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(54) REFRIGERATION APPLIANCE HAVING EMBEDDED HANDLE

(57) The present invention relates to a refrigeration appliance having an embedded handle, including a case body (11) and a door (12). An embedded handle (16) is provided on the door (12). The embedded handle (16) has a handle slot (14) to be operated. According to the proposal of the present invention, a heating element (15) is disposed on at least one wall (27) of walls (26, 27, 28, 29) forming the handle slot (14).

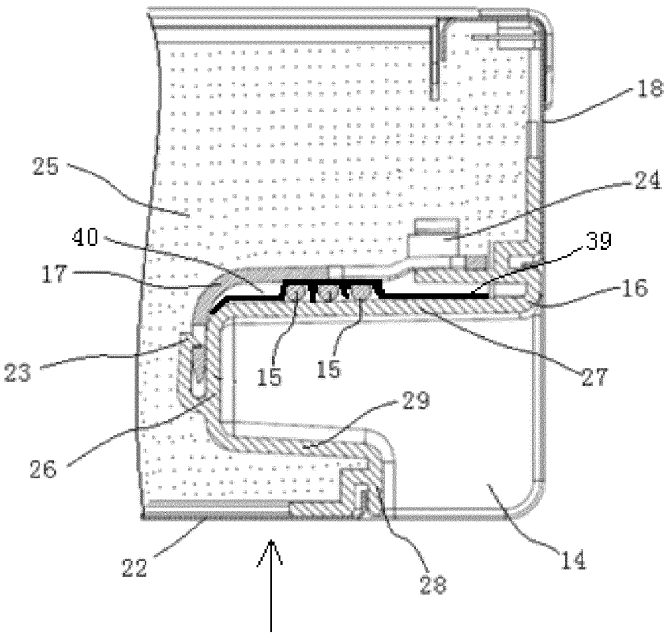

FIG. 3

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Description

BACKGROUND

Technical Field

[0001] The present invention relates to the field of home appliances, and in particular, to a refrigeration appliance having an embedded handle.

Related Art

[0002] It is known that an embedded handle is disposed on a door of a refrigerator. The design of an embedded handle may enable a refrigerator to occupy smaller space and improve the beauty of the refrigerator. However, when an embedded handle is disposed on a door of a refrigerator, especially, on a door of a freezer compartment, a new problem is caused. Space occupied by an embedded handle on a door is originally space for a foaming layer, and therefore, the thickness of the foaming layer between a position where the embedded handle is located and a lining of the door is clearly thinner than the normal thickness of the foaming layer inside the door. The temperature of a wall of the embedded handle may be clearly lower than the ambient temperature. Especially, when the ambient temperature is relatively high and the air humidity is high, condensate is very likely to form on the surface of the wall of the embedded handle. The formation of condensate on a wall of an embedded handle undermines the reliability of quality of a refrigerator for a user.

SUMMARY

[0003] To solve a problem mentioned in the prior art that condensate easily occurs on a wall of an embedded handle, the present invention provides a refrigeration appliance that can solve the foregoing problem.

[0004] To achieve the foregoing objective, the present invention proposes a refrigeration appliance, including a case body and a door, where an embedded handle is provided on the door, the embedded handle has a handle slot to be operated, and a heating element is disposed on at least one of the walls forming the handle slot.

[0005] Because the walls of the embedded handle are directly touched by a user when the user opens the door, the heating element is disposed on at least one wall of the embedded handle, so that condensate that is produced on the walls of the embedded handle may be removed, so as to keep the inside of the handle slot dry, and improve reliability of a product for the user. For the sake of beauty, the handle slot may be closed by using a rotatable cover. When the user performs an operation, the user pushes the cover into the slot. When the user does not perform an operation, the cover closes the handle slot, and in this case, the cover and the surface of the refrigerator are located on the same plane, so that the refrigerator looks more beautiful.

