



(11) **EP 3 086 062 A1**

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

(43) Date of publication:
26.10.2016 Bulletin 2016/43

(51) Int Cl.:
F25D 23/02 ^(2006.01) **F25D 23/06** ^(2006.01)
F25D 11/00 ^(2006.01)

(21) Application number: **14871882.8**

(86) International application number:
PCT/KR2014/012453

(22) Date of filing: **17.12.2014**

(87) International publication number:
WO 2015/093837 (25.06.2015 Gazette 2015/25)

(84) Designated Contracting States:
AL 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 RS SE SI SK SM TR
Designated Extension States:
BA ME

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(30) Priority: **18.12.2013 KR 20130158480**

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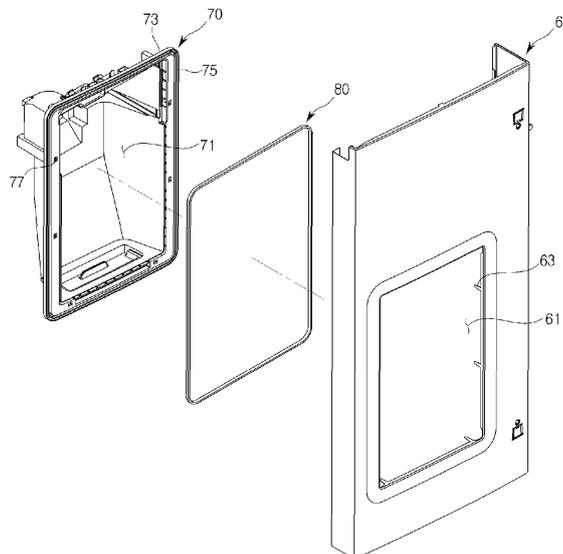
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(54) **REFRIGERATOR**

(57) Provided is a refrigerator having a gasket that seals between a front plate of a door and a dispenser unit. The refrigerator is characterized by comprising: a body; a storage chamber which is provided inside the body and which has an open front surface; a door which is rotatably coupled to the body so as to open/close the open front surface of the storage chamber, and which

has a front plate provided with an opening, a thermal thermal insulating material filling the interior of the door; a dispenser unit which is coupled to the rear surface of the front plate so as to seal the opening, and which dispenses water and ice out of the body; and a gasket coupled to an edge portion of the dispenser unit to seal between the front plate and the dispenser unit.

[Fig. 2]



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Description

[Disclosure]

[Technical Field]

[Technical Problem]

[0001] The present invention relates to a refrigerator having an improved structure in which a dispenser unit is coupled to a front plate of a door.

5 **[0010]** The present invention is directed to providing a refrigerator in which a gasket seals between a front plate of a door and a dispenser unit.

[Background Art]

[Technical Solution]

[0002] Generally, a refrigerator is an appliance that includes storage chambers and a cold air supply unit which supplies cold air to the storage chambers and keeps food fresh.

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[0003] The temperature of the storage chamber is maintained in a predetermined range desired for keeping the food fresh.

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[0004] Such a storage chamber of the refrigerator is provided with a front surface to be opened, and the open front surface is closed by a door at ordinary times to maintain the temperature of the storage chamber.

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[0005] A plurality of storage chambers are partitioned by partitions, the storage chambers provided at an upper side among the plurality of storage chambers are opened and closed by double-door-type doors which are rotatably hinge-coupled, and the storage chambers provided

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[0006] A dispenser unit capable of discharging water and ice at an outside of a main body is provided at the double-door-type door, and the dispenser unit is coupled to a rear surface of the double-door-type door of the front plate.

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[0007] After the dispenser unit is coupled to the rear surface of the front plate, an additional operation such as a taping operation or a sealing operation around an edge of the dispenser unit is required to prevent a thermal insulating material filling the inside of the double-door-type door from leaking between the front plate and the dispenser unit.

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[0008] When the taping operation is performed between the front plate and the dispenser unit with subsidiary materials such as tapes to prevent the leakage of the thermal insulating material, the front plate may be bent while the thermal insulating material filling the inside of the double-door-type door is absorbed into the subsidiary material and hardened.

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[0009] The subsidiary material has to be separated from the thermal insulating material such that the front plate is not bent, and to this end, the subsidiary material has to be covered with felt and the like into which the thermal insulating material is not absorbed so as not to be in contact with the thermal insulating material.

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[0011] One aspect of the present invention provides a refrigerator including a main body, a storage chamber provided in the main body and having an open front surface, a door which is rotatably coupled to the main body, opens and closes the open front surface of the storage chamber, and has a front plate in which an opening is provided, wherein an inside thereof is filled with a thermal insulating material, a dispenser unit which is coupled to a rear surface of the front plate to seal the opening, and discharges water and ice to an outside of the main body, and a gasket which is coupled to an edge portion of the dispenser unit and seals between the front plate and the dispenser unit.

[0012] An insertion groove into which the gasket is inserted may be provided at the edge portion.

[0013] The gasket may be inserted into the insertion groove to protrude from a front surface of an edge of the dispenser unit, and may prevent the thermal insulating material from permeating between the front plate and the dispenser unit.

[0014] Since the thermal insulating material is prevented from permeating between the front plate and the dispenser unit by the gasket, the inside of the door may be filled with the thermal insulating material to be in direct contact with the front plate.

[0015] A plurality of hooks by which the dispenser unit is fixed may be provided at the opening of the rear surface of the front plate.

[0016] A plurality of fixing holes fixed by the hooks may be provided in the dispenser unit.

[0017] The dispenser unit may be coupled to the rear surface of the front plate so that the hook is inserted into the fixing hole, and when the hook is inserted into the fixing hole, the hook may be bent so that the dispenser unit may be fixed to the front plate.

[0018] When the dispenser unit is fixed to the front plate, a cap which seals the fixing hole may be provided at the fixing hole to prevent the thermal insulating material from leaking through the fixing hole.

[0019] A protrusion protruding along a circumference of the opening may be provided at the rear surface of the front plate.

50 **[0020]** The protrusion may be provided to have a width of 30 mm from the opening, and to protrude 0.45 mm from the rear surface of the front plate.

