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(54) **REFRIGERATING DEVICE**

(57) Provided is a refrigerating device (1), wherein exhaust of a vacuum pump (12) is introduced into a storage chamber (101) where a housing (11) defining an evacuable chamber (110) is disposed or another storage chamber (102) outside the storage chamber (101); relative to that low-temperature gas discharged by the vacuum pump (12) is discharged outside the refrigerating

device (1) and the storage chambers (101, 102) cool normal-temperature gas that enters into the refrigerating device (1) from the outside, the present utility model directly introduces the low-temperature gas discharged by the vacuum pump (12) into any storage chamber or multiple storage chambers (101, 102), which can reduce energy consumption.

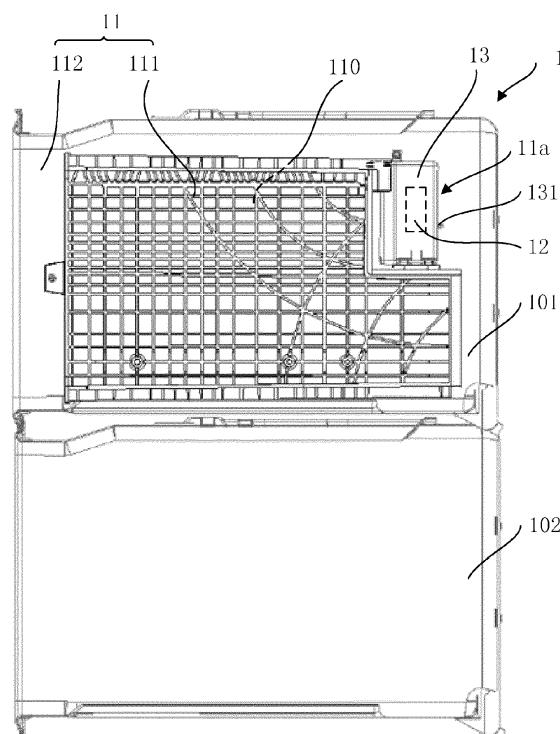


FIG. 1

Description

BACKGROUND

Technical Field

[0001] The present utility model relates to a refrigerating device, and particularly to a refrigerating device having an evacuable chamber.

Related Art

[0002] In recent years, with continuous development of storage technologies, the existing refrigerating device adopts an evacuable chamber to reduce oxygen content in the chamber so as to increase storage effects of items, thereby prolonging storage time. The evacuable chamber (which may also be called "low-pressure chamber") uses a vacuum pump for evacuation.

[0003] Actual use indicates that energy consumption of the refrigerating device having an evacuable chamber remains to be further reduced.

SUMMARY

[0004] An object of the present utility model is to provide a refrigerating device having an evacuable chamber that can further reduce energy consumption.

[0005] To achieve the aforementioned object, the present utility model provides a refrigerating device, including at least two storage chambers, a housing defining an evacuable chamber and a vacuum pump used to evacuate the chamber, wherein the housing is disposed in one storage chamber, and exhaust of the vacuum pump is introduced into at least one of the two storage chambers. Compared with the prior art, the technical solution has the following advantages: as the housing is disposed in one storage chamber, gas pumped out by the vacuum pump from the chamber defined by the housing is low-temperature gas, discharged gas is also low-temperature gas, and relative to that the low-temperature gas is discharged outside the refrigerating device and the storage chamber cools normal-temperature gas entering from the outside, the low-temperature gas discharged by the vacuum pump is directly introduced into any storage chamber or multiple storage chambers, which can reduce energy consumption.

[0006] It should be noted that the "evacuable chamber" in the present utility model refers to that the chamber is evacuable and has pressure which is lower than atmospheric pressure, for example, the chamber can be decompressed to make the pressure in the chamber kept between the atmospheric pressure and absolute vacuum. In this field, the evacuable chamber may also be called "low-pressure chamber" or "vacuum chamber".

[0007] Optionally, an exhaust pipe of the vacuum pump is connected to at least one of the two storage chambers. When the vacuum pump is located outside all the storage

chambers, the exhaust pipe of the vacuum pump is connected to all the storage chambers or one or more in all the storage chambers, all of which can reduce energy consumption.

[0008] Optionally, the storage chambers into which the exhaust of the vacuum pump is introduced are fresh-keeping chambers, refrigerating chambers or freezing chambers. The scheme provides three specific schemes for introducing the low-temperature gas discharged by the vacuum pump into the chamber, in particular, it should be noted that, for the freezing chamber, its temperature is lower, which is generally subzero, when a user opens the door that closes the freezing chamber, outside air enters into the freezing chamber, the temperature of the entering normal-temperature gas is lowered in the freezing chamber, while the volume is unchanged, thus the pressure is reduced, this results in that the user needs great efforts to open the door next time he/she opens the door of the freezing chamber, and discharging the low-temperature gas discharged by the vacuum pump into the freezing chamber can increase the pressure in the freezing chamber, thus facilitating the user to open the door in the case of saving efforts.