[0006] Optionally, the heating element is disposed on a wall, towards the front surface of the door, of the walls forming the handle slot. This is because the wall towards the front surface of the door has a shortest distance away from a lining of the door. That is, the thickness of a foaming layer between the wall towards the front surface of the door and the lining is the smallest, the temperature of the wall towards the front surface of the door is significantly susceptible to cold air inside the case body, and condensate is easily formed on the wall towards the front surface of the door. Therefore, an effect is remarkable when the heating element is disposed on the wall towards the front surface of the door to remove condensate. Certainly, the heating element may also be formed on all the walls of the handle slot, so that the speed of removing condensate may be increased.

[0007] Optionally, the handle slot opens towards the front surface and/or the side surface of the door. The handle slot is disposed in three manners: 1. The handle slot only opens towards the front surface of the door. 2. The handle slot only opens towards the side surface of the door. 3. The handle slot opens towards the front surface and the side surface of the door. All the three different forms of the handle slot in the foregoing may be used in actual products.

[0008] Optionally, the heating element is fixed on the wall of the embedded handle by using at least one fastening clip in a mechanical manner, so as to prevent a position of the heating element from changing under the impact of the foaming agent in the foaming process. Especially, when the heating element is an electric heating wire, a safety problem may be caused. In addition, when the position of the heating element is changed, adverse influence may also be caused on the efficiency of removing condensate. Therefore, when the fastening clip is used to fix the heating element, the occurrence of the foregoing problem may be avoided.

[0009] Optionally, a limit mechanism used for fixing the fastening clip is disposed on the side, towards the inside of the door, of the wall of the embedded handle, that is, the limit mechanism is disposed on the wall of the embedded handle, and such a disposing manner facilitates assembly of the fastening clip.

[0010] Optionally, at least one of the limit mechanisms is located on the wall, towards the front surface of the door, of the walls of the embedded handle, so that it becomes easy to fix the heating element located on the wall towards the front surface of the door. The limit mechanism and the fastening clip are at least fixed and connected by using a fastener. The fastening clip is generally integrally formed by using a resin material, and at least one segment of the fastening clip is connected by using the fastener, so as to improve the efficiency of assembly and increase the stability of a connection between the fastening clip and the limit mechanism.

[0011] Optionally, the fastening clip includes a stop portion, a pressing portion, and a clamping portion, where

the stop portion and the pressing portion are located on the same plane, and the plane where the clamping portion is located is perpendicular to the plane where the stop portion and the pressing portion are located. Therefore, a structure of the fastening clip is not a planar structure, and may be designed into a structure of two walls enveloping the embedded handle, so as to make installation easier and improve the stability. The clamping portion may be designed into a clamping hole to facilitate a clamping operation. In addition, the number of the fastening clips is 2 or 3, and the fastening clips are kept at a particular distance from each other, and optimally evenly distributed on the wall of the embedded handle.

[0012] Optionally, the limit mechanisms are located on different walls of the embedded handle, and the limit mechanism at least includes one elastic clamping hook.

[0013] Optionally, the heating element is fixed on at least one wall of the embedded handle by using a bonding apparatus. After the heating element is first fixed by using the bonding apparatus, the fastening clip is then used to fix the heating element, thereby improving the stability of fixing the heating element.

[0014] Optionally, the fastening clip presses the heating element, and the heating element is tightly joined on the wall of the embedded handle, thereby improving the efficiency of removing condensate.

[0015] Optionally, the door has a foaming layer used for heat insulation, and the heating element is located between the foaming layer and at least one wall of the embedded handle.

[0016] Optionally, the heating element is an electric heating wire, or may also be a metal tube having a high-temperature refrigerant guided from a compressor.

[0017] Optionally, the embedded handle is formed on the door of a freezer compartment of the refrigeration appliance, and if necessary, the embedded handle having the heating element may also be disposed on a door of a refrigeration compartment and a door of a zero-degree compartment.

[0018] Optionally, the refrigeration appliance is a refrigerator, a freezer or a wine cooler.