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[Advantageous Effects]

[0021] According to the embodiments of the present invention, when a dispenser unit is coupled to a front plate of a door, an additional taping or sealing process for sealing between the front plate and the dispenser unit can be omitted.

[0022] In addition, the front plate may not be bent even when additional subsidiary materials, such as a tape or felt, are not used.

[Description of Drawings]

[0023]

FIG. 1 is a perspective view illustrating a refrigerator according to one embodiment of the present invention.

FIG. 2 is a view illustrating a case in which a front plate, a gasket, and a dispenser unit are coupled according to one embodiment of the present invention.

FIG. 3 is a view illustrating a case in which the gasket is coupled to the dispenser unit according to one embodiment of the present invention.

FIG. 4 is a view illustrating a case in which the dispenser unit is coupled to the front plate of a door after the gasket is coupled to the dispenser unit according to one embodiment of the present invention.

FIG. 5 is a view illustrating a case in which the gasket is inserted into an insertion groove of the dispenser unit according to one embodiment of the present invention.

FIG. 6 is an enlarged view illustrating a portion A shown in FIG. 5.

FIG. 7 is a view illustrating a case in which the dispenser unit is coupled to the front plate by hooks of the front plate being inserted into fixing holes of the dispenser unit according to one embodiment of the present invention.

FIG. 8 is a view illustrating a case in which the fixing holes are covered by a cap after the dispenser unit is fixed to the front plate by bending the hooks shown in FIG. 7.

FIG. 9 is an enlarged view illustrating a portion B shown in FIG. 8.

FIG. 10 is a view illustrating a case in which the gasket seals between the front plate and the dispenser unit when the dispenser unit is fixed to the front plate according to one embodiment of the present invention.

FIG. 11 is an enlarged view illustrating a portion C shown in FIG. 10.

FIG. 12 is a view illustrating a rear surface of the front plate according to one embodiment of the present invention.

FIG. 13 is an enlarged cross-sectional view illustrating a portion D shown in FIG. 12.

[Modes of the Invention]

[0024] Hereinafter, embodiments of the present invention will be described in detail with reference to the accompanying drawings.

[0025] As illustrated in FIG. 1, a refrigerator includes a main body 10, a plurality of storage chambers 20 provided in the main body 10 to open front surfaces, doors 30 pivotably coupled to the main body 10 to open and close the open front surfaces of the storage chambers 20, storage units 40 which are accommodated in the storage chambers 20 and slide in or out from the storage chamber 20, and a dispenser unit 70 coupled to the door 30 to discharge water and ice to the outside of the main body 10.

[0026] The main body 10 includes an inner case (not shown) forming the storage chambers 20, an outer case (not shown) forming an exterior, and a cooling air supplier (not shown) which supplies cooling air to the storage chambers 20.

[0027] The cooling air supplier may include a compressor, a condenser, an expansion valve, an evaporator, a blower fan, a cooling air duct, and the like, and a thermal insulating material U is foamed between the inner case and the outer case of the main body 10 and inside of the door 30 to prevent a leakage of the cooling air of the storage chambers 20 (see FIG. 10).

[0028] A machine compartment (not shown), in which the compressor which compresses a refrigerant and the condenser which condenses the compressed refrigerant are installed, may be provided at a lower portion in a rear side of the main body 10.

[0029] The plurality of storage chambers 20 may be partitioned into an upper chamber 21, an intermediate chamber 23, and a lower chamber 25 by partitions 11, and each of the chambers may refrigerate or freeze and store food as necessary.

[0030] A plurality of shelves 27 may be provided in the upper chamber 21 and divide the upper chamber 21 into a plurality of spaces, and a plurality of storage containers 29 capable of storing food and the like may be provided in the upper chamber 21.

[0031] The upper chamber 21 may be opened and closed by the doors 30 pivotably coupled to the main body 10, and the intermediate chamber 23 and the lower chamber 25 may be respectively opened and closed by the storage units 40 capable of sliding with respect to the main body 10.

[0032] Handles 31 may be provided on a front surface of the doors 30, and a plurality of door guards 33 capable of storing food and the like may be installed on a rear surface of the doors 30.

[0033] The storage units 40 may include drawer type doors 41 which open and close the intermediate chamber 23 and the lower chamber 25, and storage containers 43 installed on rear surfaces of the drawer type doors 41, and drawer handles 41a that a user can grip may be provided on the drawer type doors 41.

[0034] The storage containers 43 may be provided to be integrally formed with the drawer type doors 41, or may be provided by a method in which the storage containers 43 are manufactured separately from the drawer type doors 41 and are coupled to the drawer type doors 41.

[0035] The storage units 40 may slide in or out from the intermediate chamber 23 and the lower chamber 25 by sliding units 50.

[0036] The dispenser unit 70 is coupled to the door 30 so that a discharge groove 71 is exposed to the outside of the door 30, and water and ice in the main body 10 may be discharged to the outside of the main body 10 through the discharge groove 71 even without opening the door 30.

[0037] Next, a process of coupling the dispenser unit 70 to the door 30 will be described with reference to FIGS. 2 to 13.

[0038] As illustrated in FIGS. 2 to 4, the door 30 includes a front plate 60 disposed at a front surface of the door 30 to form an exterior, and an opening 61 configured to expose the discharge groove 71 of the dispenser unit 70 to the outside is provided in the front plate 60.

[0039] The dispenser unit 70 is coupled to a rear surface of the front plate 60 so that the discharge groove 71 faces the front plate 60, and the discharge groove 71 is exposed to the outside of the door 30 through the opening 61.

[0040] A user may discharge water and ice included in the main body 10 through the discharge groove 71 exposed to the outside of the door 30.

[0041] A gasket 80 is coupled to the dispenser unit 70 coupled to the rear surface of the front plate 60 to prevent the thermal insulating material U filling the door 30 from leaking between the front plate 60 and the dispenser unit 70.

[0042] An insertion groove 75 into which the gasket 80 is inserted is provided at an edge portion 73 of the dispenser unit 70 to seal between the front plate 60 and the dispenser unit 70 so as to prevent the leakage of the thermal insulating material U by the gasket 80 inserted into the insertion groove 75.

