



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

(43) Date of publication:
03.04.2019 Bulletin 2019/14

(51) Int Cl.:
F25D 19/00 ^(2006.01)

(21) Application number: **17896728.7**

(86) International application number:
PCT/CN2017/082520

(22) Date of filing: **28.04.2017**

(87) International publication number:
WO 2018/149032 (23.08.2018 Gazette 2018/34)

(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
Designated Validation States:
MA MD

(30) Priority: **15.02.2017 CN 201710080370**

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(54) **HEAT DISSIPATION ASSEMBLY AND REFRIGERATION DEVICE**

(57) Provided in the disclosure are a heat dissipation assembly and a refrigeration device. The heat dissipation assembly comprises: a base plate, having a fan arranged on one side thereof, and having a condenser arranged on the base plate; at least one fastener, arranged on the upper surface of the base plate and facing the condenser; and at least one first wind shield, arranged on the lower surface of the base plate. The heat dissipation assembly enable most of air in an airflow formed by the fan to flow through the condenser on the base plate and take away heat, air flowing through the lower portion of the base plate can be reduced by providing the at least one first wind shield on the lower surface of the base plate, so that the air flow, flow velocity loss, resistance, noise of the airflow in the flowing process are reduced; the utili-

zation efficiency of the fan air volume is improved; the heat dissipation area of the condenser is increased; the heat dissipation and heat exchange capacities of the condenser are improved; the supercooling degree of a refrigerant at an outlet of the condenser is increased; the refrigeration effect is improved. The utilization efficiency of the fan air volume is improved, the heat dissipation area of the condenser is increased, the heat dissipation and heat exchange capacities of the condenser are improved, the supercooling degree of a refrigerant at an outlet of the condenser is increased, the refrigeration effect is improved.

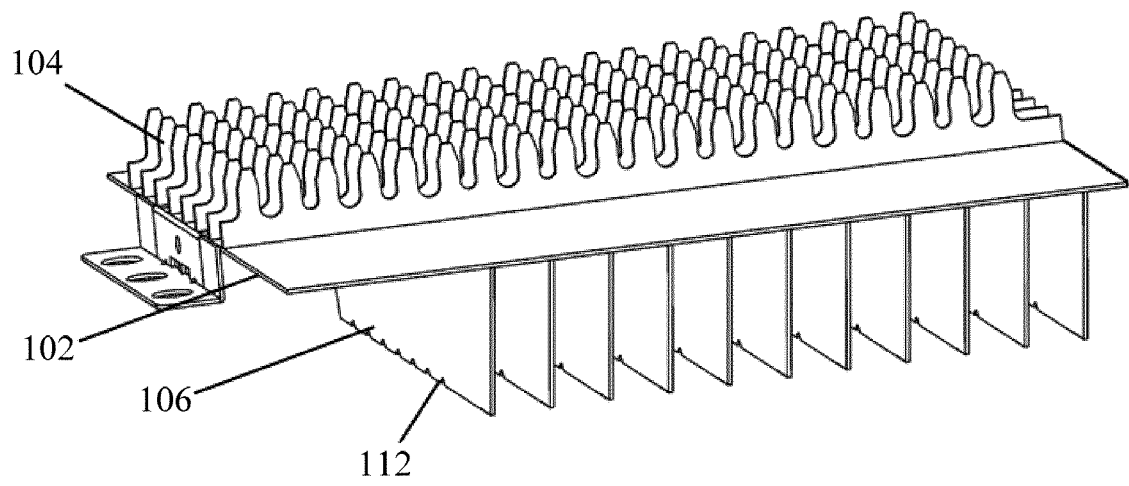


Fig. 1

Description

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority to Chinese Patent Application No. 201710080370.4, entitled "Heat dissipation assembly and refrigeration device" filed on February 15, 2017, which is hereby incorporated by reference in its entirety.

TECHNICAL FIELD

[0002] The present disclosure relates to the field of refrigeration technology, more particularly to a heat dissipation assembly and a refrigeration device.

BACKGROUND

[0003] Nowadays, the size of refrigerators is getting bigger and bigger, the requirement of energy consumption is getting higher and higher. In the compressor compartment with limited space, there are heat generating equipment such as the compressor and the condenser, the compressor compartment is ventilated and dissipated by the fan. In such a compact space, the key factor for improving the overall performance of the refrigerator is enhancing the heat dissipation effect, which is achieved by reducing flow resistance by means of a reasonable flow path design.