[0009] Optionally, the vacuum pump and the housing are placed in the same storage chamber, and the storage chamber accommodating the vacuum pump and the housing is a fresh-keeping chamber or refrigerating chamber. The vacuum pump may be placed in a compressor room, or like the scheme, be placed in the same storage chamber with the housing, thereby shortening the length of the evacuable pipeline and reducing the cost. In addition, the scheme also provides two specific schemes for the chamber that accommodates the vacuum pump and the housing.

[0010] Optionally, the vacuum pump is disposed in an accommodation shell, and the accommodation shell and the housing are placed in the same storage chamber. The vacuum pump may vibrate during evacuation, thus, when the vacuum pump is directly fixed to an outer wall of the housing or an inner wall of the storage chamber, the vacuum pump will drive the housing or a storage chamber inner tank to vibrate together, noise is greater, and after the vacuum pump is housed in the accommodation shell, noise produced by them can be reduced through a buffer structure or the like when the accommodation shell is fixed with the housing or the storage chamber inner tank.

[0011] Optionally, a wall of the accommodation shell has an opening, used for passing of the exhaust of the vacuum pump. For the scheme that the accommodation shell and the housing are placed in the same storage chamber, relative to the scheme that the exhaust pipe of the vacuum pump is introduced into the storage chamber, an opening is opened on a wall of the accommodation shell, which can avoid connections of exhaust pipelines and reduce the cost.

[0012] Optionally, in the storage chambers, an exhaust pipe is connected between the accommodation shell and

the other storage chamber except for one storage chamber where the housing and the accommodation shell are placed. Although the vacuum pump is placed in one storage chamber, exhaust is introduced into such a storage chamber, it is also feasible to introduce the exhaust of the vacuum pump into another storage chamber, for example, through a Y-pipe or a one-in-two-out valve, and in this case, an exhaust pipe is connected between the accommodation shell and the other storage chamber. Certainly, the exhaust of the vacuum pump may also be completely introduced into the other storage chamber.

[0013] Optionally, the exhaust pipe is a soft tube, and at least part of the soft tube is accommodated in a hard tube. To facilitate arrangement of the exhaust pipe, the exhaust pipe is preferably a soft material, for example, plastic, the soft exhaust pipe, in the foaming process of the refrigerating device, may be wrapped by a foaming liquid, and to prevent the foaming liquid from squeezing the soft tube, preferably, a hard tube is disposed outside some sections of the soft tube.

[0014] Optionally, the vacuum pump is disposed in an accommodation shell, outer walls of the housing enclose a recessed area recessed towards the chamber, and the recessed area is used to accommodate the vacuum pump. In addition to placing the accommodation shell (or vacuum pump) and the housing into the same storage chamber, the scheme further disposes a recessed area on outer walls of the housing to accommodate the accommodation shell (or vacuum pump), and advantages of the scheme are as follows: the vacuum pump, the accommodation shell and the housing (or the vacuum pump and the housing) form a vacuum storage unit standard part, the standard part has good compatibility, which is suitable for a certain type of refrigerating devices, for example, refrigerators, can be added to refrigerating devices having different platforms/models according to requirements, and does not need to adjust layout in the existing refrigerating device, which thus increases applicability of the vacuum storage unit in the refrigerating devices having different platforms/models and is conducive to simplifying assembling of refrigerating devices having vacuum storage units, thereby helping to increase assembling efficiency.

[0015] Optionally, the accommodation shell (or vacuum pump) is completely housed in the recessed area. Advantages of the scheme are as follows: the housing and the accommodation shell (or vacuum pump) are placed at the same time by using the existing space accommodating the housing, that is, the existing storage chamber that can accommodate the housing, i.e., can accommodate the standard part formed by the housing and the accommodation shell (or vacuum pump), and the internal structure of the existing refrigerating device is changed slightly.

[0016] Optionally, the outer walls of the housing enclosing the recessed area are shared with some walls of the accommodation shell. The scheme can avoid setting of various walls of the accommodation shell, thus helping

to reduce the cost.

[0017] Optionally, walls of the accommodation shell and the outer walls of the housing enclosing the recessed area have gaps therebetween. Advantages of the scheme are as follows: the shape of the outer walls of the housing can make targeted setting according to transformation in the evacuation process of the housing, and some buffer structures can be disposed between the accommodation shell and the outer walls of the housing to reduce noise of the vacuum pump in the evacuation process.