[0043] As illustrated in FIGS. 5 to 6, it is preferable that the gasket 80 be inserted into the insertion groove 75 of the dispenser unit 70 to protrude forward from a front surface of the dispenser unit 70.

[0044] Thus, as illustrated in FIGS. 10 and 11, when the dispenser unit 70 is coupled to the front plate 60, the gasket 80 is pressed against the rear surface of the front plate 60 to more firmly seal between the front plate 60 and the dispenser unit 70.

[0045] Since the gasket 80 seals between the front plate 60 and the dispenser unit 70, after the dispenser unit 70 is coupled to the front plate 60, an additional taping or sealing operation for preventing the leakage of the thermal insulating material U is not needed.

[0046] In addition, when the taping or sealing operation is performed at the edge portion 73 of the dispenser unit

70 and the thermal insulating material U filling the door 30 is in contact with a tape or the like, since the tape or the like absorbs the thermal insulating material U, and thus the front plate 60 becomes bent, after the taping or sealing operation is performed at the edge portion 73 of the dispenser unit 70, a portion in which the taping or sealing operation is performed is covered by felt which does not absorb the thermal insulating material U in order to separate the tape or the like from the thermal insulating material U. However, when the gasket 80 seals between the front plate 60 and the dispenser unit 70, additional subsidiary materials may not be needed.

[0047] Accordingly, as illustrated in FIG. 10, the thermal insulating material U filling the door 30 is in direct contact with the rear surface of the front plate 60.

[0048] As illustrated in FIGS. 4 and 7, a plurality of hooks 63 are provided at the opening 61 of the front plate 60 to couple the dispenser unit 70 to the rear surface of the front plate 60, and a plurality of fixing holes 77 are provided in the dispenser unit 70 at positions corresponding to the plurality of hooks 63.

[0049] By the plurality of hooks 63 provided at the front plate 60 being inserted into the plurality of fixing holes 77 provided in the dispenser unit 70, the dispenser unit 70 is pressed against the rear surface of the front plate 60. Next, as illustrated in FIG. 8, by bending the hooks 63, the dispenser unit 70 is fixed to the front plate 60.

[0050] After the dispenser unit 70 is fixed to the front plate 60, the fixing hole 77 is covered by a cap 90 to be sealed as illustrated in FIGS. 8 and 9 to prevent the thermal insulating material U from leaking through the fixing hole 77.

[0051] When the dispenser unit 70 is fixed to the rear surface of the front plate 60, since the dispenser unit 70 is pressed against the rear surface of the front plate 60, the surroundings of the opening 61 of the front plate 60 in contact with the dispenser unit 70 may be bent.

[0052] Accordingly, as illustrated in FIGS. 12 and 13, a protrusion 65 protruding from the rear surface of the front plate 60 along a circumference of the opening 61 may be provided at the rear surface of the front plate 60.

[0053] The protrusion 65 may be provided to have a width of approximately 30 mm from the opening 61, and to protrude approximately 0.45 mm from the rear surface of the front plate 60.

[0054] Since the protrusion 65 is provided along the circumference of the opening 61, when the dispenser unit 70 is coupled to the rear surface of the front plate 60, bends occurring at the surroundings of the opening 61 of the front plate 60 may be improved.

[0055] The process of coupling the dispenser unit 70 to the front plate 60 will be described. First, the gasket 80 is inserted into the insertion groove 75 of the dispenser unit 70 as illustrated in FIG. 3, and then the dispenser unit 70 is pressed against the rear surface of the front plate 60 as illustrated in FIG. 4.

[0056] Here, as illustrated in FIG. 7, the dispenser unit 70 is pressed against the rear surface of the front plate

60 by the fixing holes 77 being inserted into the hooks 63 of the front plate 60.

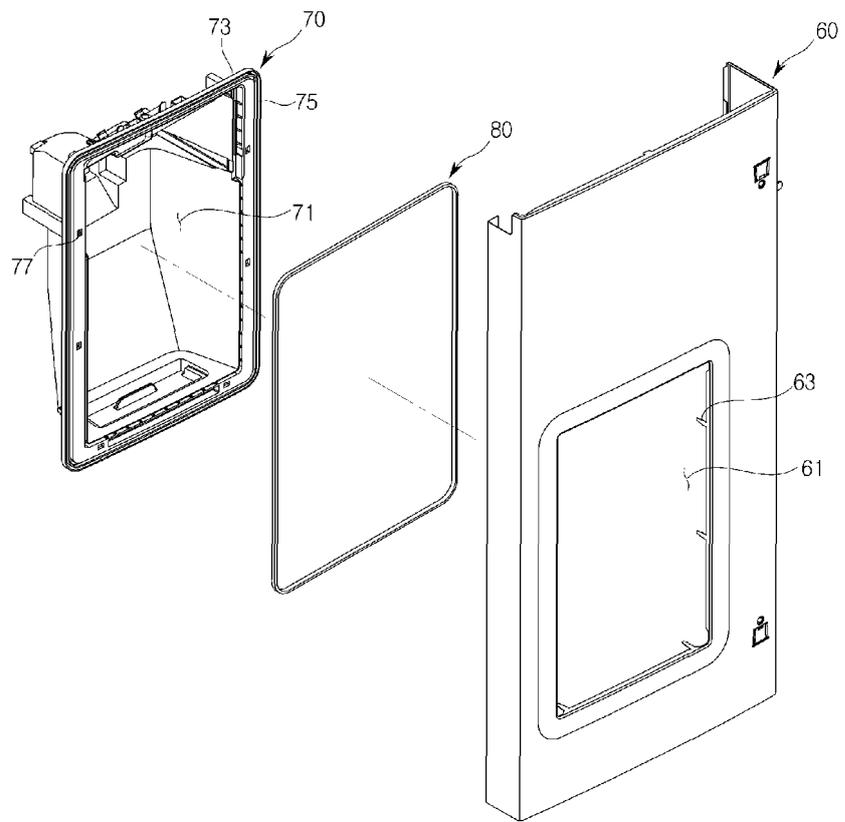
[0057] After the dispenser unit 70 is pressed against the rear surface of the front plate 60 by the hooks 63 being inserted into the fixing holes 77, the dispenser unit 70 is fixed to the front plate 60 by bending the hooks 63, and the fixing holes 77 are covered by the cap 90 to be sealed as illustrated in FIGS. 8 and 9.

