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(71) Applicant: **Dongbu Daewoo Electronics Corporation**
Seoul 100-769 (KR)

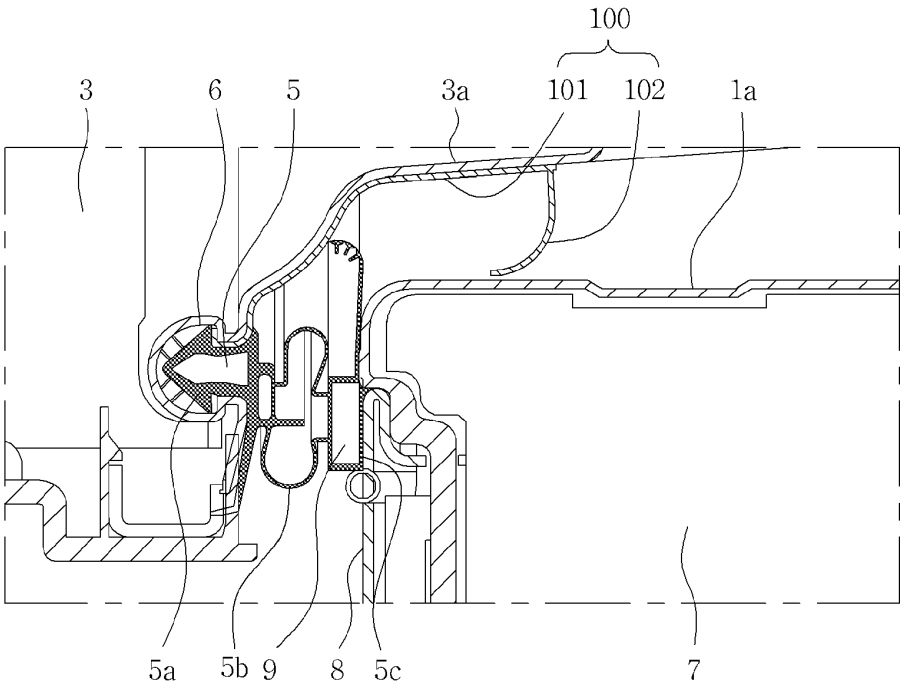
(72) Inventor: **Cheon, Woo Cheol**
403-010 Seoul (KR)

(74) Representative: **Michalski, Stefan**
Michalski Hüttermann & Partner Patentanwälte
Speditionstraße 21
40221 Düsseldorf (DE)

(54) Refrigerator for preventing dewing on door gasket

(57) The disclosure relates to a refrigerator for preventing dewing on door gaskets, including one or more doors, each door having a rear or internal surface; a door gasket along one or more edges of the rear or internal surface of at least one of the one or more doors to prevent cool air in an interior of the refrigerator from leaking to outside the refrigerator; and a cool air shield between a door inside surface and the door gasket, configured to separate the door gasket and the interior of the refrigerator from each other.

[FIGURE 2]



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Description

BACKGROUND OF THE INVENTION

Field of the Invention

[0001] The present invention relates to a refrigerator, and more particularly, to a refrigerator for preventing dewing of door gaskets. The refrigerator is capable of preventing cool air within the refrigerator from causing dew to form directly in the door gaskets.

Background of the Related Art

[0002] Generally, a refrigerator is partitioned into a freezer room or space and a cold room or space, in which food items are stored in frozen and cold states, respectively. So as to selectively open and close the freezer room or space and the cold room or space, a freezer door and a cold room door are separately mounted.

[0003] The interior of the refrigerator is cooled by means of the cool air supplied continuously thereto, and the cool air is continuously produced through the heat exchanging operation of refrigerant, wherein the refrigerant is repeatedly compressed, condensed, expanded and evaporated.

[0004] The cool air supplied to the interior of the refrigerator is evenly sent thereto by convection so that the food items stored within the refrigerator can be maintained at a desired temperature.

[0005] On the other hand, if the cool air supplied to the interior of the refrigerator meets external air of high temperature and humidity, the gaskets, cabinet side surfaces and cover plate of the refrigerator are maintained below a dew point, thereby condensing dew thereon.