BRIEF DESCRIPTION OF THE DRAWINGS

[0019] The disclosure will become more fully understood from the detailed description given herein below for illustration only, and thus are not limitative of the disclosure, and wherein:

FIG. 1 is a schematic structural view of a first embodiment of a refrigeration appliance which is defined as a refrigerator according to the present invention;

FIG. 2 is a rear view of a door of a freezer compartment of the refrigerator in FIG. 1;

FIG. 3 is a sectional view along a dotted line AB in FIG. 2;

FIG. 4 is an assembly view of an embedded handle in FIG. 2; and

FIG. 5 is a schematic structural view of an embedded handle of a second embodiment of a refrigerator of a refrigeration appliance according to the present invention.

DETAILED DESCRIPTION

[0020] Referring to FIG. 1, FIG. 1 shows a side-by-side refrigerator 10 of a first embodiment. The refrigerator 10 has a case body 11 including a refrigeration compartment and a freezer compartment and a door 12 of the freezer compartment and a door 13 of the refrigeration compartment that are separately located on the left side and the right side. An embedded handle 16 (see FIG. 2) is disposed on the door 12 of the freezer compartment. The embedded handle 16 has a handle slot 14 to be operated. By using the handle slot 14, a user may open or close the door 12 of the freezer compartment. The handle slot 14 opens towards a front surface and the side surface of the door 12 of the freezer compartment.

[0021] FIG. 2 is a rear view of a door of a freezer compartment of the refrigerator in FIG. 1. The door 12 of the freezer compartment includes a front panel 22, a first side wall 18 and a second side wall 19 located on the left side and the right side of the front panel 22, and an upper cover plate 20 and a lower cover plate 21 located on the upper side and the bottom side of the front panel 22. The first side wall 18 is towards the door 13 of the refrigeration compartment. The embedded handle 16 is fixed on the first side wall 18 and the front panel 22. An electric heating wire 15 is disposed on a wall 27, towards a direction of the front surface of the door 12, of the embedded handle 16. The electric heating wire 15 is first fixed by using an aluminum foil tape 39 (see FIG. 3), and then is fixed on the wall 27 of the embedded handle 16 by using two fastening clips 17. For a more detailed structure, reference may be made to FIG. 3 and FIG. 4.

[0022] FIG. 3 is a sectional view along a dotted line AB in FIG. 2. FIG. 4 is an assembly view of the embedded handle in FIG. 2. An arrow direction in FIG. 3 is the direction of the front surface of the door of the refrigerator. It may be seen from the sectional view in FIG. 3 that four walls, connected to each other, of the embedded handle 16 are sequentially the first wall 26 of the embedded handle, the second wall 27 of the embedded handle, the third wall 28 of the embedded handle, and the fourth wall 29 of the embedded handle. The first wall 26 of the embedded handle and the third wall 28 of the embedded handle are towards the direction of the door 13 of the refrigeration compartment, the second wall 27 of the embedded handle is towards a direction of the front surface of the door 12 of the freezer compartment, the second wall 27 of the embedded handle is the wall on which the electric heating wire 15 is disposed, and the fourth wall 29 and the second wall 27 are disposed opposite. Such four walls form the handle slot 14. A user may open or close the door 12 of the freezer compartment by using the handle slot 14.

When the door 12 of the freezer compartment is opened or closed, the user mainly applies a force on the fourth wall 29 of the embedded handle.

[0023] To prevent condensate from forming on the walls of the embedded handle, especially on the second wall 27, where condensate is formed easily, of the embedded handle, the electric heating wire 15 is disposed on the side, towards a foaming layer 25, of the second wall 27 of the embedded handle. The electric heating wire 15 is first fixed on the second wall 27 of the embedded handle by using the aluminum foil tape 39, and then the fastening clip 17 is used to fix the electric heating wire 15 on the second wall 27 of the embedded handle again, so that a case in which a position of the electric heating wire 15 is changed caused by impacts on the electric heating wire 15 from the foaming liquid in the foaming process may be prevented.

[0024] The fastening clip 17 includes a stop portion 31, a pressing portion 33, and a clamping portion 32. The clamping portion 32 is perpendicular to the pressing portion 33. A clamping hole 41 is disposed on the clamping portion 32. The second fixing piece 24 that is used in combination with the stop portion 31 is disposed on the second wall 27 of the embedded handle. The first fixing piece 23 that is used in combination with the clamping portion 32 is disposed on the first wall 26 of the embedded handle. A clamping hook 42 that extends into the clamping hole 41 on the clamping portion 32 is provided on the first fixing piece 23.