[0018] Optionally, the refrigerating device is a refrigerator, a freezer or a wine cabinet.

BRIEF DESCRIPTION OF THE DRAWINGS

[0019]

FIG. 1 is a local schematic structural view of a refrigerating device in Embodiment 1 of the present utility model;

FIG. 2 is a schematic structural view of the housing and the accommodation shell accommodating a vacuum pump in FIG. 1;

FIG. 3 is a modular structural view of a refrigerating device in Embodiment 2;

FIG. 4 is a modular structural view of a refrigerating device in Embodiment 3; and

FIG. 5 is a modular structural view of a refrigerating device in Embodiment 4.

DETAILED DESCRIPTION

[0020] As stated in Related Art, energy consumption of the refrigerating device having an evacuable chamber remains to be further reduced. To achieve the object, the present utility model puts forward: introducing exhaust of a vacuum pump into a storage chamber where a housing defining an evacuable chamber is placed or other chambers outside such a storage chamber, and relative to that low-temperature gas discharged by the vacuum pump is discharged outside the refrigerating device and the storage chamber cools normal-temperature gas entering into the refrigerating device from the outside, the low-temperature gas discharged by the vacuum pump is directly introduced into any storage chamber or multiple storage chambers, which can reduce the energy consumption.

[0021] To make the object, features and advantages of the present utility model more comprehensible, specific embodiments of the present utility model are described below in detail with reference to the accompanying drawings.

Embodiment 1

[0022] FIG. 1 is a local schematic structural view of a refrigerating device 1 in Embodiment 1 of the present utility model. Referring to FIG. 1, the refrigerating device 1 includes a first storage chamber 101, a second storage chamber 102, a housing 11 defining an evacuable chamber 110 and a vacuum pump 12 used to evacuate the chamber 110, the housing 11 is disposed in the first storage chamber 101, and exhaust of the vacuum pump 12 is introduced into the first storage chamber 101 that accommodates the housing 11.

[0023] The refrigerating device 1 may be a refrigerator, and may also be other types of refrigerating devices, for example, freezers or wine cabinets.

[0024] Various parts are introduced below respectively.

[0025] Referring to FIG. 1, in this embodiment, the first storage chamber 101 and the second storage chamber 102 are defined with different box-type tanks. In other embodiments, the two storage chambers 101 and 102 may also be defined with the same box-type tank.

[0026] The first storage chamber 101 that accommodates an airtight housing 11 may be a refrigerating chamber and may also be a fresh-keeping chamber, the temperature in the fresh-keeping chamber, for example, is between -5°C - 5°C , and the temperature of the refrigerating chamber is higher than that in the fresh-keeping chamber. It can be understood that the first storage chamber 101 provides a low temperature for the housing 11. Gas pumped out by the vacuum pump 12 from the housing 11 is low-temperature gas, and the gas discharged is also low-temperature gas. It can be understood that, relative to the scheme that the low-temperature gas is discharged outside the refrigerating device and the first storage chamber 101 cools normal-temperature gas entering from the outside, the low-temperature gas discharged by the vacuum pump is directly introduced into the first storage chamber 101, which can reduce energy consumption.

[0027] The second storage chamber 102 can, like the first storage chamber 101, be called a refrigerating chamber or a fresh-keeping chamber; in addition, the second storage chamber 102 may also be a freezing chamber.

[0028] FIG. 2 is a schematic structural view of the housing and the accommodation shell accommodating a vacuum pump in FIG. 1. Referring to FIG. 1 and FIG. 2, in this embodiment, the airtight housing 11 includes two parts, wherein one part is a housing body 111, and the housing body 111 has an opening; the second part is a cover body 112 that a drawer door serves as, and the drawer door is located at the opening of the housing body 111 when the drawer door is closed. In other embodiments, the airtight housing 11 may also have other implementation structures.

[0029] In addition, still referring to FIG. 1 and FIG. 2, the vacuum pump 12 is placed in an accommodation shell 13, the housing 11, specifically outer walls of the

housing body 111 enclose a recessed area 11 a, the recessed area 11 a is used to accommodate the accommodation shell 13, and the accommodation shell 13 and the housing 11 are placed in the same storage chamber 101. The accommodation shell 13 can be partially or completely housed in the recessed area 11 a. Advantages of the arrangement are as follows: the housing 11 and the accommodation shell 13 partially or wholly recessed in the recessed area 11 a enclosed by the outer walls of the housing 11 can be combined into a vacuum storage unit standard part, the standard part has good compatibility, is suitable for a certain type of refrigerating devices, can be added to refrigerating devices having different platforms/models according to requirements, and does not need to adjust layout in the existing refrigerating device, which thus increases applicability of the vacuum storage unit in the refrigerating devices having different platforms/models and is conducive to simplifying assembling of refrigerating devices having vacuum storage units, thereby helping to increase assembling efficiency.