[0006] So as to prevent dewing on the gaskets, a hot pipe is coupled to the inside of the cabinet in the conventional practice, thereby allowing the temperature of a portion where dewing is expected to be raised to greater than the dew point temperature.

[0007] In case of the refrigerators developed recently for the purpose of energy saving, however, the prevention of dewing cannot be ensured just with the conventional hot pipe type structure.

[0008] For example, the improvement of the insulation structure of the refrigerator or the improvement of the performance of the cooling cycle of the refrigerator has been recently made to obtain energy saving.

[0009] To improve the performance of the cooling cycle of the refrigerator, the efficiency of a compressor, the heat transfer efficiency of a condenser, and the evaporation efficiency of an evaporator should be improved, and through the improvements, the evaporation temperature at which the refrigerant is evaporated in the evaporator can be lowered.

[0010] Such improvements are advantageous to energy saving, but they do not solve the problem(s) caused by dewing on the refrigerator door gaskets.

SUMMARY OF THE INVENTION

[0011] Accordingly, the present invention has been made in view of the above-mentioned problems occurring in the prior art, and it is an object of the present invention to provide a refrigerator for preventing dewing on door gaskets. The refrigerator is capable of preventing cool air within the refrigerator from reaching the door gaskets, and reducing the temperature deviation or difference at a location where internal air and external air meet each other at or near the door gaskets to prevent dewing around the door gaskets.

[0012] To accomplish the above object(s), according to the present invention, there is provided a refrigerator for preventing dewing on door gaskets, including one or more doors, each door having a rear or internal surface; a door gasket along one or more edges of the rear or internal surface of at least one of the one or more doors, configured to prevent cool air in an interior of the refrigerator from leaking to outside the refrigerator; and a cool air shield between a door inside surface and the door gasket, configured to separate the door gasket and the interior of the refrigerator from each other. The door inside surface may extend from the edge of the rear or internal surface of the door(s) toward the interior of the refrigerator.

[0013] According to the present invention, desirably, the cool air shield includes a sealing surface portion contacting the internal surface of the door(s); and a shielding portion extending from one side of the sealing surface portion, configured to shield a space between the door inside surface of the door(s) and the inner surface of the refrigerator and/or to separate the door gasket and the interior of the refrigerator from each other.

[0014] According to the present invention, desirably, one side of the sealing surface portion is in a coupling groove on the rear or internal surface of the door(s) and in contact with the door inside surface.

[0015] According to the present invention, desirably, one side end portion of the sealing surface portion is bent or curved along an inner surface of the coupling groove, and a portion of the door gasket fits with the coupling groove and allows the bent or curved portion of the sealing surface portion to resist and/or press the inner surface of the coupling groove.

[0016] According to the present invention, desirably, the shielding portion has a front end portion bent or curved toward the door gasket.

[0017] According to the present invention, desirably, the front end portion of the shielding portion contacts an inner surface of the refrigerator when the door(s) is/are closed.

BRIEF DESCRIPTION OF THE DRAWINGS

[0018] The above and other objects, features and advantages of the present invention will be apparent from the following detailed description of embodiments of the

invention in conjunction with the accompanying drawings, in which:

[0019] FIG. 1 is a cross-sectional view showing a refrigerator for preventing dewing on door gaskets according to the present invention;

[0020] FIG. 2 is an enlarged cross-sectional view showing the part of dotted portion of FIG. 1 with the freezer door 3 in the closed position;

[0021] FIG. 3 is a perspective view showing a cool air shield to be disposed in the refrigerator for preventing dewing on the door gaskets according to the present invention;

[0022] FIG. 4 is a cross-sectional view showing temperature regions of FIG. 2; and

[0023] FIG. 5 is a graph showing the temperature of [something; a door gasket?] relative to the dew point according to the present invention and the conventional practice.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0024] Hereinafter, an explanation of a refrigerator for preventing dewing on door gaskets according to the present invention will be given in detail given with reference to the attached drawings.