[0058] While the refrigerator is mainly described with specific shapes and directions with reference to the accompanying drawings, various alterations and changes may be made by those skilled in the art, and it should be interpreted that the various alterations and changes fall within the scope of the appended claims.

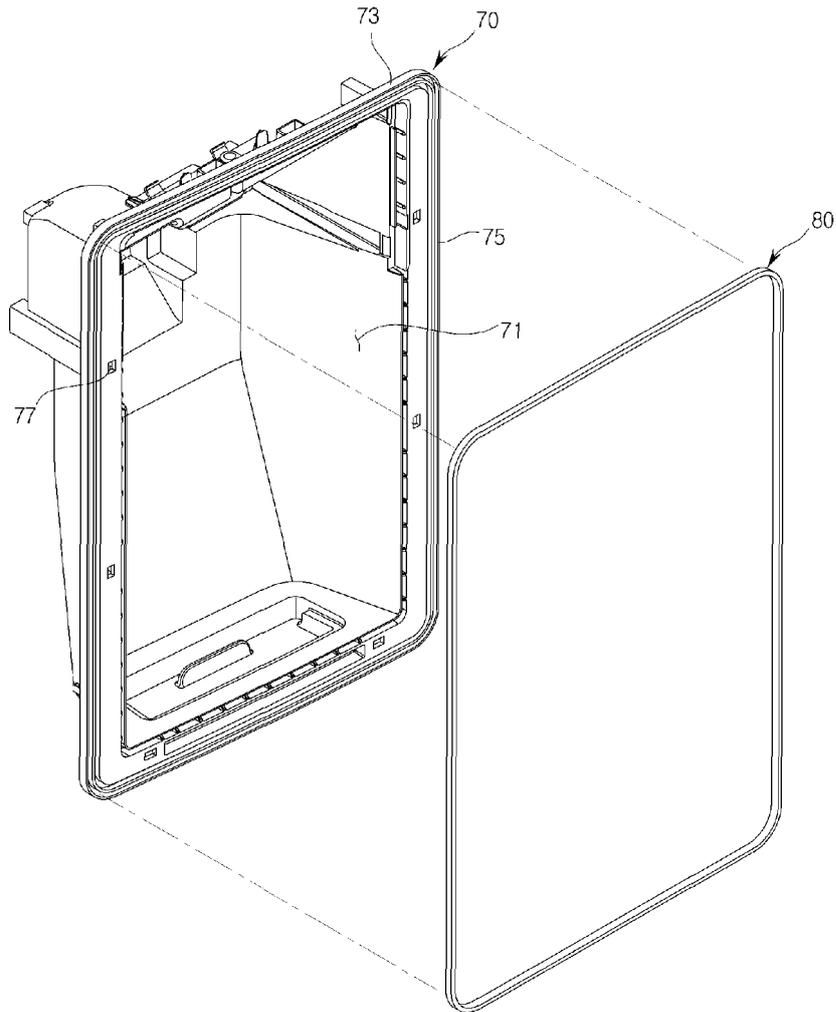
Claims

1. A refrigerator comprising:
 - a main body;
 - a storage chamber provided in the main body and having an open front surface;
 - a door which is rotatably coupled to the main body, opens and closes the open front surface of the storage chamber, and has a front plate in which an opening is provided, wherein an inside thereof is filled with a thermal insulating material;
 - a dispenser unit which is coupled to a rear surface of the front plate to seal the opening, and discharges water and ice to an outside of the main body; and
 - a gasket which is coupled to an edge portion of the dispenser unit and seals between the front plate and the dispenser unit.
2. The refrigerator of claim 1, wherein an insertion groove into which the gasket is inserted is provided at the edge portion.
3. The refrigerator of claim 2, wherein the gasket is inserted into the insertion groove to protrude from a front surface of an edge of the dispenser unit, and prevents the thermal insulating material from permeating between the front plate and the dispenser unit.
4. The refrigerator of claim 3, wherein since the thermal insulating material is prevented from permeating between the front plate and the dispenser unit by the gasket, the inside of the door is filled with the thermal insulating material to be in direct contact with the front plate.
5. The refrigerator of claim 1, wherein a plurality of hooks by which the dispenser unit is fixed are provided at the opening of the rear surface of the front plate.
6. The refrigerator of claim 5, wherein a plurality of fixing holes fixed by the hooks are provided in the dispenser unit.
7. The refrigerator of claim 6, wherein the dispenser unit is coupled to the rear surface of the front plate so that the hook is inserted into the fixing hole, and when the hook is inserted into the fixing hole, the hook is bent so that the dispenser unit is fixed to the front plate.
8. The refrigerator of claim 7, wherein when the dispenser unit is fixed to the front plate, a cap which seals the fixing hole is provided at the fixing hole to prevent the thermal insulating material from leaking through the fixing hole.
9. The refrigerator of claim 5, wherein a protrusion protruding along a circumference of the opening is provided at the rear surface of the front plate.
10. The refrigerator of claim 9, wherein the protrusion is provided to have a width of 30 mm from the opening, and to protrude 0.45 mm from the rear surface of the front plate.