[0030] As the vacuum pump 12 in this embodiment is housed in the accommodation shell 13, in FIG. 2, the vacuum pump 12 is illustrated with dotted lines.

[0031] The airtight housing 11, the vacuum pump 12 and the accommodation shell 13 form a vacuum storage unit.

[0032] In other embodiments, the vacuum pump 12 may also be directly fixed to the housing 11, specifically on the housing body 111, or before the housing 11 is housed in the first storage chamber 101, the vacuum pump 12 is first fixed onto an inner wall of the box-type tank defining the first storage chamber 101. In this case, the vacuum pump 12 may be partially or wholly housed in the housing 11, and specifically in the recessed area 11 a enclosed by the outer walls of the housing body 111. The airtight housing 11 and the vacuum pump 12 form a vacuum storage unit.

[0033] The vacuum pump 12 may vibrate during evacuation, thus, when the vacuum pump 12 is directly fixed to an outer wall of the housing 11 or an inner wall of the first storage chamber 101, the vacuum pump will drive the housing 11 or a storage chamber inner tank to vibrate together, noise is greater, and after the vacuum pump 12 is housed in the accommodation shell 13, noise produced by them can be reduced through a buffer structure or the like when the accommodation shell 13 is fixed with the housing 11 (or the storage chamber inner tank).

[0034] In this embodiment, the recessed area 11 a is located at a junction of a rear wall and an upper wall of the housing 11, and is an unfilled angle, and in other embodiments, the recessed area 11 a may also be located on other walls.

[0035] In addition, referring to FIG. 2, in this embodiment, walls of the accommodation shell 13 and the outer walls of the housing 11 enclosing the recessed area 11 a have gaps therebetween, and the structure having gaps has the following advantages: 1) the shape of the outer walls of the housing 11 can make targeted setting ac-

according to transformation in the evacuation process of the housing 11, and 2) some buffer structures can be disposed between the accommodation shell 13 and the outer walls of the housing 11 to reduce noise of the vacuum pump 12 in the evacuation process. In other embodiments, to reduce the cost, the outer walls of the housing 11 enclosing the recessed area 11a and some walls of the accommodation shell 13 may also be shared. In this embodiment, the housing 11 and the accommodation shell 13 recessed in the recessed area 11a formed by the outer walls of the housing 11 are placed in the same storage chamber 101, and thus a wall of the accommodation shell 13 is directly provided with an opening 131, that is, exhaust of the vacuum pump 12 can be introduced into the first storage chamber 101. In other embodiments, an exhaust pipe of the vacuum pump 12 may also be introduced into the first storage chamber 101, relative to the scheme of the latter, the former, in a manner of disposing an opening 131 on a wall of the accommodation shell 13, can omit installation of the exhaust pipe in the first storage chamber 101, and thus the cost is lower and the installation procedure is simple.

[0036] It can be understood that, in this embodiment, the accommodation shell 13 is recessed in the recessed area 11a enclosed by the outer walls of the housing 11, thus shortening the length of the exhaust pipe of the vacuum pump 12; in other embodiments, the accommodation shell 13 may also be placed above the housing 11 or at other corners in the first storage chamber 101, as long as the housing 11 and the accommodation shell 13 are disposed in the same storage chamber 101.

Embodiment 2

[0037] FIG. 3 is a modular structural view of a refrigerating device in Embodiment 2. Referring to FIG. 3, the structure of the refrigerating device provided in Embodiment 2 is substantially the same as that of the refrigerating device provided in Embodiment 1, and their difference lies in that: the exhaust of the vacuum pump 12 is not introduced into a first storage chamber 101 where the housing 11 is placed, but into a second storage chamber 102. Correspondingly, an exhaust pipe 14 is connected between the accommodation shell 13 and the second storage chamber 102 which is disposed outside the housing 11 and the accommodation shell 13. In other embodiments, the exhaust pipe 14 of an outlet end of the vacuum pump 12 in the accommodation shell 13 may also be directly introduced into the second storage chamber 102.

[0038] To facilitate arrangement, the exhaust pipe 14 is preferably a soft tube, the soft exhaust pipe 14 may be wrapped by a foaming liquid in the foaming process of the refrigerating device, and to prevent the foaming liquid from squeezing the soft tube, preferably, a hard tube is disposed outside some sections of the soft tube.