[0025] FIG. 1 is a cross-sectional view showing a refrigerator for preventing dewing of door gaskets according to the present invention, FIG. 2 is an enlarged cross-sectional view showing part of the dotted portion of FIG. 1 with the freezer door 3 in the closed position, and FIG. 3 is a perspective view showing a cool air shield for preventing dewing on the door gaskets according to the present invention.

[0026] Further, FIG. 4 is a cross-sectional view showing temperature regions of FIG. 2, and FIG. 5 is a graph showing the temperatures of the door gaskets relative to the dew point according to the present invention and the conventional practice.

[0027] As shown in FIGS. 1 and 2, a freezer door 3 and a cold room or cold storage space door 4 are mounted on the cabinet of a refrigerator so as to open and close the freezer 1 and the cold room or cold storage unit 2 when items like food are put thereinto and/or withdrawn therefrom.

[0028] A door gasket 5 is mounted along one or more edges of the rear or internal surface of each of the freezer door 3 and the cold room door 4 to prevent the cold air within the refrigerator from leaking through a space between the door and the refrigerator cabinet. For example, one door gasket 5 can be mounted on or fixed to the internal surface of the freezer door 3 along and/or near a lower edge thereof, and another door gasket can be mounted on or fixed to the internal surface of the cold room door 4 along and/or near an upper edge thereof.

[0029] The door gasket 5 includes a coupling portion 5a inserted into and/or fixed to a coupling groove 6 along the edges of the rear or internal surface of each of the freezer door 3 and the cold room door 4, a buffering portion 5b extending from the coupling portion 5a and configured to buffer the impact generated when the door is closed, and a contact portion 5c extending from the buffering portion 5b and contacting the front surface of the refrigerator body or cabinet when the freezer door 3 is closed.

[0030] Further, a cover plate 8 is on or over a partition 7 that divides the freezer 1 and the cold room 2 from each other. A magnet 9 is inserted into the contact portion 5c of the door gasket 5 and holds the freezer door 3 closed when the contact portion 5c contacts the cover plate 8 on the front surface of the refrigerator body or cabinet.

[0031] The coupling portion 5a of the door gasket 5 is inserted into and/or fixed to the coupling groove 6 along one or more edges of the rear or internal surface of each of the freezer door 3 and the cold room door 4, so that the door gasket 5 is fixed to the door frame of each of the freezer door 3 and the cold room door 4 and prevents the cold air within the refrigerator from leaking through the door to the outside.

[0032] On the other hand, the freezer 1 and the cold room 2 have a plurality of shelves 10 disposed therein on which items are stored and a plurality of pockets 11 inside the freezer door 3 and the cold room door 4 to accommodate food containers or drinks therein. Pocket bars (not shown) are inside the pockets 11 so as to prevent the food containers or drinks in the pockets 11 from escaping or falling.

[0033] According to the present invention, as shown in FIG. 2, a thin cool air shield 100 is disposed between the door gasket 5 and a door inside surface 3a to separate the interior of the freezer 1 from the door gasket 5. That is, the cool air shield 100 is adapted to shield the space between the door inside surface 3a and an inner surface 1a of the freezer 1 at a relatively distant point from the door gasket 5 toward the interior of the freezer 1. The door inside surface 3a as shown in FIG. 2 extends from one or more edges of the rear or interior surface of the freezer door 3, toward the interior of the refrigerator (or freezer). However, when the freezer door 3 does not have a lower portion that extends into the freezer 1, the door inside surface 3a may be an internal surface of the freezer door 3 just above the door gasket 5 and/or the cool air shield 100.

[0034] As shown in FIG. 3, the cool air shield 100 has a sealing surface portion 101 that contacts the door inside surface 3a of the freezer door 3 and a shielding portion 102 that is bent and that extends from one side of the sealing surface portion 101 to shield the space between the door inside surface 3a of the freezer door 3 and the inner surface 1a of the freezer 1. Alternatively, the shielding portion 102 is configured to shield the space between the door gasket 5 and an interior of the freezer 1.