[0004] At present, the main equipment inside the compressor compartment mainly comprises a compressor, a condenser, a condenser fan, generally, the condenser is a tube-and-fin type. As the energy source of the whole refrigeration system, the compressor compresses a low-temperature and low-pressure refrigerant into a high-temperature and high-pressure superheated air by the movement of a rotational mechanical action, a large amount of heat is generated in this process. The high-temperature and high-pressure refrigerant superheated air is discharged from an outlet of the compressor, entered into the condenser and subjected to forced air convection heat exchange with the surrounding air by means of a condensing fan. In such a narrow space, the heat exchanging efficiency of the compressor and the condenser directly affect the refrigeration performance of the entire refrigerator system. At the same time, both the compressor and the condensing fan are rotating machines that generate noise during operation, wherein the compressor mainly generates vibration noise and the condensing fan mainly generates pneumatic noise. The noise level of the compressor and condensing fan will directly affect the noise performance of the whole machine.

[0005] Due to the limited space, the existing refrigerator products have problems of insufficient heat dissipation capacity and high noise level:

There is a problem with the heat dissipation of the compressor. Due to the influence of the spatial layout and

the air-flow field, on a leeward side of the compressor, the amount of heat carried by the air is reduced due to a reduced flow rate, thus the heat cannot be effectively dissipated.

[0006] There is a problem in the heat dissipation of the condenser. Due to the limited space and the structure of the condenser itself, when the air flows through the condenser, the air resistance is large, the flow rate is lowered, the heat dissipation performance is reduced.

[0007] The compressor generates vibration noise when compressing the refrigerant from a low-temperature and a low-pressure state to a high-temperature and a high-pressure state by means of a rotating structure, which is the main source of refrigerator noise and seriously affects the noise performance of the refrigerator.

[0008] The flow is lost due to a portion of the air flowing through the space below the condenser.

SUMMARY

[0009] In order to solve at least one of the above technical problems, the embodiment of a first aspect of the present disclosure provides a heat dissipation assembly.

[0010] The embodiment of a second aspect of the present disclosure provides a refrigeration device. In this regard, according to an embodiment of the first aspect of the present disclosure, there is provided in the present disclosure a heat dissipation assembly used for the refrigeration device. The refrigeration device comprises a condenser and a fan, wherein the heat dissipation assembly comprises: a base plate, having a fan arranged on one side thereof, and having the condenser arranged on the base plate; at least one fastener, arranged on the upper surface of the base plate and facing one side of the condenser; at least one first wind shield, arranged on the lower surface of the base plate.

[0011] The heat dissipation assembly provided in the present disclosure can enable most of air in an airflow formed by the fan to flow through the condenser on the base plate and take away heat, air flowing through a lower portion of the base plate can be reduced by providing the at least one first wind shield on the lower surface of the base plate, so that the air flow, flow velocity loss, resistance, noise of the airflow in the flowing process are reduced, the utilization efficiency of the fan air volume is improved, the heat dissipation area of the condenser is increased, the heat dissipation and heat exchange capacities of the condenser are improved, the supercooling degree of a refrigerant at an outlet of the condenser is increased, the refrigeration effect is improved.

[0012] In addition, the heat dissipation assembly in the above embodiment provided in the present disclosure may further have the following additional technical features:

In the above technical solution, preferably, the heat dissipation assembly further comprising: at least one second wind shield, arranged on the lower surface of the base plate, the at least one second wind shield being

provided with ventilation holes; wherein, the at least one second wind shield and the at least one first wind shield are sequentially arranged on the base plate along an air-flow direction generated by the fan.

[0013] In the technical solution, by providing the at least one second wind shield with the ventilation holes on the lower surface of the base plate, the airflow can flow through the at least one second wind shield via the ventilation holes and be subjected to full convection between the at least one first wind shield and the at least one second wind shield, which further remove the heat of the condenser and improving the heat exchange effect on the condenser.

[0014] In any one of the above technical solutions, preferably, the number of the at least one second wind shield is plural; along the air-flow direction generated by the fan, a cross-sectional area of the ventilation holes on the at least one second wind shield of a rear side is smaller than the cross-sectional area of the ventilation holes on the at least one second wind shield of a front side.

[0015] In the technical solution, by providing the plurality of the at least one second wind shield, with the design that the cross-sectional areas of the ventilation holes on each of the at least one second wind shield along the air-flow direction generated by the fan are gradually reduced, the airflow can be fully mixed and convected when flowing through each at least one second wind shield, so that and the heat exchange effect of the condenser is further improved.

[0016] In any one of the above technical solutions, preferably, an angle between a line connecting geometric centers of the ventilation holes of two adjacent second wind shield and the base plate ranges from 30° to 45°.