[0039] The second storage chamber 102 may be a refrigerating chamber, a fresh-keeping chamber or a freezing chamber. As stated in Embodiment 1, the low-tem-

perature gas discharged by the vacuum pump is directly introduced into the second storage chamber 102 which is specifically a refrigerating chamber or a fresh-keeping chamber, and energy consumption can be reduced. In this embodiment, when the second storage chamber 102 is a freezing chamber, its temperature is lower, when a user opens the door that closes the freezing chamber, outside air enters into the freezing chamber, the temperature of the entering normal-temperature gas is lowered in the freezing chamber, while the volume is unchanged, thus the pressure is reduced, this results in that the user needs great efforts to open the door next time he/she opens the door of the freezing chamber, and discharging the low-temperature gas discharged by the vacuum pump into the freezing chamber can increase the pressure in the freezing chamber, thus facilitating the user to open the door in the case of saving efforts.

[0040] In the case that there is no accommodation shell 13 and the vacuum pump 12 is directly housed in the first storage chamber 101 with the housing 11, an exhaust pipe 14 is connected between the second storage chamber 102 and the vacuum pump 12.

Embodiment 3

[0041] FIG. 4 is a modular structural view of a refrigerating device in Embodiment 3. Referring to FIG. 4, the structure of the refrigerating device provided in Embodiment 3 is substantially the same as that of the refrigerating device provided in Embodiment 1 or 2, and their difference lies in that: the exhaust of the vacuum pump 12 is not only introduced into a first storage chamber 101 where the housing 11 and the accommodation shell 13 are disposed, but also is introduced into a second storage chamber 102.

Correspondingly, an exhaust pipe 14 is connected between the accommodation shell 13 and the second storage chamber 102 which is disposed outside the housing 11 and the accommodation shell 13, and the exhaust pipe 14 is a Y-pipe or one-in-two-out valve. The Y-pipe or one-in-two-out valve introduces some exhaust into the first storage chamber 101 and some into the second storage chamber 102. In other embodiments, the exhaust pipe 14 of an outlet end of the vacuum pump 12 in the accommodation shell 13 may also be directly introduced into the first storage chamber 101 and the second storage chamber 102.

[0042] In the case that there is no accommodation shell 13 and the vacuum pump 12 is directly housed in the first storage chamber 101 with the housing 11, an exhaust pipe 14 is connected between the second storage chamber 102 and the vacuum pump 12, and the exhaust pipe 14 may also be a Y-pipe or one-in-two-out valve, which introduces some exhaust into the first storage chamber 101 and some into the second storage chamber 102.

[0043] In other embodiments, in addition to the first storage chamber 101 where the housing 11 and the accommodation shell 13 or the housing 11 and the vacuum

pump 12 are disposed, two or more other storage chambers are also included, and it is also feasible to discharge the exhaust of the vacuum pump 12 into the storage chambers through other structures.

Embodiment 4

[0044] FIG. 5 is a modular structural view of a refrigerating device in Embodiment 4. Referring to FIG. 5, in the refrigerating device of Embodiment 4, the vacuum pump 12 is not placed in the accommodation shell 13 which is located in the first storage chamber 101, but located in a compressor room 15, an exhaust pipe 14 of the vacuum pump is connected to a second storage chamber 102 outside the first storage chamber 101 where the housing 11 is disposed. In other embodiments, the number of the another storage chamber may also be two or more, and the exhaust pipe 14 of the vacuum pump may also be simultaneously connected to the first storage chamber 101 where the housing 11 is disposed, or only connected to the first storage chamber 101 where the housing 11 is disposed.

[0045] Although the present utility model is disclosed as above, the present utility model is not limited thereto. Any person skilled in the art can make various variations and modifications without departing from the spirit and scope of the present utility model, and thus the protection scope of the present utility model should be subject to the scope defined by the claims.

Claims

1. A refrigerating device (1), comprising at least two storage chambers (101, 102), a housing (11) defining an evacuable chamber (110) and a vacuum pump (12) used to evacuate the chamber (110), the housing (11) being disposed in one storage chamber (101), **characterized in that:**

exhaust of the vacuum pump (12) is introduced into at least one of the two storage chambers (101, 102).

2. The refrigerating device (1) according to claim 1, **characterized in that:** an exhaust pipe (14) of the vacuum pump (12) is connected to at least one of the two storage chambers (101, 102).
3. The refrigerating device (1) according to claim 1, **characterized in that:** the storage chambers (101, 102) into which the exhaust of the vacuum pump (12) is introduced are fresh-keeping chambers, refrigerating chambers or freezing chambers.
4. The refrigerating device (1) according to claim 1, **characterized in that:** the vacuum pump (12) and the housing (11) are placed in the same storage

chamber (101), and the storage chamber (101) accommodating the vacuum pump (12) and the housing (11) is a fresh-keeping chamber or refrigerating chamber.