[0035] In more detail, one side or edge of the sealing surface portion 101 of the cool air shield 100 is inserted into the coupling groove 6 and/or brought into close contact with the coupling groove 6, together with the door

gasket 5. At the same time, an opposite side or edge of the sealing surface portion 101 extends toward the interior of the freezer 1 along the door inside surface 3a of the freezer door 3, spaced apart from the door gasket 5.

[0036] The end portion of the sealing surface portion 101 toward the interior of the freezer 1 elastically contacts the door inside surface 3a of the freezer door 3, so that even if a long period of time has passed, the sealing surface portion 101 does not separate from the door inside surface 3a of the freezer door 3 due to its own weight or temperature changes.

[0037] When the freezer door 3 is closed, the door gasket 5 may push the sealing surface portion 101 toward the door inside surface 3a, thereby allowing the sealing surface portion 101 to be in contact with the door inside surface 3a.

[0038] Furthermore, when the sealing surface portion 101 elastically pushes toward the door inside surface 3a of the freezer door 3, as the shielding portion 102 shields the door gasket 5 from the inner surface 1a and/or interior of the freezer 1, separation of the sealing surface portion 101 from the door inside surface 3a can be prevented.

[0039] Further, the shielding portion 102 may comprise or be made of a flexible material that may have a curtain shape and/or extend from the sealing surface portion 101 toward the inner surface 1a of the freezer 1 and shield the space communicating with the door gasket 5 (e.g., the space under the door inside surface 3a, between the shielding portion 102 and the door gasket 5).

[0040] Further, the shielding portion 102 has a front end portion bent toward the door gasket 5 to inhibit or prevent locking when the freezer room door 3 is closed.

[0041] Accordingly, the formation of the cool air shield 100 prevents the cool air supplied to the freezer 1 from directly coming into contact with the door gasket 5, thereby avoiding the freezing of the door gasket 5 (or cooling of the door gasket 5 to below the dew point), and thus reduce the deviation or difference of the temperature at a location where freezer internal air and external air meet each other at or near a boundary of the door gasket 5 to prevent dewing on or around the door gasket 5.

[0042] That is, as shown in FIG. 4, the door gasket 5 is not directly between a low temperature dry region A within the freezer 1 and a high temperature and high humidity region C outside the refrigerator. Rather, a temperature drop suppressing region B is formed between the door gasket 5 and the low temperature dry region A within the freezer 1 by the cool air shield 100, thereby reducing drastic temperature deviations and/or differences and thus preventing the formation of dew on or near the door gasket 5.

[0043] The shielding portion 102 may contact the inner surface 1a of the freezer 1, but even when spaced apart therefrom by a small distance or gap, the temperature drop suppressing region B can be effective.

[0044] According to the present invention, as shown in FIG. 5, the temperature of the door gasket 5 or the cover plate 8 is increased much more than when compared with the conventional practice, so that the time that the door gasket 5 or the cover plate 8 is below the dew point becomes shorter than in the conventional practice, and the lowest temperature of the door gasket 5 or the cover plate 8 becomes higher than in the conventional practice, thereby preventing (or at least significantly reducing) dewing around the door gasket 5 on the freezer door 3.

[0045] Of course, the cool air shield 100 may be disposed on the cold room door 4 to shield the space between the door inner surface 4a of the cold room door 4 and the inner surface or interior of the cold room 2.

[0046] As mentioned above, accordingly, the refrigerator for preventing dewing on the door gaskets according to the present invention is provided with a cool air shield that may be disposed between an inside surface of the freezer door and the door gasket to shield the space between the inside surface of the freezer door and the inner surface or interior of the freezer, thereby preventing the cool air supplied to the freezer from directly contacting the door gasket and further avoiding the freezing of the door gasket.

[0047] Additionally, the present invention reduces a temperature deviation or difference at a location where internal air and external air meet each other (e.g., at or near a boundary of the door gaskets), thereby preventing dewing on or around the door gaskets.

[0048] While the present invention has been described with reference to the particular illustrative embodiments, it is not to be restricted by the embodiments but only by the appended claims. It is to be appreciated that those skilled in the art can change or modify the embodiments without departing from the scope and spirit of the present invention.