[0017] In the technical solution, the angle between the line connecting geometric centers of the ventilation holes of two adjacent the at least one second wind shield and the base plate ranges from 30° to 45°, which means that the ventilation holes on the adjacent the at least one second wind shield are arranged in a staggered manner. This allows that a stronger convection effect can be produced as the air flows through the ventilation holes on each of the at least one second wind shield, so that the air can be more fully contacted with the at least one second wind shield to exchange heat, thereby taking more heat from the condenser, achieving better heat exchange effect for the condenser and improving the cooling efficiency.

[0018] In any one of the above technical solutions, preferably, the ventilation holes are circular or polygonal.

[0019] In the technical solution, the ventilation hole can be circular or polygonal, since a regular and common shape of the ventilation hole helps to simplify the production of the at least one second wind shield and increase production efficiency. A polygonal hole can be a triangular hole or a square hole or the like.

[0020] In any one of the above technical solutions, preferably, a distance between the at least one first wind shield and the adjacent at least one second wind shield

ranges from 1 mm to 50 mm; a distance between two adjacent at least one second wind shield ranges from 1 mm to 50 mm.

[0021] In the technical solution, the distance between the at least one first wind shield and the adjacent at least one second wind shield and/or the distance between the two adjacent second wind shields ranges from 1 mm to 50 mm. The number, position and distribution of the at least one first wind shield and the at least one second wind shield are reasonably arranged, so that the airflow flowing through can be fully mixed and convected to exchange heat with the condenser, which improve the heat exchange efficiency of the condenser.

[0022] In any one of the above technical solutions, preferably, the heat dissipation assembly further comprising: a water pan arranged below the base plate; a distance between a bottom of the at least one first wind shield and/or the at least one second wind shield and the water pan ranges from 1 mm to 10 mm.

[0023] In the technical solution, the water pan arranged below the base plate can collect water droplets generated by the condenser and other components located above the water pan to prevent the accumulated water from flowing to other components or flowing out of the refrigeration device; meanwhile, the distance between the bottom of the at least one first wind shield and/or the at least one second wind shield and the water pan ranges from 1 mm to 10 mm. The water in the water pan can also dissipate heat from the at least one first wind shield and the at least one second wind shield, which indirectly exchanges heat for the condenser, improves heat exchange efficiency, further improves refrigeration efficiency.

[0024] In any one of the above technical solutions, preferably, a bottom of the at least one first wind shield and/or a bottom of the at least one second wind shield are/is arranged with a notch.

[0025] In the technical solution, by arranging the notch at the bottom of the at least one first wind shield and/or the at least one second wind shield, a part of the air can be divided to enhance the convection of the air between the wind shields, to improve heat exchange efficiency; at the same time, the notch facilitates the flow of water in the water pan and avoids the accumulation of water between the wind shields.

[0026] In any one of the above technical solutions, preferably, an upper portion of the water pan is arranged with an overflow port.

[0027] In the technical solution, by providing the overflow port at the upper portion of the water pan, it is possible to drain the water in time when the water level in the water pan is too high.

[0028] In any one of the above technical solutions, preferably, at least one fastener comprises a plurality of fastening fins; and a condenser tube of the condenser is arranged between the fastening fins.

[0029] In the technical solution, by providing the fastening fins to fix the condenser tube of the condenser,

the space between each condenser tube is increased, the heat exchange efficiency of the airflow to the condenser tube is increased, the contact area between the fastening fin and the condenser tube can be increased, the heat exchange of the condenser is also facilitated.

[0030] In any one of the above technical solutions, preferably, the fastening fins are arranged in parallel.

[0031] In the technical solution, a plurality of fastening fins are arranged in parallel with each other, so that the plurality of fastening fins can better fix the condenser tube, so as to improve stability and facilitate the fastening fins to be accommodated to shape changes of the condenser tube.

[0032] In any one of the above technical solutions, preferably, the fastening fins are provided with a plurality of U-shaped mounting slots, the condenser tube is provided in the mounting slots.

[0033] In the technical solution, the condenser tube is fixed by means of the U-shaped mounting slots on the fastening fins to ensure stable fixing of the condenser tube and to facilitate installation and arrangement of the condenser tube.

[0034] A refrigeration device provided by the second aspect of the embodiments of the present disclosure comprises the heat dissipation assembly of the first aspect of the embodiments.

[0035] According to the refrigeration device provided by the present disclosure, by providing the heat dissipating assembly of the first aspect of the embodiments below the condenser, most of air in an airflow formed by the fan is enabled to flow through the condenser on the base plate and take away heat, air flowing through the lower portion of the base plate can be reduced by providing the at least one first wind shield on the lower surface of the base plate, so that the air flow, flow velocity loss, resistance, noise of the airflow in the flow process are reduced, the utilization efficiency of the fan air volume is improved, the heat dissipation area of the condenser is increased, the heat dissipation and heat exchange capacities of the condenser are improved, the supercooling degree of a refrigerant at an outlet of the condenser is increased, the refrigeration effect is improved. At the same time, power consumption of the compressor is reduced, energy saved.