[0025] During an actual assembly procedure, the stop portion 31 and the second fixing piece 24 are first assembled, the pressing portion 33 is then pressed towards the electric heating wire 15, and finally the clamping hole 41 of the clamping portion 32 and the clamping hook 42 of the first fixing piece 23 are assembled and combined. A receiving area 40 is formed between the pressing portion 33 and the second wall 27 of the embedded handle. A distance between the pressing portion 33 and the second wall 27 of the embedded handle is slightly less than a sum of the diameter of the electric heating wire 15 and the thickness of the aluminum foil tape 39, so that micro deformation of the fastening clip 17 may be used to tightly press the electric heating wire 15 on the second wall 27 of the embedded handle.

[0026] FIG. 5 is a schematic structural view of an embedded handle of a second embodiment of a refrigerator of a refrigeration appliance according to the present invention. In FIG. 5, a control panel is disposed inside a control box 34 which is on the side of an embedded handle 16. The control box 34 is blocked by a glass 35 which is on a front panel 22 of the refrigerator. A user may set the temperature or other parameters of each compartment on the glass 35. The electric heating wire 15 is still disposed on a wall 27, towards a direction of the front surface of the door, of the embedded handle 16, and is sequentially fixed on the wall 27 of the embedded handle 16 by using an aluminum foil tape (not shown) and a fastening clip 38. The fourth fixing piece 37 is still disposed on the wall 27 of the embedded handle 16, the third fixing piece 36 is disposed on the control box 34, a hole is provided on the third fixing piece 36, one end of the fastening clip 38 extends into the hole, and the other end of the fastening clip 38 is fixed by a clamping hook which is on the fourth fixing piece 37.

Claims

1. A refrigeration appliance, comprising a case body (11) and a door (12), an embedded handle (16) being provided on the door (12), and the embedded handle (16) having a handle slot (14) to be operated, **characterized in that**: a heating element (15) is disposed on at least one wall (27) of the walls (26, 27, 28, 29) forming the handle slot (14).

2. The refrigeration appliance according to claim 1, **characterized in that**: the heating element (15) is disposed on the wall (27), towards a front surface (22) of the door (12), of the walls (26, 27, 28, 29) forming the handle slot (14).

3. The refrigeration appliance according to claim 1 or 2, **characterized in that**: the handle slot (14) opens towards the front surface (22) and/or a side surface (18) of the door (12).

4. The refrigeration appliance according to at least one of the preceding claims, **characterized in that**: the heating element (15) is fixed on at least one wall (27) of the embedded handle (16) by using at least one fastening clip (17, 38) in a mechanical manner.

5. The refrigeration appliance according to claim 4, **characterized in that**: the fastening clip (17) comprises a stop portion (31), a pressing portion (33), and a clamping portion (32), where the stop portion (31) and the pressing portion (33) are located on the same plane, and the plane where the clamping portion (32) is located is perpendicular to the plane where the stop portion (31) and the pressing portion (33) are located.

6. The refrigeration appliance according to claim 5, **characterized in that**: the clamping portion (32) is a clamping hole.

7. The refrigeration appliance according to at least one of the claims 4-6, **characterized in that**: a limit mechanism (23, 24, 36, 37) used for fixing the fastening clip (17, 38) is disposed on the side, towards the inside of the door (12), of the wall (26, 27, 28, 29) of the embedded handle (16).

8. The refrigeration appliance according to claim 7, **characterized in that**: at least one of the limit mech-

anisms (23, 24, 36, 37) is located on the wall (27), towards the front surface (22) of the door (12), of the walls (26, 27, 28, 29) of the embedded handle (16).

9. The refrigeration appliance according to claim 7 or 8, **characterized in that**: the limit mechanisms (23, 24, 36, 37) are located on different walls (26, 27, 28, 29) of the embedded handle (16).

10. The refrigeration appliance according to at least one of the claims 7-9, **characterized in that**: the limit mechanism (23, 24, 36, 37) at least comprises one elastic clamping hook (42).