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5. The refrigerating device (1) according to claim 1, **characterized in that:** the vacuum pump (12) is disposed in an accommodation shell (13), and the accommodation shell (13) and the housing (11) are placed in the same storage chamber (101).

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6. The refrigerating device (1) according to claim 5, **characterized in that:** a wall of the accommodation shell (13) has an opening (131), used for passing of the exhaust of the vacuum pump (12).

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7. The refrigerating device (1) according to claim 5, **characterized in that:** in the storage chambers (101, 102), an exhaust pipe (14) is connected between the accommodation shell (13) and the other storage chamber outside the one where the housing (11) and the accommodation shell (13) are placed.

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8. The refrigerating device (1) according to claim 7, **characterized in that:** the exhaust pipe (14) is a soft tube, and at least part of the soft tube is accommodated in a hard tube.

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9. The refrigerating device (1) according to claim 4, **characterized in that:** outer walls of the housing (11) enclose a recessed area (11 a) recessed towards the chamber (110), and the recessed area (11 a) is used to accommodate the vacuum pump (12).

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10. The refrigerating device (1) according to claim 9, **characterized in that:** the vacuum pump (12) is completely housed in the recessed area (11a).

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11. The refrigerating device (1) according to claim 5, **characterized in that:** outer walls of the housing (11) enclose a recessed area (11 a) recessed towards the chamber (110), and the recessed area (11 a) is used to accommodate the accommodation shell (13).

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12. The refrigerating device (1) according to claim 11, **characterized in that:** walls of the accommodation shell (13) and the outer walls of the housing (11) enclosing the recessed area (11 a) have gaps there between.

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13. The refrigerating device (1) according to claim 1, **characterized in that:** the refrigerating device (1) is a refrigerator, a freezer or a wine cabinet.

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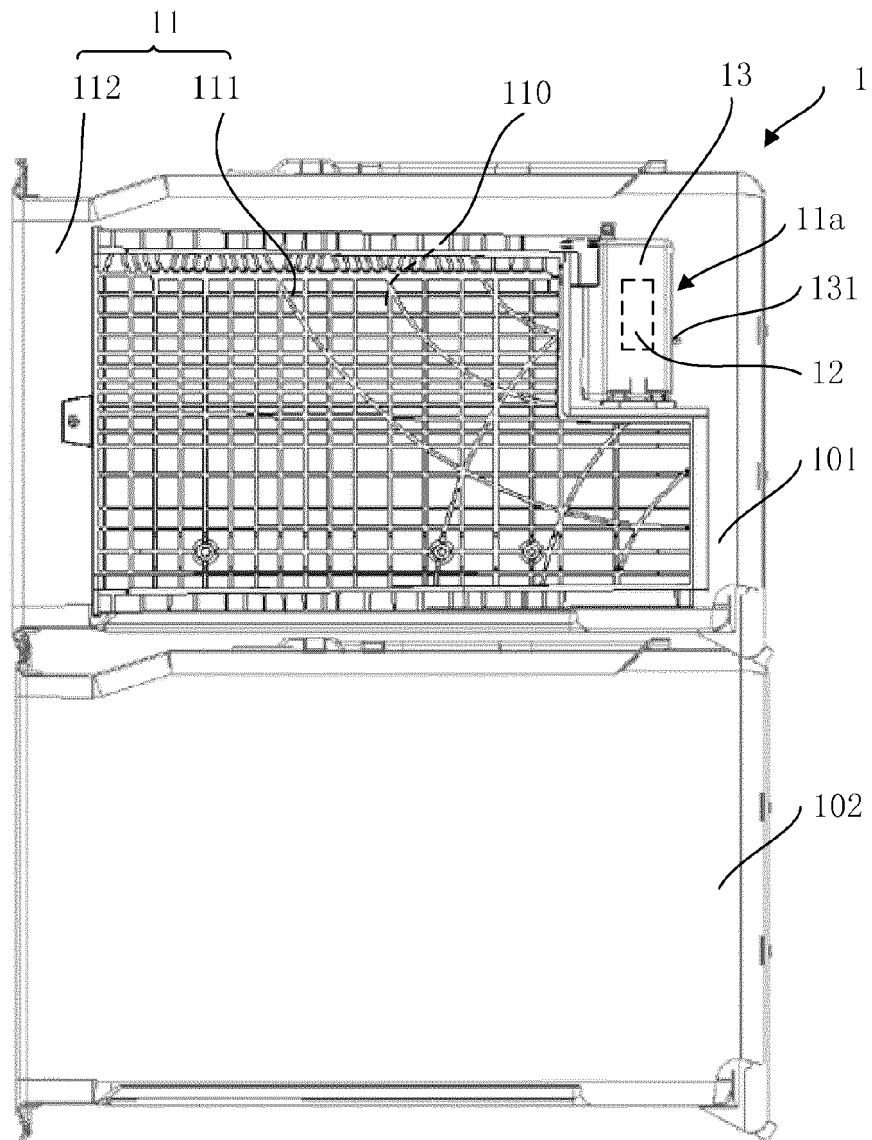


