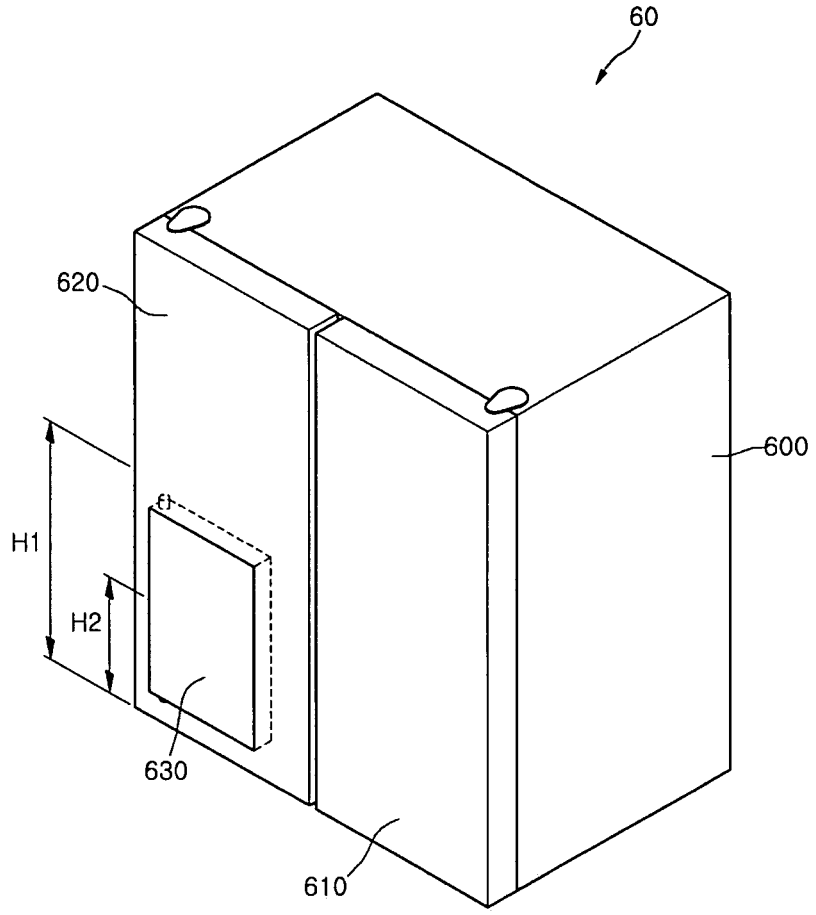


Fig.7



INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR2009/004964

A. CLASSIFICATION OF SUBJECT MATTER

F25D 25/00(2006.01)i

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 25/00; F25D 23/02; F25D 25/02

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
Korean Utility models and applications for Utility models: IPC as above
Japanese Utility models and applications for Utility models: IPC as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKOMPASS (KIPO internal) & Keywords: basket, sliding, door, rotation, receiving member

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	KR 10-1999-0049527 A (DAEWOO ELECTRONICS CO., LTD.) 05 July 1999 See abstract; claim 1; figure 5	1-6
A	KR 10-2006-0062149 A (LG ELECTRONICS INC.) 12 June 2006 See abstract; claim 1; figure 3	1-6
A	KR 10-2004-0082700 A (LG ELECTRONICS INC.) 30 September 2004 See abstract; claim 1; figure 3	1-6

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* Special categories of cited documents:
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"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
16 APRIL 2010 (16.04.2010)	**19 APRIL 2010 (19.04.2010)**

Name and mailing address of the ISA/KR	Authorized officer
Korean Intellectual Property Office Government Complex-Daejeon, 139 Seonsa-ro, Daejeon 302-701, Republic of Korea Facsimile No. 82-42-472-7140	Telephone No.

Form PCT/ISA/210 (second sheet) (July 2009)

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/KR2009/004964

Patent document cited in search report	Publication date	Patent family member	Publication date
KR 10-1999-0049527 A	05.07.1999	NONE	
KR 10-2006-0062149 A	12.06.2006	NONE	
KR 10-2004-0082700 A	30.09.2004	NONE	

Form PCT/ISA/210 (patent family annex) (July 2009)