11. The refrigeration appliance according to at least one of the preceding claims, **characterized in that**: the door (12) has a foaming layer (25) used for heat insulation, and the heating element (15) is located between the foaming layer (25) and at least one wall (27) of the embedded handle (16).

12. The refrigeration appliance according to at least one of the preceding claims, **characterized in that**: the heating element (15) is an electric heating wire.

13. The refrigeration appliance according to at least one of the preceding claims, **characterized in that**: the embedded handle (16) is formed on the door (12) of a freezer compartment of the refrigeration appliance.

14. The refrigeration appliance according to at least one of the preceding claims, **characterized in that**: the refrigeration appliance is a refrigerator, a freezer or a wine cooler.

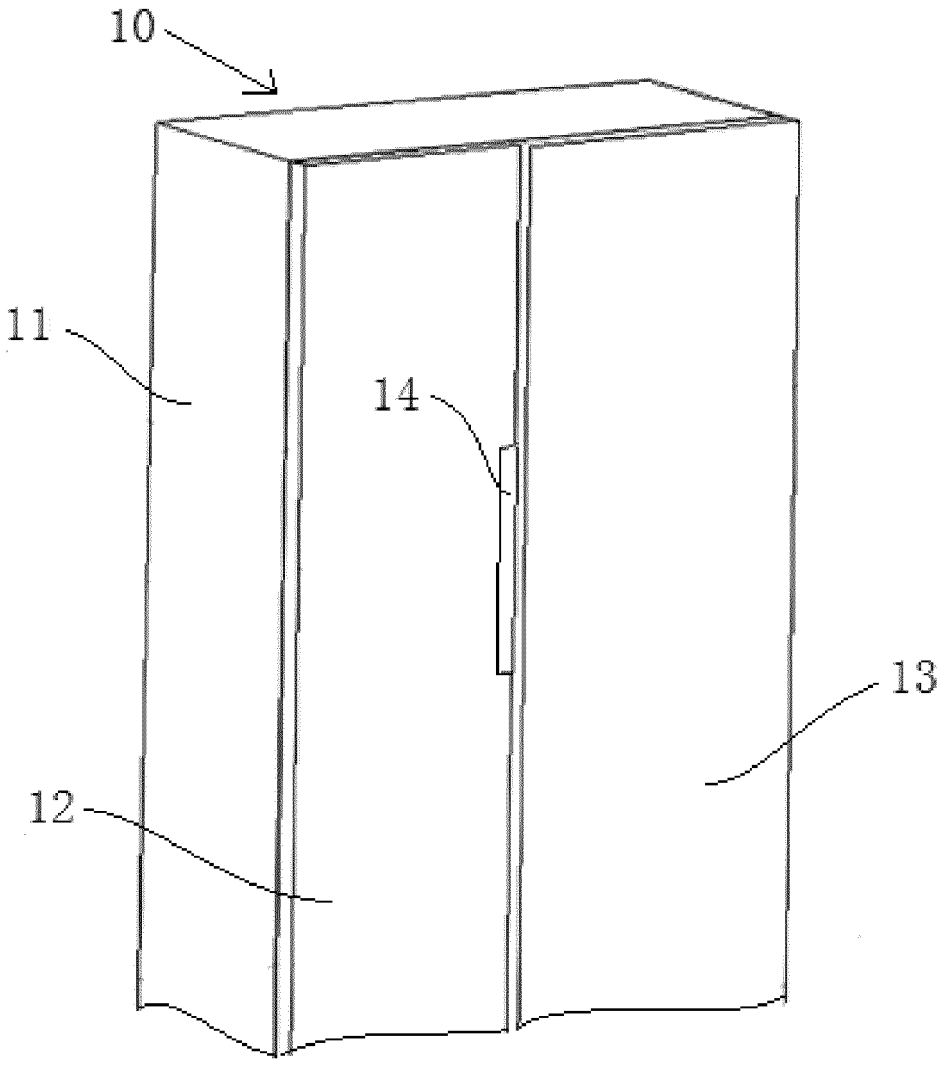

FIG. 1