[0036] In addition, the refrigeration device in the above embodiments provided in the present disclosure may further have the following additional technical features:

In the above technical solution, preferably, the refrigeration device further comprises: a fan, arranged on one side of the base plate; a condenser, arranged on the at least one fastener; a compressor, wherein the condenser and the compressor are arranged on both sides of the fan respectively.

[0037] In the technical solution, the condenser and the compressor are arranged on both sides of the fan respectively, the air flowing through the condenser continues to exchange heat with the compressor to cool the compressor. Such an arrangement makes the compo-

nents in the refrigeration device more compact. By providing the fan, the heat exchange and cooling for both the condenser and the compressor can be realized simultaneously, the power consumption of the refrigeration device is reduced, energy is saved.

[0038] In the above technical solution, preferably, the refrigeration device further comprises: a compressor compartment assembly comprising a compressor compartment base, wherein a water outlet is arranged on the compressor compartment base, the heat dissipation assembly, the fan, the condenser, the compressor are arranged inside the compressor compartment assembly.

[0039] In the technical solution, the heat dissipation assembly, the fan, the condenser, the compressor are arranged inside the compressor compartment assembly. Typically, the compressor compartment assembly is arranged at the bottom of the refrigerator, such a centralized arrangement facilitates the installation, management and maintenance of the refrigerator. In addition, excess condensed water or accumulated water in the condenser or the water pan can be discharged by means of the water outlet arranged on the compressor compartment base.

[0040] In the above technical solution, preferably, the compressor comprises a rotational speed detecting device for detecting a rotational speed of the compressor; the fan comprises a rotational speed control device, which is connected to the rotational speed detecting device and is configured to control the rotational speed of the fan according to the rotational speed of the compressor.

[0041] In the technical solution, the rotational speed of the fan can be adjusted according to the rotational speed of the compressor. For example, when the speed of the compressor rises, it indicates that the refrigerator is operating at a high load, it is necessary to dissipate heat more efficiently for the compressor and the condenser. At this time, the speed of the fan can be increased to improve the heat dissipation capability; when the speed of the compressor is reduced or the compressor is stopped, the fan speed can be appropriately reduced at this time to save energy.

[0042] In any of the above technical solutions, preferably, the refrigeration device is selected from the group consisting of: a refrigerator, a freezer, an air conditioner.

[0043] In the technical solution, the refrigerator, the freezer or the air conditioner can reduce the flow rate and the flow velocity loss of the airflow by using the above-mentioned heat dissipation assembly, so as to improve heat exchange efficiency of the condenser and refrigeration efficiency of the refrigeration device, save energy. At the same time, the speed and power consumption of the compressor can also be reduced due to the increase of the heat exchange efficiency of the condenser, thereby reducing the noise generated by the compressor.

[0044] Additional aspects and advantages of the disclosure will partly become apparent in the following description or be appreciated in practicing of the disclosure.

BRIEF DESCRIPTION OF THE DRAWINGS

[0045] The above and/or additional aspects and advantages of the present disclosure will become apparent and easy to understand by describing the embodiments thereof with reference to the accompanying drawings, in which:

Fig. 1 is a schematic structural view of the heat dissipation assembly in an embodiment of the present disclosure;

Fig. 2 is a schematic structural view of an embodiment of the present disclosure;

Fig. 3 is a schematic diagram showing an air velocity vector distribution when the structure shown in Fig. 2 is operated;

Fig. 4 is a schematic structural view of an embodiment of the present disclosure;

Fig. 5 is a schematic structural view of the heat dissipation assembly in an embodiment of the present disclosure;

Fig. 6 is a side view of the structure shown in Fig. 5;

Fig. 7 is a schematic structural view of an embodiment of the present disclosure;

Fig. 8 is a rear view of the refrigerator in an embodiment of the present disclosure;

Fig. 9 is a perspective view of a refrigerator in an embodiment of the present disclosure.

[0046] The correspondence between the reference numerals and the component names in Fig. 1 to Fig. 9 is as follows:

1: heat dissipation assembly; 102: base plate; 104: at least one fastener; 106: at least one first wind shield; 108: at least one second wind shield; 1082: ventilation hole; 110: water pan; 112: notch; 202: condenser; 204: fan; 206: compressor; 208: compressor compartment base; 210: air leakage passage; 30: compressor compartment assembly; 40: centrifugal fan assembly; 50: rear cover assembly; 60: front cover assembly; 70: refrigerated air duct assembly; 8: refrigerator; 82: control display screen.