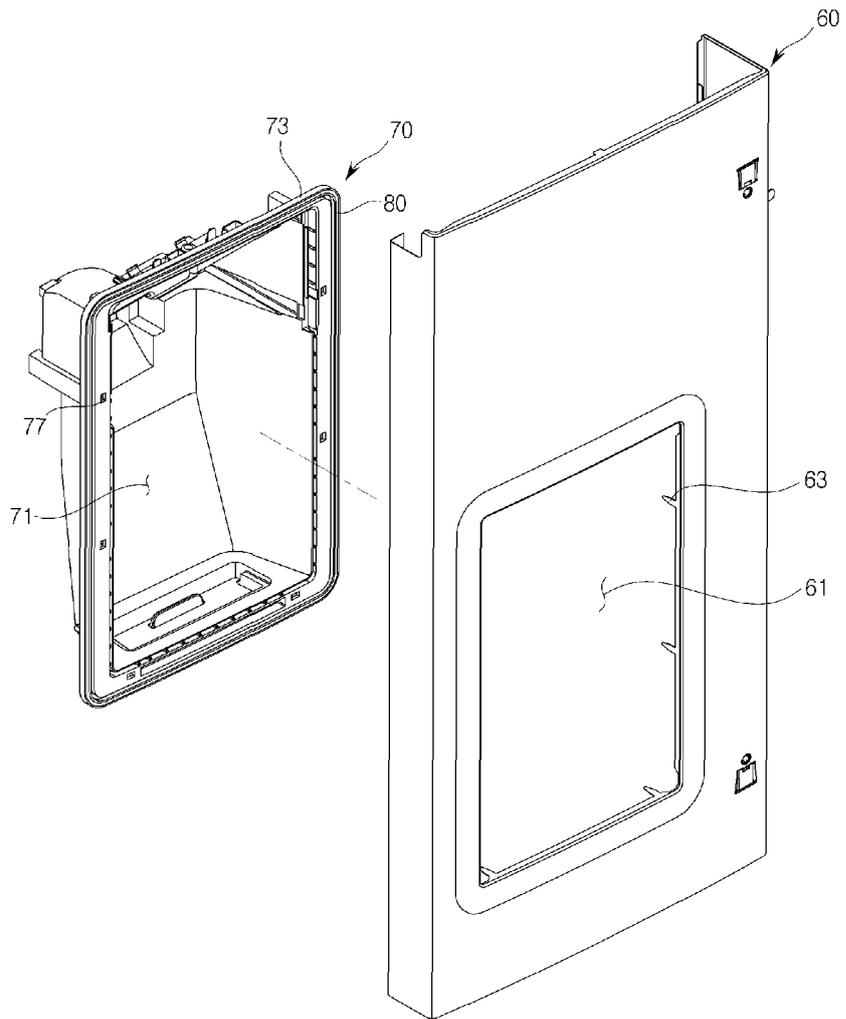
[Fig. 2]



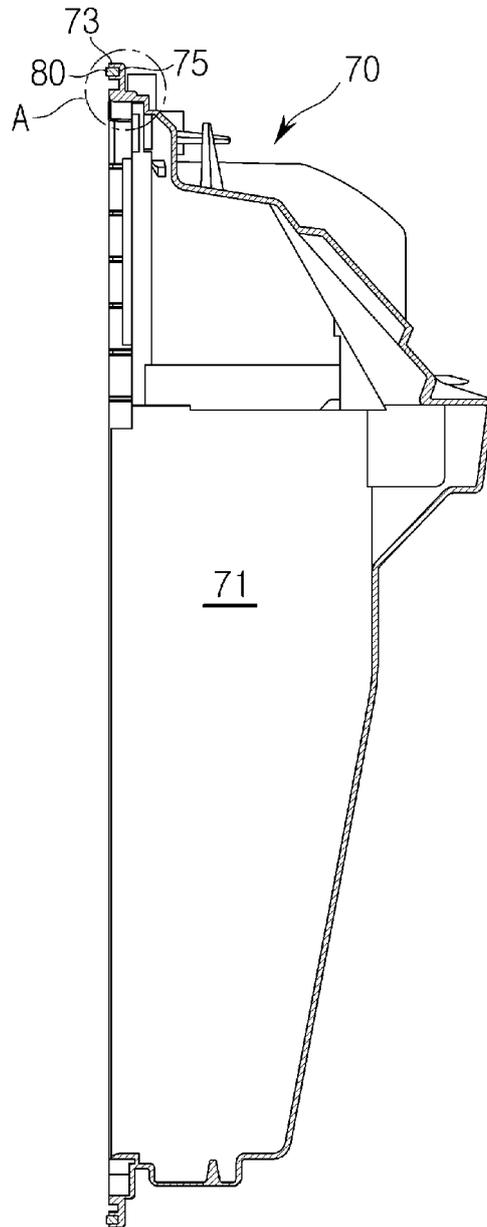
[Fig. 3]



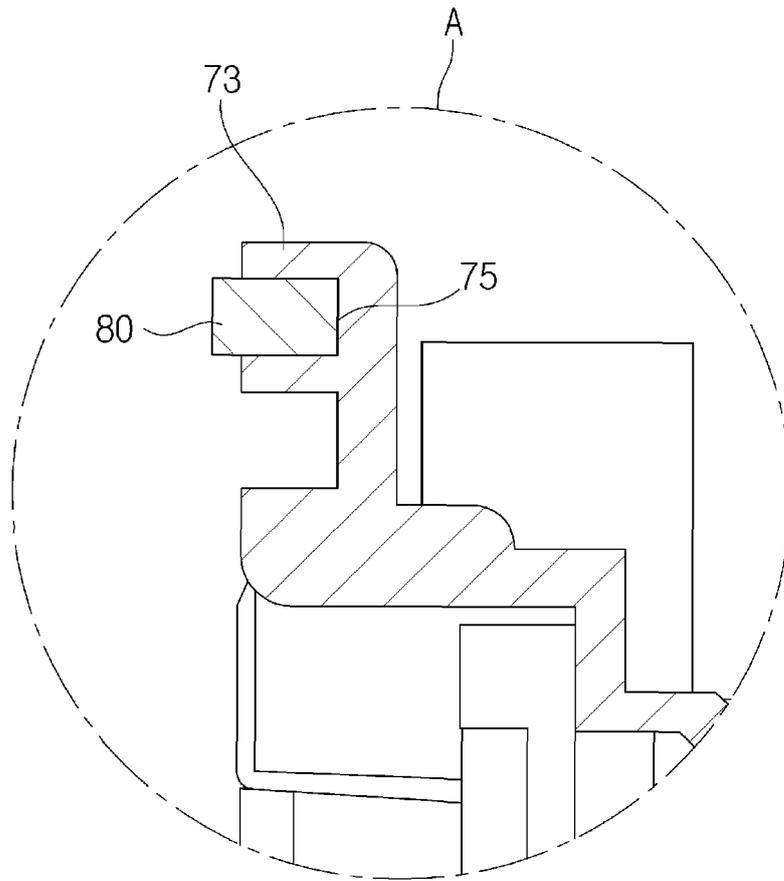
[Fig. 4]