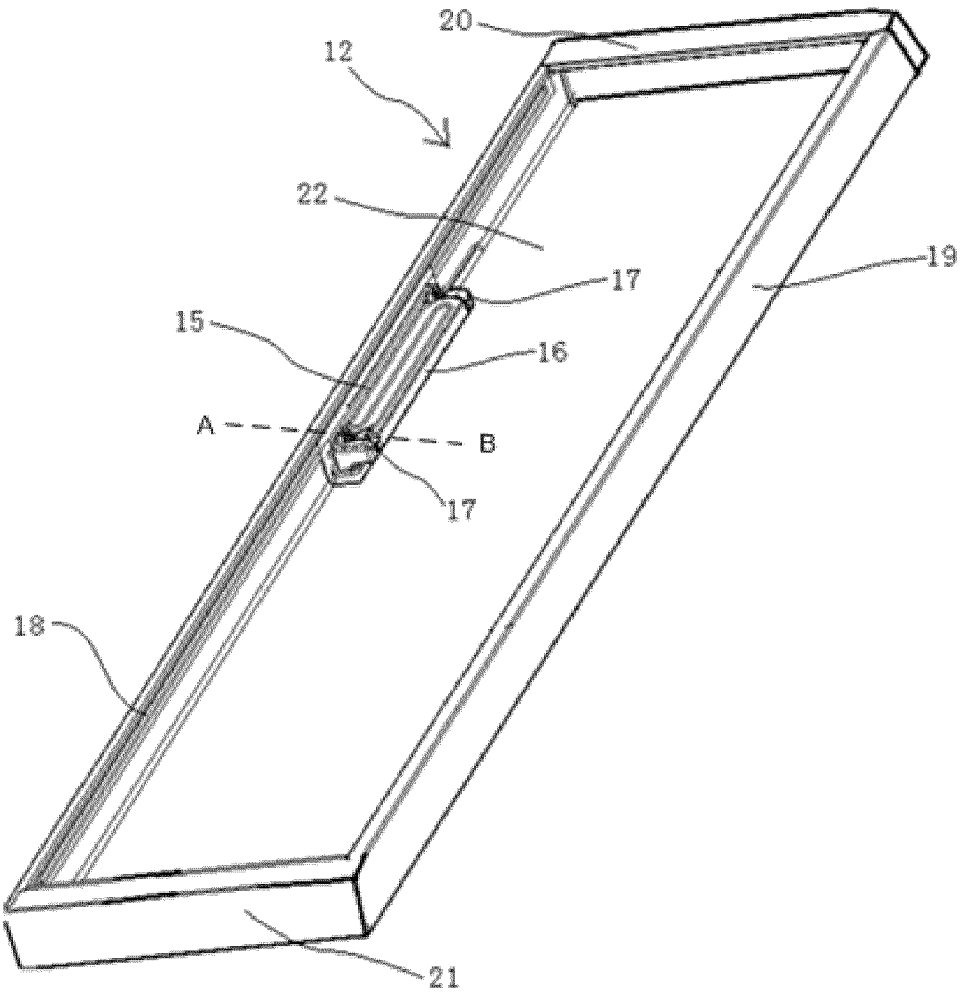

FIG. 2

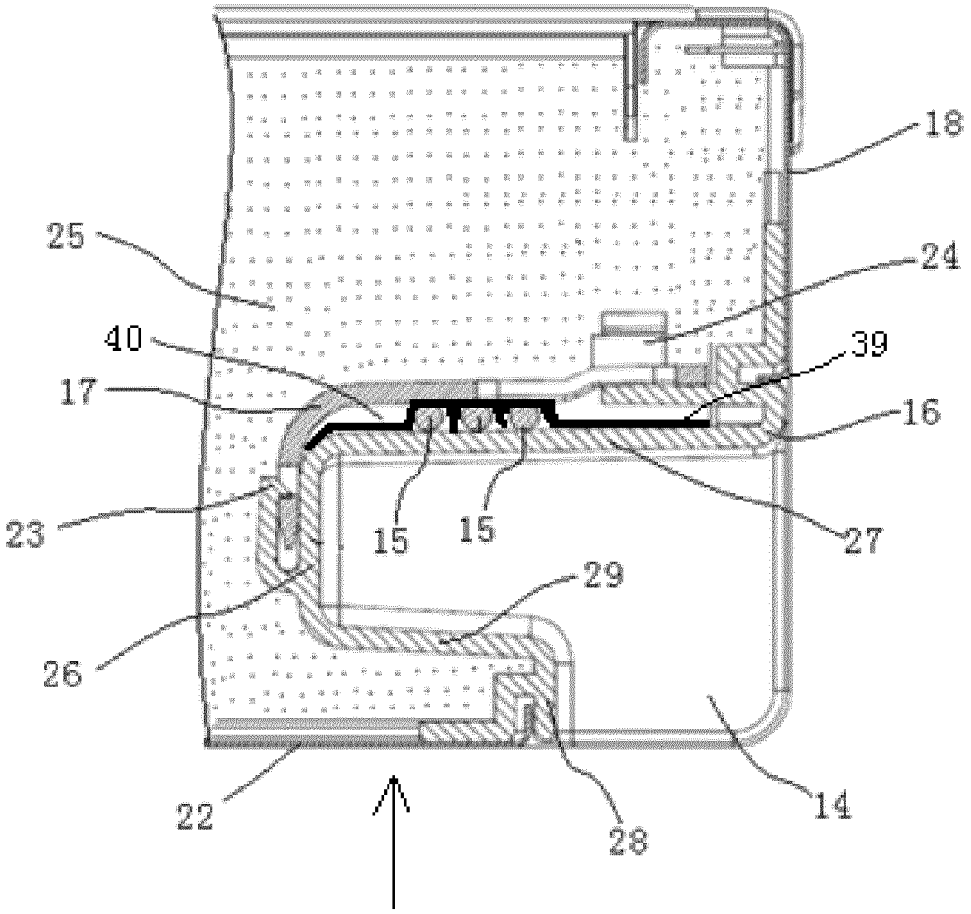

FIG. 3

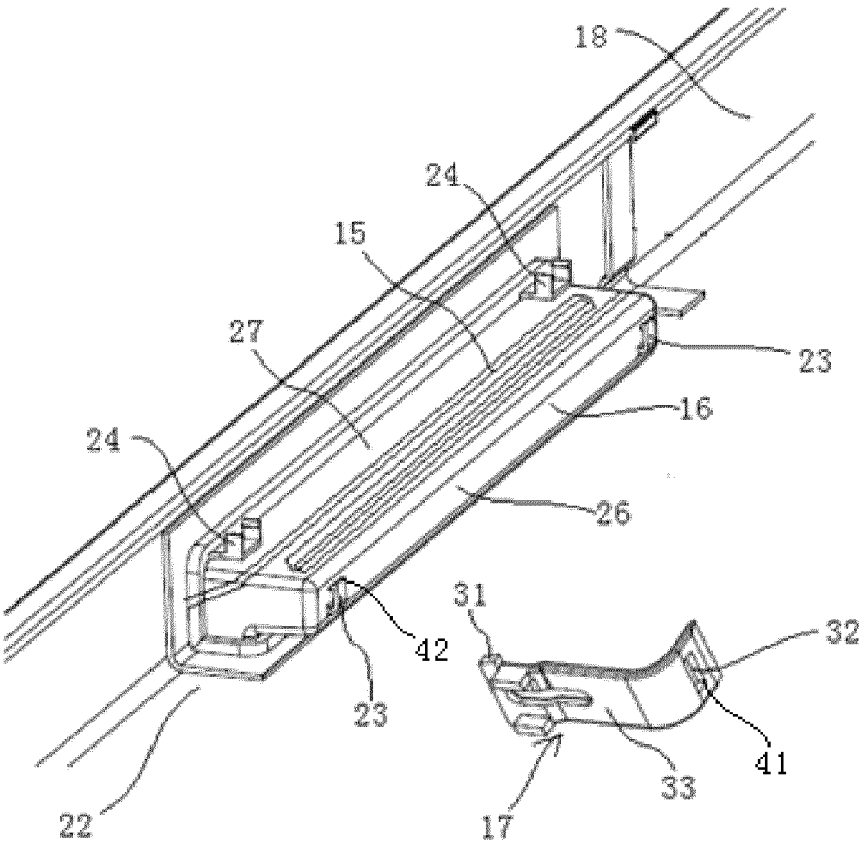

FIG. 4

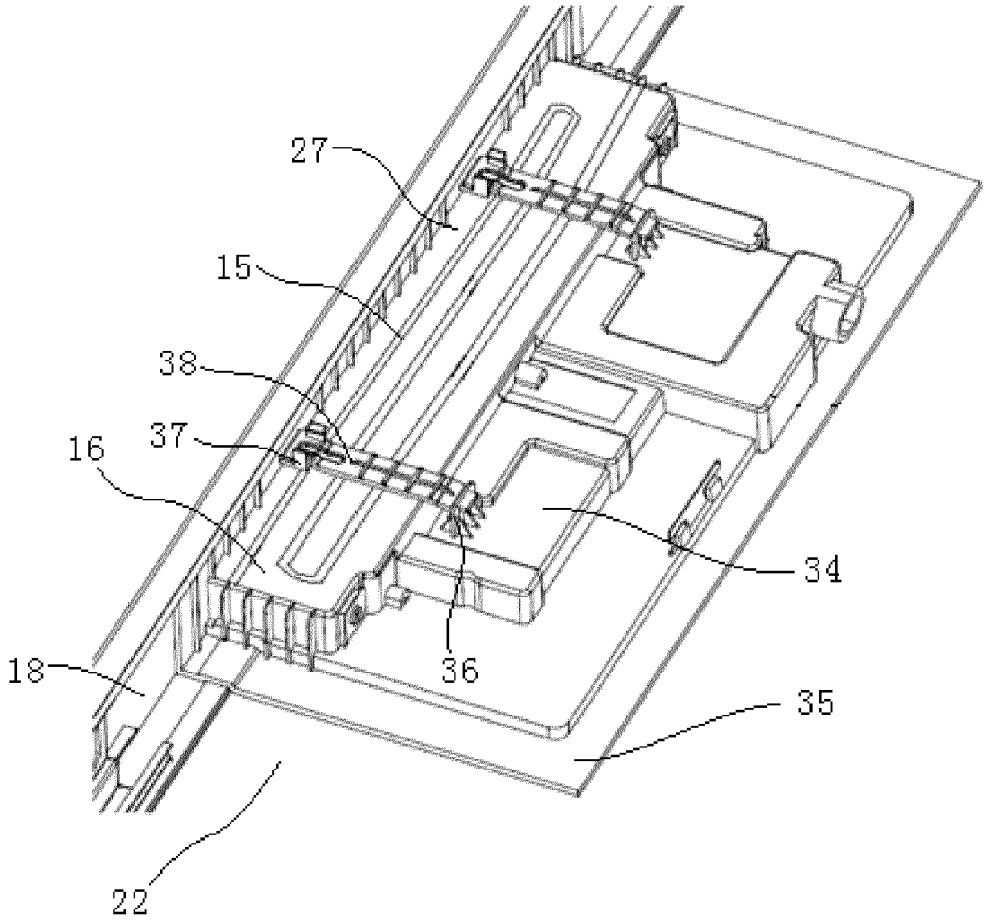

FIG. 5

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EUROPEAN SEARCH REPORT

Application Number
EP 15 17 9536

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	DE 20 2005 006686 U1 (VIESSMANN KAELTETECHNIK AG [DE]) 14 July 2005 (2005-07-14) * paragraphs [0001] - [0027]; figures 1-4 *	1-13	INV. F25D21/04 F25D23/02
X	JP H03 181770 A (MATSUSHITA REFRIGERATION) 7 August 1991 (1991-08-07) * abstract; figures 1-4 *	1-3,11, 14	

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
The Hague	2 December 2015	Kolev, Ivelin

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 15 17 9536

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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02-12-2015

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