DETAILED DESCRIPTION

[0047] To enable the above objects, features and advantages of the present disclosure to be better understood, the disclosure will be further described in detail with the accompanying drawings and specific embodiments. It should be noted that the embodiments and the characteristics of the embodiments can be combined if no conflict is caused.

[0048] In the following description, numerous specific details are set forth in order to provide a thorough understanding of the disclosure. However, the present disclosure may be embodied in other specific forms than those described herein. Therefore, the scope of the present disclosure is not limited by the specific embodiments disclosed below.

[0049] The heat dissipation assembly and the refrigeration device according to some embodiments of the present disclosure will be described with reference to Fig. 1 to Fig. 9.

[0050] As shown in Fig. 1 to Fig. 4, there is provided in the present disclosure a heat dissipation assembly 1 used for the refrigeration device. The refrigeration device comprising a condenser 202 and a fan 204, wherein the heat dissipation assembly 1 comprises: a base plate 102, having a fan 204 arranged on one side thereof, and having a condenser 202 arranged on the base plate 102; at least one fastener 104 arranged on the upper surface of the base plate 102 and facing one side of the condenser 202; at least one first wind shield 106, arranged on the lower surface of the base plate 102.

[0051] The heat dissipation assembly 1 provided in the present disclosure as shown in Fig. 1 can be applied to the structure shown in Fig. 2 to Fig. 4, can enable most of air in an airflow formed by the fan 204 to flow through the condenser 202 on the base plate 102 and take away heat, air flowing through a lower portion of the base plate 102 can be reduced by providing the at least one first wind shield 106 on the lower surface of the base plate 102, so that the air flow, flow velocity loss, resistance, noise of the airflow in the flowing process are reduced, the utilization efficiency of the fan 204 air volume is improved, the heat dissipation area of the condenser 202 is increased, the heat dissipation and heat exchange capacities of the condenser 202 are improved, the super-cooling degree of a refrigerant at an outlet of the condenser is increased, the refrigeration effect is improved. At the same time, the rotational speed and power consumption of the compressor 206 can also be reduced due to the increase of the heat exchange efficiency of the condenser 202, thereby reducing the noise generated by the compressor 206 and saving energy. As shown in Fig. 3, most of the flowing air formed by the fan 204 flows through the condenser 202 and dissipates heat thereof, the air flow through an air leakage passage 210 arranged below the condenser 202 is small. This ensures that as much air as possible passes through the condenser 202 and carries away the heat thereof, reducing the amount of ineffective air flowing through the air leakage passage 210, improving the work efficiency of the fan 204 and the condenser 202. As shown in Fig. 2 and Fig. 4, in the refrigeration device adopting the heat dissipating assembly 1, the compressor 206 arranged on the compressor compartment base 208 can be placed behind the fan 204. This allows the flowing air to also dissipate heat from the compressor 206, ensuring safe use and the work efficiency of the compressor 206.

[0052] In one embodiment of the present disclosure, preferably, as shown in Fig. 5 to Fig. 7, the heat dissipation assembly further comprising: at least one second wind shield 108, arranged on the lower surface of the base plate 102, the at least one second wind shield 108 being arranged with ventilation holes 1082; wherein, the at least one second wind shield 108 and the at least one

first wind shield 106 are sequentially arranged on the base plate 102 along an air-flow direction generated by the fan 204.

[0053] In the embodiment, by providing the at least one second wind shield 108 with the ventilation holes 1082 on the lower surface of the base plate 102, the airflow can flow through the at least one second wind shield 108 via the ventilation holes 1082 and be subjected to full convection between the at least one first wind shield 106 and the at least one second wind shield 108, which further remove the heat of the condenser 202 and improving the heat exchange effect on the condenser 202. The at least one second wind shield 108 and the at least one first wind shield 106 can be sequentially arranged along the air-flow direction generated by the fan 204, the number and position of the two can be adjusted according to actual needs.

[0054] In one embodiment of the present disclosure, preferably, as shown in Fig. 5 and Fig. 6, the number of the at least one second wind shield 108 is plural; along the air-flow direction generated by the fan 204, a cross-sectional area of the ventilation holes 1082 on the at least one second wind shield 108 of a rear side is smaller than the cross-sectional area of the ventilation holes 1082 on the at least one second wind shield 108 of a front side.

[0055] In the embodiment, by providing the plurality of second wind shield 108, with the design that the cross-sectional areas of the ventilation holes 1082 on each of the at least one second wind shield 108 along the air-flow direction generated by the fan 204 are gradually reduced, the airflow can be fully mixed and convected when flowing through each of the at least one second wind shield 108, so that and the heat exchange effect of the condenser 202 is further improved.