FIG. 1

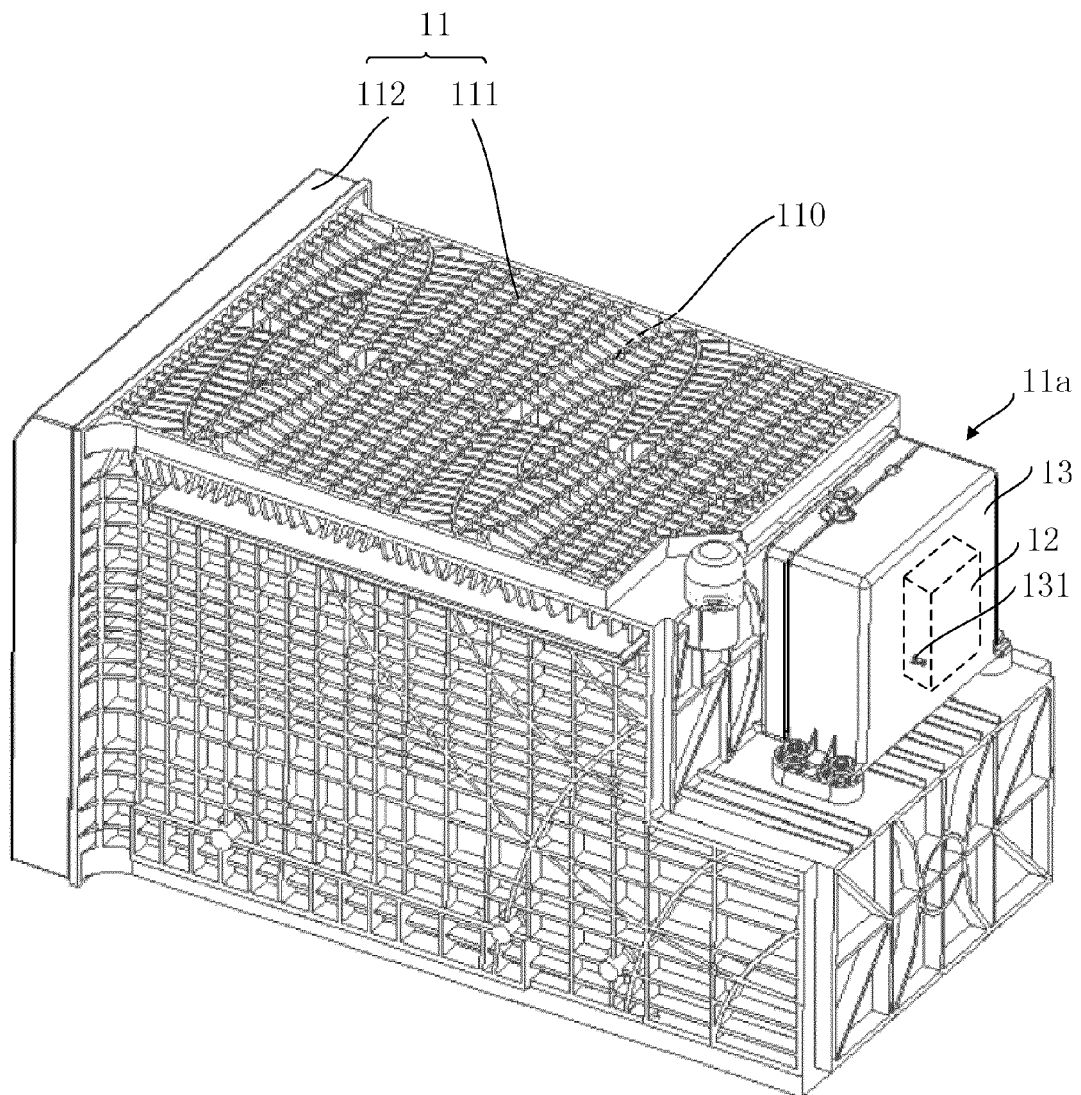


FIG. 2

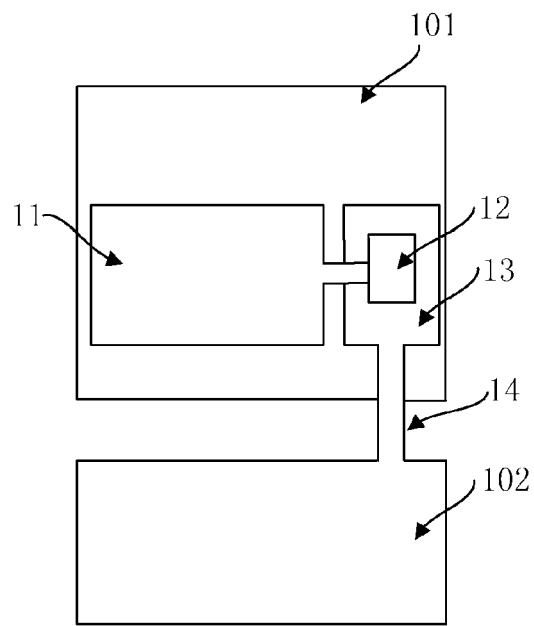


FIG. 3

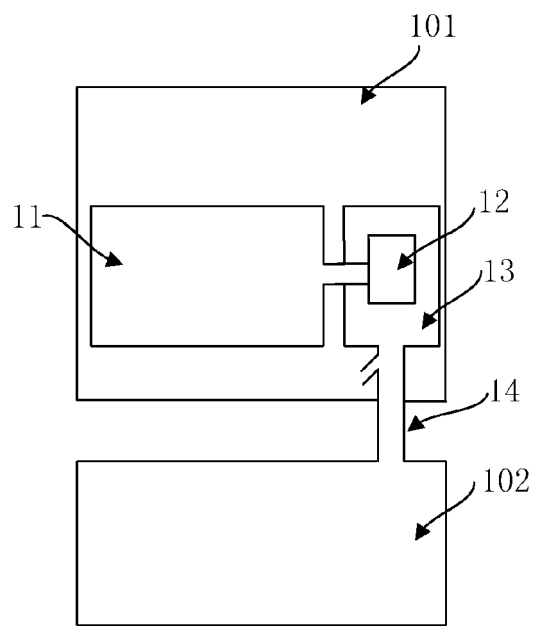


FIG. 4

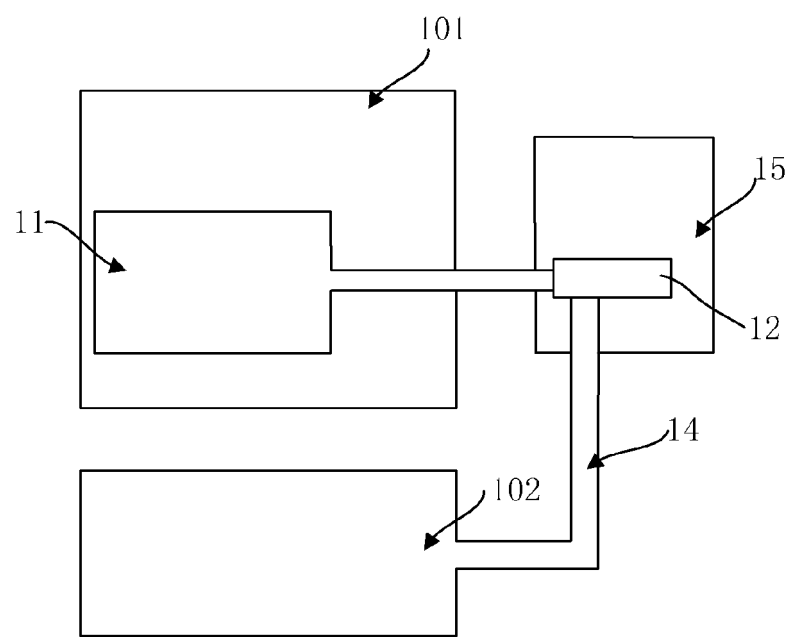


FIG. 5



EUROPEAN SEARCH REPORT

Application Number
EP 15 19 9330

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	JP 2004 251599 A (TOSHIBA CORP) 9 September 2004 (2004-09-09) * paragraphs [0021], [0036], [0087] * -----	1-13	INV. F25D23/04
X	JP 2009 036443 A (HITACHI APPLIANCES INC) 19 February 2009 (2009-02-19) * paragraph [0087]; figure 9 * -----	1	ADD. F25D11/02
			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		20 April 2016	Melo Sousa, Filipe
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EP 15 19 9330

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
JP 2004251599 A	09-09-2004	NONE	

JP 2009036443 A	19-02-2009	NONE	

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