Claims

1. A refrigerator, comprising:

   one or more doors, each door having a rear or internal surface;
   a door gasket along one or more edges of the rear or internal surface of at least one of the one or more doors, configured to prevent cool air in an interior of the refrigerator from leaking to outside the refrigerator; and
   a cool air shield between a door inside surface and the door gasket, configured to separate the door gasket and the interior of the refrigerator from each other.

2. The refrigerator according to claim 1, wherein the door inside surface extends from the edge of the rear or internal surface of the at least one of the one or more doors toward the interior of the refrigerator.

3. The refrigerator according to claim 1 or 2, wherein the cool air shield comprises a sealing surface por-

tion contacting the door inside surface of the at least one of the one or more doors; and a shielding portion extending from one side of the sealing surface portion, configured to separate the door gasket and the interior of the refrigerator from each other.

4. The refrigerator according to claims 1 to 3, wherein the cool air shield is further configured to shield a space between the door inside surface and the interior of the refrigerator.

5. The refrigerator according to claims 1 to 4, wherein the shielding portion is bent or curved.

6. The refrigerator according to claims 1 to 5, wherein one side of the sealing surface portion is in a coupling groove on the rear or internal surface of the at least one of the one or more doors and in contact with the door inside surface.

7. The refrigerator according to claims 1 to 6, wherein an end portion of the one side of the sealing surface portion is inserted into the coupling groove and is bent or curved along an inner surface of the coupling groove.

8. The refrigerator according to claims 1 to 7, wherein a portion of the door gasket is in the coupling groove and allows the end portion of the one side of the sealing surface portion to resist and/or press the inner surface of the coupling groove.

9. The refrigerator according to claims 1 to 8, wherein the shielding portion has a front end portion bent or curved toward the door gasket.

10. The refrigerator according to claims 1 to 9, wherein the front end portion of the shielding portion contacts an inner surface of the refrigerator when the at least one of the one or more doors is closed.

11. The refrigerator according to claims 1 to 10, wherein the cool air shield comprises a sealing surface portion contacting an inside surface of the at least one of the one or more doors, and a shielding portion extending from one side of the sealing surface portion, configured to separate the door gasket and the interior of the refrigerator.

12. The refrigerator according to claims 1 to 11, wherein the shielding portion is further configured to shield a space between the inside surface of the at least one of the one or more doors and the interior of the refrigerator.

13. The refrigerator according to claims 1 to 12, wherein the one side of the sealing surface portion is in a coupling groove on the rear or internal surface of each door and in contact with the door inside surface.