[0056] In one embodiment of the present disclosure, preferably, an angle between a line connecting geometric centers of the ventilation holes 1082 of two adjacent second wind shields 108 and the base plate 102 ranges from 30° to 45°.

[0057] In the embodiment, the angle between the line connecting geometric centers of the ventilation holes 1082 of two adjacent second wind shields 108 and the base plate 102 ranges from 30° to 45°, which means that the ventilation holes 1082 on the adjacent at least one second wind shield 108 are arranged in a staggered manner. This allows that a stronger convection effect can be produced as the air flows through the ventilation holes 1082 on each of the at least one second wind shield 108, so that the air can be more fully contacted with the at least one second wind shield 108 to exchange heat, thereby taking more heat from the condenser 202, achieving better heat exchange effect for the condenser 202 and improving the cooling efficiency.

[0058] In one embodiment of the present disclosure, preferably, as shown in Fig. 5 to Fig. 7, the ventilation holes are circular or polygonal.

[0059] In the embodiment, the ventilation holes can be circular or polygonal, since a regular and common shape

of the ventilation holes can help simplify the production of the at least one second wind shield 108 and increase production efficiency. The polygonal hole can be a triangular hole or a square hole or the like.

[0060] In one embodiment of the present disclosure, preferably, as shown in Fig. 5, a distance between the at least one first wind shield 106 and the adjacent at least one second wind shields 108 ranges from 1 mm to 50 mm; a distance between two adjacent at least one second wind shields 108 ranges from 1 mm to 50 mm.

[0061] In the embodiment, the distance between the at least one first wind shield 106 and the adjacent second wind shields 108 and/or the distance between the two adjacent second wind shields 108 ranges from 1 mm to 50 mm. The number, position and distribution of the at least one first wind shield 106 and the at least one second wind shield 108 are reasonably arranged, so that the air-flow flowing through can be fully mixed and convected to exchange heat with the condenser 202, which improve the heat exchange efficiency of the condenser 202.

[0062] In one embodiment of the present disclosure, preferably, as shown in Fig. 2, Fig. 4, Fig. 7, the heat dissipation assembly further comprises: a water pan 110 arranged below the base plate 102, wherein a distance between a bottom of the at least one first wind shield 106 and/or the at least one second wind shield 108 and the water pan 110 ranges from 1 mm to 10 mm.

[0063] In the embodiment, the water pan 110 arranged below the base plate 102 can collect water droplets generated by the condenser 202 and other components located above the water pan to prevent the accumulated water from flowing to other components or flowing out of the refrigeration device; meanwhile, the distance between the bottom of the at least one first wind shield 106 and/or the at least one second wind shield 108 and the water pan 110 ranges from 1 mm to 10 mm. The water in the water pan 110 can also dissipate heat from the at least one first wind shield 106 and the at least one second wind shield 108, which indirectly exchanges heat for the condenser 202, improves heat exchange efficiency, further improves refrigeration efficiency.

[0064] In one embodiment of the present disclosure, preferably, as shown in Fig. 1, Fig. 5, Fig. 6, a bottom of the at least one first wind shield 106 and/or a bottom of the at least one second wind shield 108 are/is provided with a notch 112.

[0065] In the embodiment, by providing the notch at the bottom of the at least one first wind shield 106 and/or the at least one second wind shield 108, a part of the air can be divided to enhance the convection of the air between the wind shields, to improve heat exchange efficiency; at the same time, the notch facilitates the flow of water in the water pan 110 and avoids the accumulation of water between the wind shields.

[0066] In one embodiment of the present disclosure, preferably, an upper portion of the water pan 110 is provided with an overflow port.

[0067] In the embodiment, by providing the overflow

port at the upper portion of the water pan 110, it is possible to drain the water in time when the water level in the water pan 110 is too high.

[0068] In one embodiment of the present disclosure, preferably, as shown in Fig. 1, Fig. 2, Fig. 4, Fig. 6, the at least one fastener 104 comprises a plurality of fastening fins; and a condenser tube of the condenser 202 is arranged between the fastening fins.

[0069] In the embodiment, by providing the fastening fins to fix the condenser tube of the condenser 202, the space between each condenser tube is increased, the heat exchange efficiency of the airflow to the condenser tube is increased, the contact area between the fastening fin and the condenser tube can be increased, the heat exchange of the condenser 202 is also facilitated.

[0070] In any one embodiment of the present disclosure, preferably, as shown in Fig. 1, Fig. 2, Fig. 4, Fig. 6, the fastening fins are arranged in parallel.