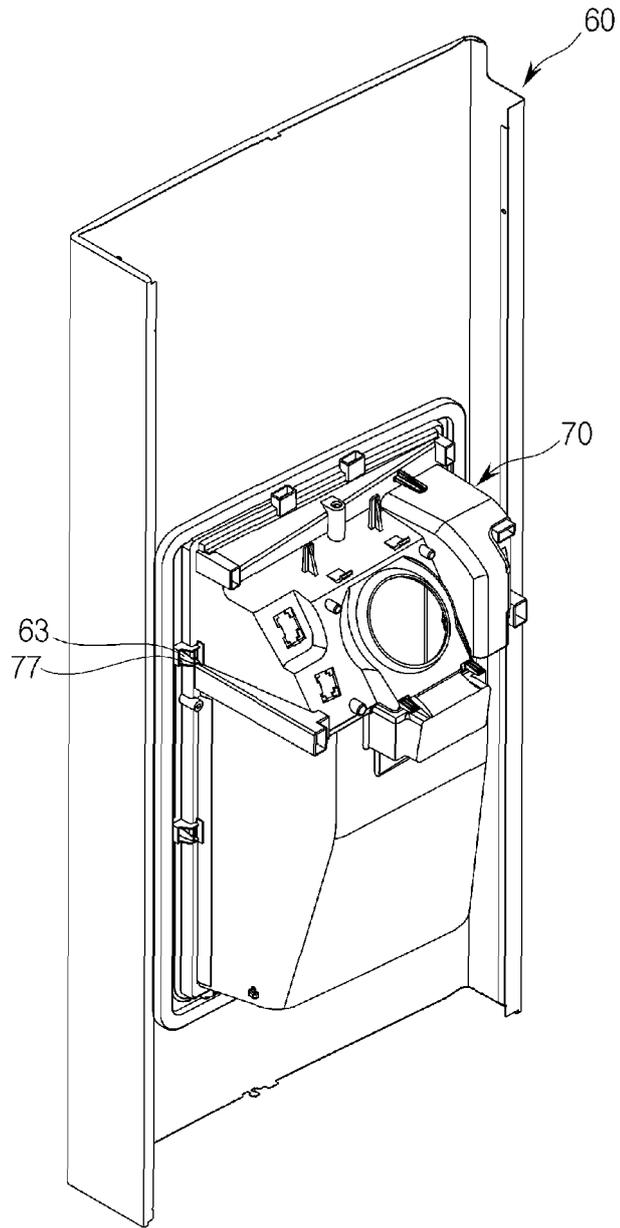
[Fig. 5]



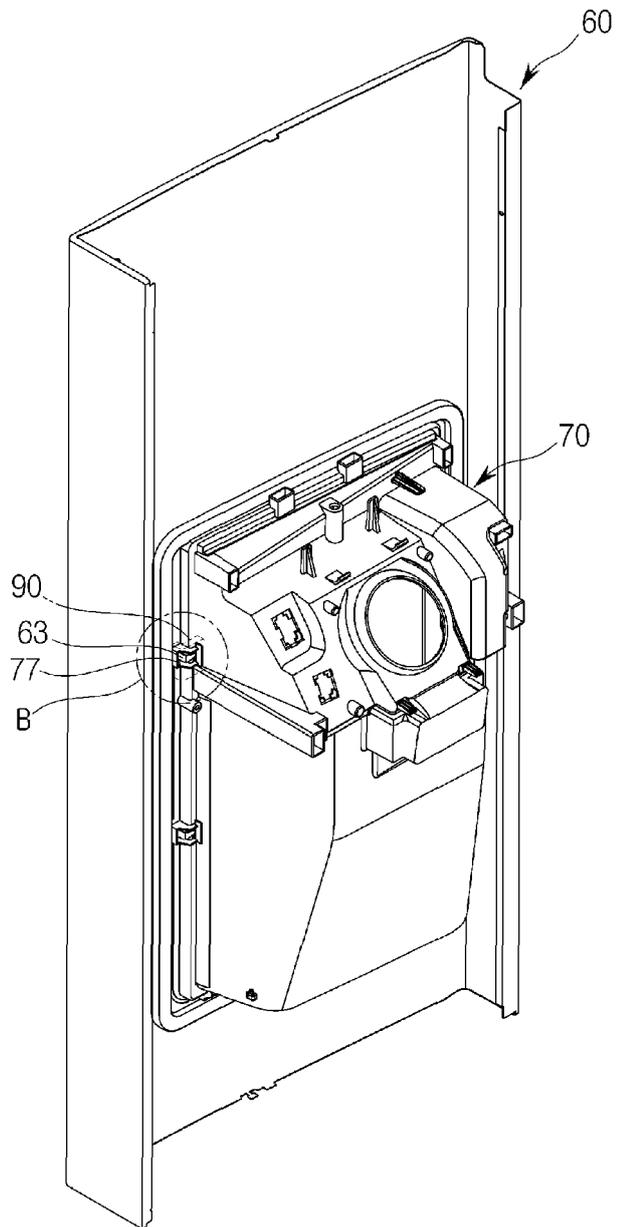
[Fig. 6]