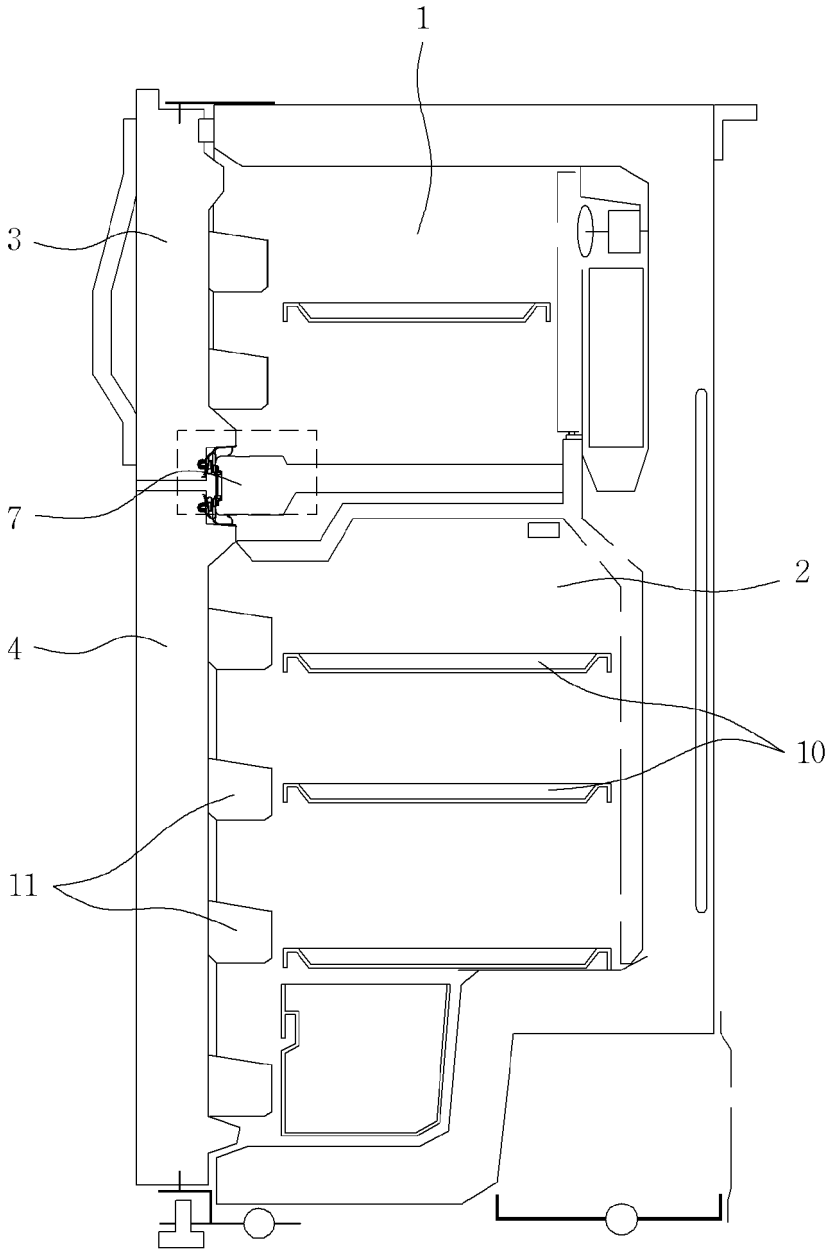
14. The refrigerator according to claims 1 to 13, wherein an end portion of the one side of the sealing surface portion is curved along an inner surface of the coupling groove, and a portion of the door gasket is in the coupling groove and presses the curve end portion of the one side of the sealing surface portion to the inner surface of the coupling groove.

15. The refrigerator according to claims 1 to 14, wherein the shielding portion has a front end portion bent or curved toward the door gasket.

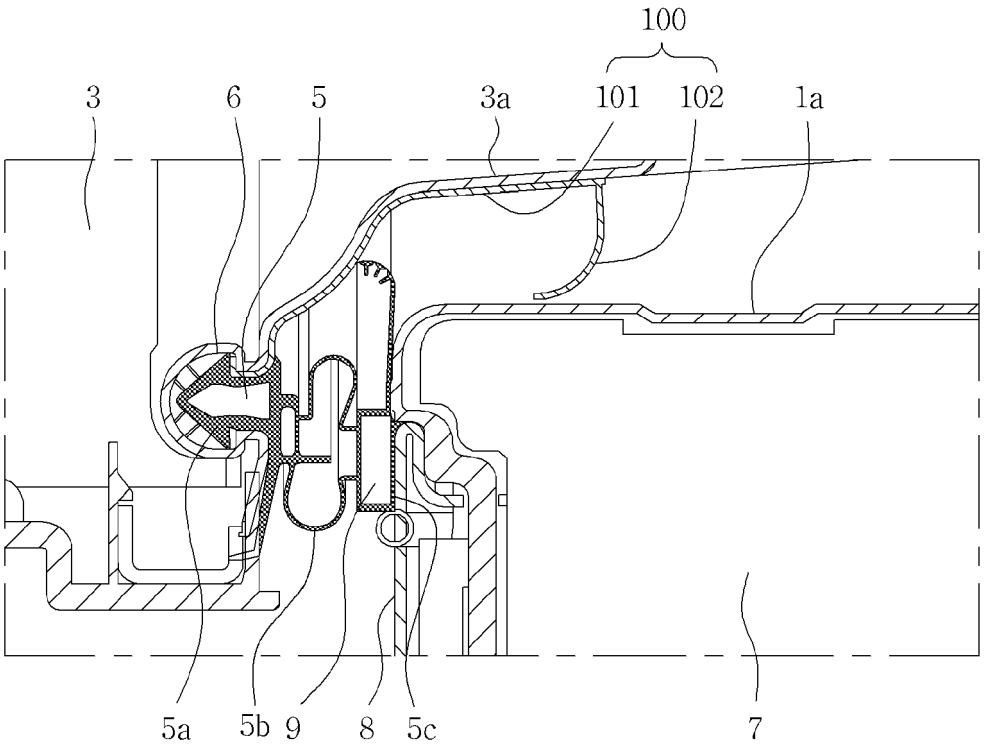
16. The refrigerator according to claims 1 to 15, wherein the front end portion of the shielding portion contacts an inner surface of the refrigerator when the at least one of the one or more doors is closed.