[0071] In the embodiment, the plurality of fastening fins are arranged in parallel with each other, so that the plurality of fastening fins can better fix the condenser tube, so as to improve stability and facilitate the fastening fins to be accommodated to shape changes of the condenser tube.

[0072] In an embodiment of the present disclosure, preferably, as shown in Fig. 1, Fig. 2, Fig. 4 to Fig. 6, the fastening fins are arranged with a plurality of U-shaped mounting slots, the condenser tube is arranged in the mounting slots.

[0073] In the embodiment, the condenser tube is fixed by means of the U-shaped mounting slots on the fastening fins to ensure stable fixing of the condenser tube and to facilitate installation and arrangement of the condenser tube.

[0074] Also provided in the present disclosure is a refrigeration device, as shown in Fig. 2, Fig. 4, Fig. 7, comprising the heat dissipation assembly 1 of the first aspect of the embodiments.

[0075] According to the refrigeration device provided by the present disclosure, by providing the heat dissipating assembly 1 of the first aspect of the embodiments below the condenser 202, most of air in an airflow formed by the fan 204 is enabled to flow through the condenser 202 on the base plate 102 and take away heat, air flowing through a lower portion of the base plate 102 can be reduced by providing the at least one first wind shield 106 on the lower surface of the base plate 102, so that the air flow, flow velocity loss, resistance, noise of the airflow in the flowing process are reduced, the utilization efficiency of the fan 204 air volume is improved, the heat dissipation area of the condenser 202 is increased, the heat dissipation and heat exchange capacities of the condenser 202 are improved, the supercooling degree of a refrigerant at an outlet of the condenser is increased, the refrigeration effect is improved. At the same time, the power consumption of the compressor 206 is also reduced, energy is saved.

[0076] In one embodiment of the present disclosure,

preferably, as shown in Fig. 2 and Fig. 4, the refrigeration device further comprises: a fan 204, arranged on one side of the base plate 102; a condenser 202, arranged on the at least one fastener 104; a compressor 206, wherein the condenser 202 and the compressor 206 are provided on both sides of the fan 204 respectively.

[0077] In the embodiment, the condenser 202 and the compressor 206 are respectively located on both sides of the fan 204, the air flowing through the condenser 202 continues to exchange heat with the compressor 206 to cool the compressor 206. Such an arrangement makes the components in the refrigeration device more compact. By providing the fan 204, the heat exchange and cooling for both the condenser 202 and the compressor 206 can be realized simultaneously, the power consumption of the refrigeration device is reduced, energy is saved.

[0078] In one embodiment of the present disclosure, preferably, as shown in Fig. 8, the refrigeration device further comprises: a compressor compartment assembly 30 comprising a compressor compartment base 208, wherein a water outlet is arranged on the compressor compartment base 208, the heat dissipation assembly 1, the fan 204, the condenser 202, the compressor 206 are arranged inside the compressor compartment assembly 30.

[0079] In the embodiment, the heat dissipation assembly 1, the fan 204, the condenser 202, the compressor 206 are arranged inside the compressor compartment assembly 30. Typically, the compressor compartment assembly 30 is arranged at the bottom of the refrigerator 8, such a centralized arrangement facilitates the installation, management and maintenance of the refrigerator. In addition, excess condensed water or accumulated water in the condenser 202 or the water pan 110 can be discharged by means of the water outlet arranged on the compressor compartment base.

[0080] In one embodiment of the disclosure, preferably, the compressor 206 comprises a rotational speed detecting device for detecting a rotational speed of the compressor 206; the fan 204 comprises a rotational speed control device, which is connected to the rotational speed detecting device and is configured to control the rotational speed of the fan 204 according to the rotational speed of the compressor 206.

[0081] In the embodiment, the rotational speed of the fan 204 can be adjusted according to the rotational speed of the compressor 206. For example, when the speed of the compressor 206 rises, it indicates that the refrigerator 8 is operating at a high load, it is necessary to dissipate heat more efficiently for the compressor 206 and the condenser 202. At this time, the speed of the fan 204 can be increased to improve the heat dissipation capability; when the speed of the compressor 206 is reduced or the compressor 206 is stopped, the fan 204 speed can be appropriately reduced at this time to save energy.

[0082] In one embodiment of the present disclosure, preferably, the refrigeration device is selected from the

group consisting of: a refrigerator, a freezer, an air conditioner.