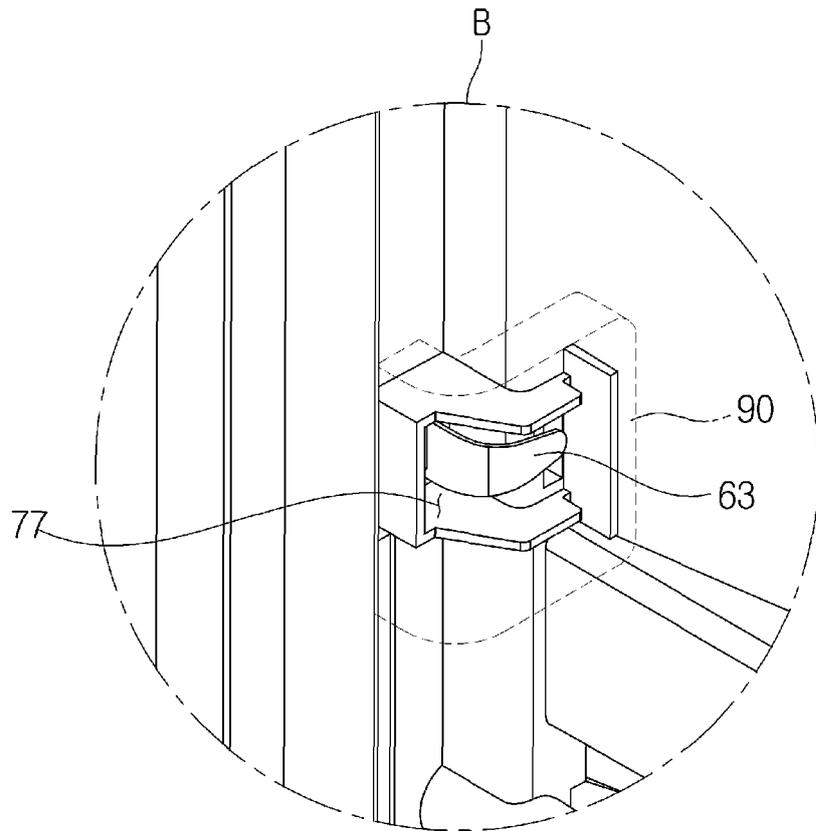
[Fig. 7]



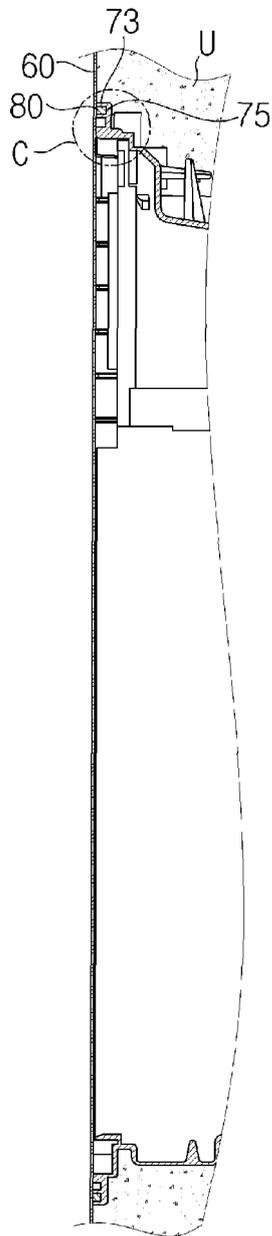
[Fig. 8]



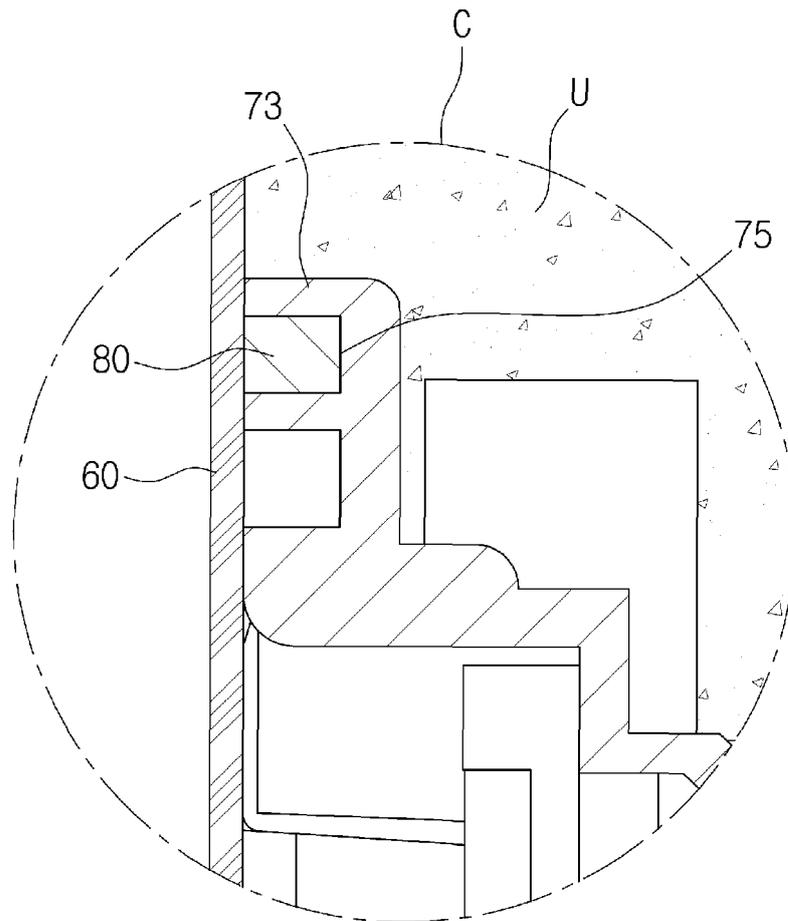
[Fig. 9]