17. The refrigerator according to claims 1 to 16, wherein the at least one of the one or more doors is a freezer door, and the interior of the refrigerator is an interior of a freezer.

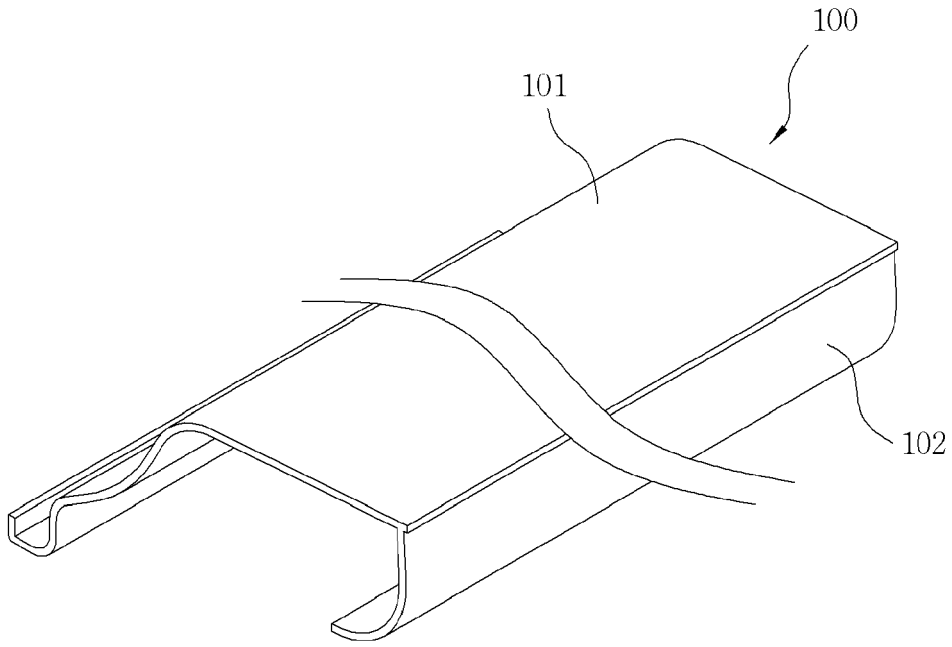
[FIGURE 1]



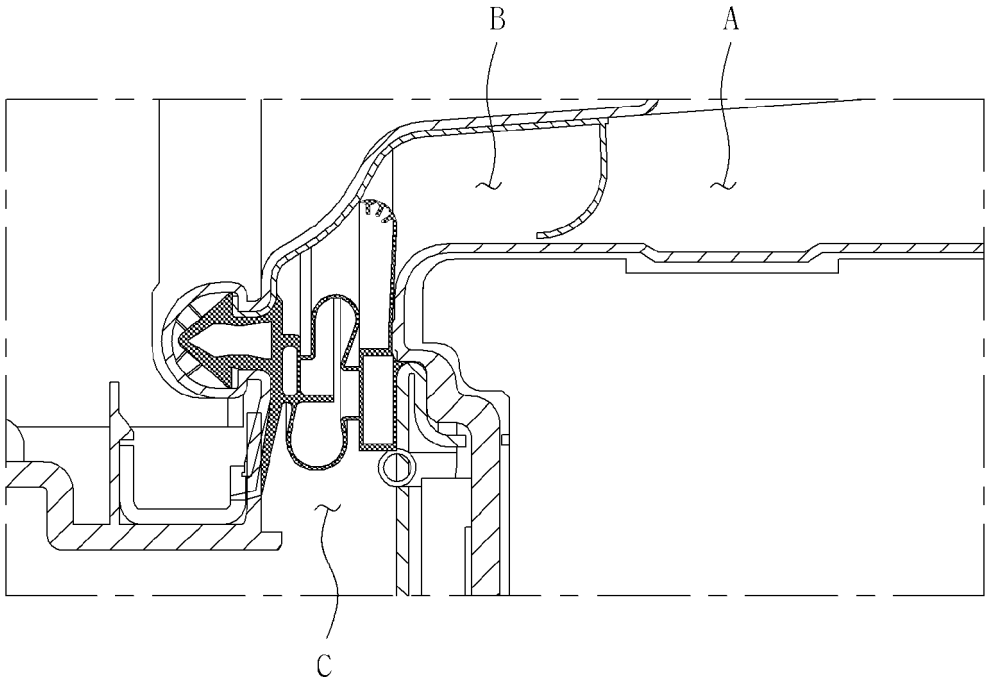
[FIGURE 2]



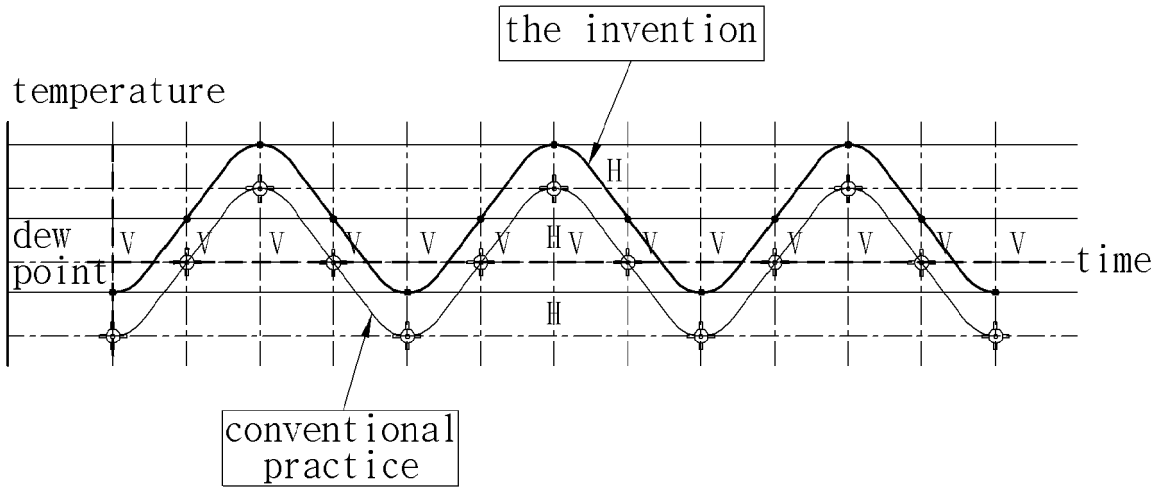
[FIGURE 3]



[FIGURE 4]



[FIGURE 5]


the invention
temperature
dew point
time
conventional practice

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EUROPEAN SEARCH REPORT

Application Number
EP 13 18 7581

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 2006/107180 A1 (LG ELECTRONICS INC [KR]; LEE JEONG YOUL [KR]; KIM SANG BAE [KR]; CHO S) 12 October 2006 (2006-10-12) * paragraph [0045] - paragraph [0112]; figures 1-8 *	1-8, 11-14,17	INV. F25D21/04 F25D23/08 F25D31/00
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X	WO 2007/065554 A1 (REHAU AG & CO [DE]; LANZL THOMAS [DE]; WASCHKE ANDREAS [DE]; BAUMGARTN) 14 June 2007 (2007-06-14) * figure 1 *	1-8, 11-14,17	
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			TECHNICAL FIELDS SEARCHED (IPC) F25D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	5 March 2014	Jessen, Flemming

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
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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

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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 13 18 7581

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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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82