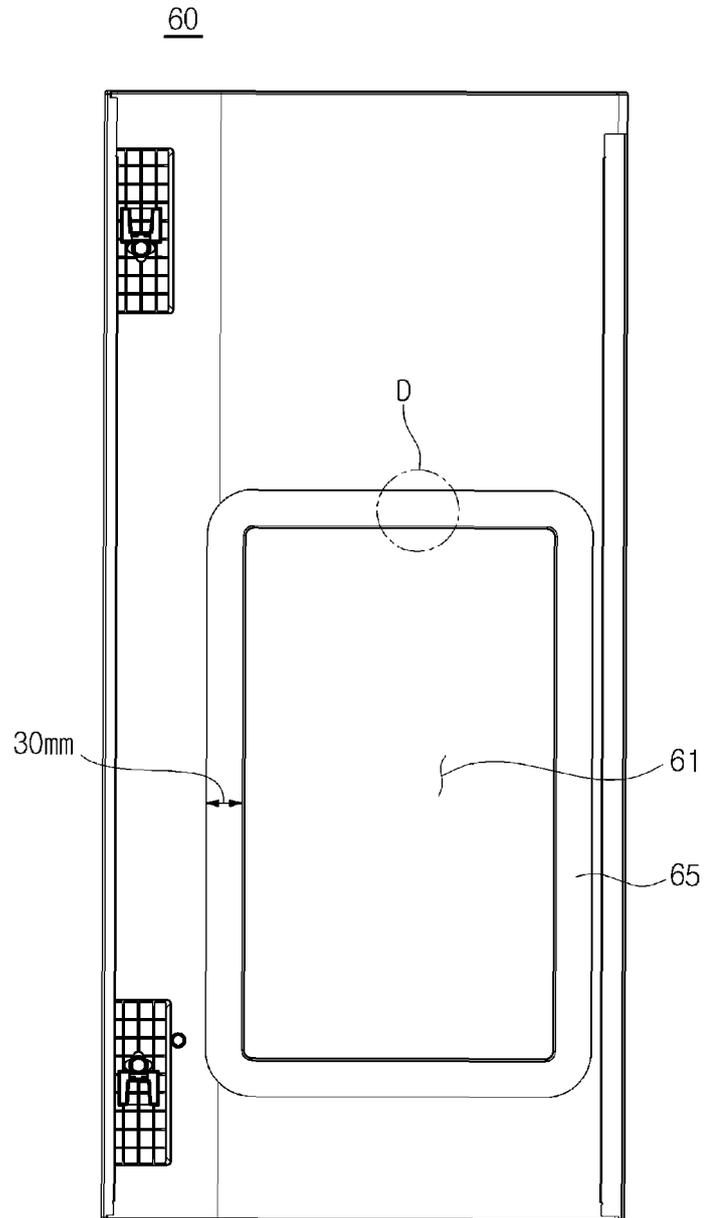
[Fig. 10]



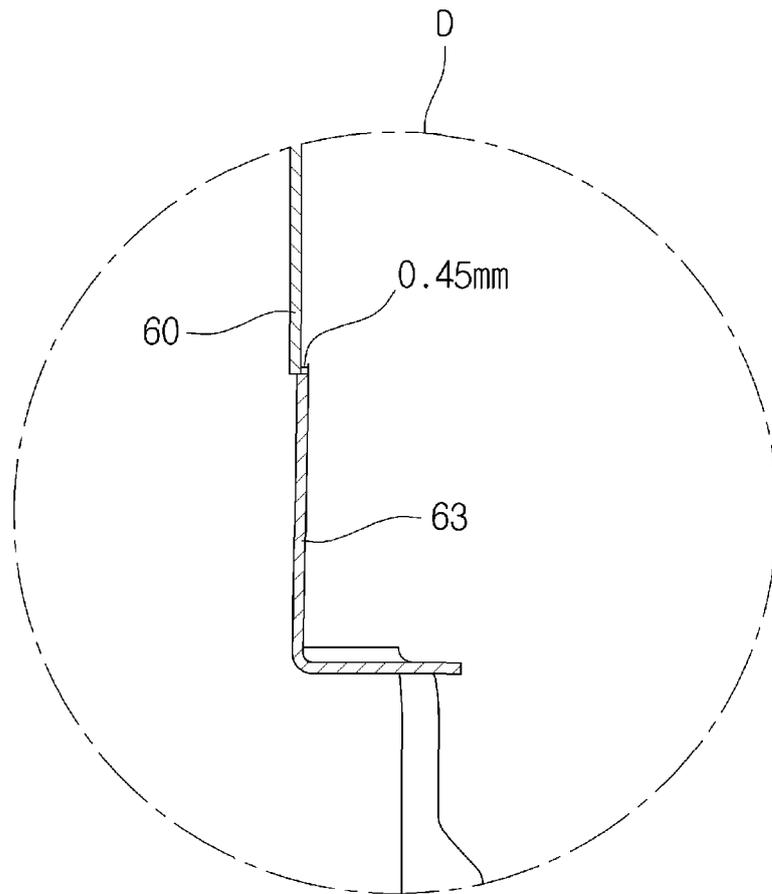
[Fig. 11]



[Fig. 12]



[Fig. 13]



INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR2014/012453

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A. CLASSIFICATION OF SUBJECT MATTER
F25D 23/02(2006.01)i, F25D 23/06(2006.01)i, F25D 11/00(2006.01)i
According to International Patent Classification (IPC) or to both national classification and IPC

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B. FIELDS SEARCHED
Minimum documentation searched (classification system followed by classification symbols)
F25D 23/02; F25D 23/06; F25D 25/00; F25D 11/00; F25D 23/00

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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

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Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
eKOMPASS (KIPO internal) & Keywords: refrigerator, dispenser, home bar, sealing, gasket, insulating material, leakage, sealing, filling

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C. DOCUMENTS CONSIDERED TO BE RELEVANT

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Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	KR 10-2007-0007600 A (LG ELECTRONICS INC.) 16 January 2007 See paragraphs [0011]-[0031] and figures 1-3.	1-4
Y		5-10
Y	KR 10-2011-0009436 A (LG ELECTRONICS INC.) 28 January 2011 See paragraphs [0024]-[0027] and figures 2-4.	5-10
A	KR 10-2011-0064740 A (LG ELECTRONICS INC.) 15 June 2011 See paragraphs [0013]-[0017] and figure 2.	1-10
A	KR 10-2008-0090874 A (SAMSUNG ELECTRONICS CO., LTD.) 09 October 2008 See paragraphs [0031]-[0054] and figures 3a-3c.	1-10
A	KR 10-2008-0046848 A (SAMSUNG ELECTRONICS CO., LTD.) 28 May 2008 See paragraphs [0042]-[0049] and figure 5.	1-10

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

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* Special categories of cited documents:
 "A" document defining the general state of the art which is not considered to be of particular relevance
 "E" earlier application or patent but published on or after the international filing date
 "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
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Date of the actual completion of the international search 19 MARCH 2015 (19.03.2015)	Date of mailing of the international search report 20 MARCH 2015 (20.03.2015)
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Name and mailing address of the ISA/KR  Korean Intellectual Property Office Government Complex-Daejeon, 189 Seonsa-ro, Daejeon 302-701, Republic of Korea Facsimile No. 82-42-472-7140	Authorized officer Telephone No.
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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/KR2014/012453

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