[0083] In the embodiment, the refrigerator, the freezer or the air conditioner can reduce the flow rate and the flow velocity loss of the airflow by using the above-mentioned heat dissipation assembly 1, so as to improve heat exchange efficiency of the condenser 202 and refrigeration efficiency of the refrigeration device, save energy. At the same time, the speed and power consumption of the compressor 206 can also be reduced due to the increase of the heat exchange efficiency of the condenser 202, thereby reducing the noise generated by the compressor 206.

[0084] In one embodiment of the present disclosure, preferably, as shown in Fig. 8, the refrigeration system of the refrigerator comprises the compressor and the condenser (arranged inside the compressor compartment assembly 30), an evaporator, a centrifugal fan assembly 40 (arranged between a rear cover assembly 50 and a front cover assembly 60), a refrigerated air duct assembly 70, a refrigerator liner (comprising the refrigeration compartment), wherein refrigerant and air are circulated in various parts of the refrigeration system to cool the food in the refrigerator. With the heat dissipating assembly provided in the present disclosure, ineffective air volume when the air passes through the condenser 202 can be effectively reduced, the working efficiency of the condenser 202 and the fan 204 is improved, the cooling efficiency and the cooling performance of the refrigerator 8 are also improved.

[0085] In one embodiment of the present disclosure, preferably, as shown in Fig. 9, the refrigerator 8 further comprises a control display screen 82. A working state of the refrigerator 8 can be set by controlling the display screen 82. For example, the cooling temperature of the freezer compartment and the refrigerating compartment in the refrigerator 8 can be set. It is also possible to temporarily stop cooling for a certain refrigeration compartment and the like. By setting the control display screen 82 for controlling the refrigerator 8, the intelligence degree of the refrigerator 8 is improved, so that the refrigerator 8 can more satisfy the user's needs.

[0086] According to the heat dissipating assembly and the refrigerating device provided in the present disclosure, ineffective ventilation that does not cool the condenser is reduced, so that the heat exchange efficiency of the condenser and the efficiency of the fan are increased, the supercooling degree of the refrigerant at the outlet of the condenser is increased, the refrigeration effect is improved. At the same time, the rotational speed and power consumption of the compressor can also be reduced due to the increase of the heat exchange efficiency of the condenser, thereby reducing the noise generated by the compressor and saving energy.

[0087] In the present disclosure, the term "plurality" means two or more, unless specifically defined otherwise. The terms "installation", "connection", "connected", and "fixed" should be understood broadly. For example,

the "connection" may indicate a fixed connection, a detachable connection, or an integral connection; "connected" may indicate being directly connected or being indirectly connected by means of an intermediate medium.

The specific meanings of the above terms in the present disclosure can be understood by those skilled in the art on a case-by-case basis.

[0088] Reference throughout this specification to "one embodiment", "some embodiments", "specific embodiments" and the like means that the specific features, structures, materials or characteristics described in connection with the embodiment or example is included in at least some embodiments of the present disclosure. In the present specification, schematic representations of the above terms are not necessarily referring to the same embodiment or example. Meanwhile, the particular features, structures, materials or characteristics may be combined in any suitable manner with one or more other embodiments.

What stated above are merely preferred embodiments of the present disclosure but are not used to limit the present disclosure. It will be apparent to those skilled in the art that various modifications and variations can be made in the present disclosure. Any modification, equivalent alternative, or improvement inside the spirit and principle of the disclosure should be included in the scope of the disclosure.

Claims

1. A heat dissipation assembly for a refrigeration device, the refrigeration device comprising a condenser and a fan, wherein the heat dissipation assembly comprises:

a base plate, having the fan arranged on one side thereof, and having the condenser arranged on the base plate;

at least one fastener, arranged on the upper surface of the base plate and facing one side of the condenser; and

at least one first wind shield, arranged on the lower surface of the base plate.

2. The heat dissipation assembly according to claim 1, further comprising:

at least one second wind shield, arranged on the lower surface of the base plate, the at least one second wind shield being arranged with ventilation holes, wherein,

the at least one second wind shield and the at least one first wind shield are sequentially arranged on the base plate along an air-flow direction generated by the fan.

3. The heat dissipation assembly according to claim 2,

- wherein,
the number of the at least one second wind shield is plural;
along the air-flow direction generated by the fan, a cross-sectional area of the ventilation holes on the at least one second wind shield of a rear side is smaller than the cross-sectional area of the ventilation holes on the at least one second wind shield of a front side.
4. The heat dissipation assembly according to claim 3, wherein,
an angle between a line connecting geometric centers of the ventilation holes of two adjacent second wind shields and the base plate ranges from 30° to 45°.
5. The heat dissipation assembly according to claim 3, wherein,
the ventilation holes are circular or polygonal.
6. The heat dissipation assembly according to any one of claims 1 to 5, wherein,
a distance between the at least one first wind shield and the adjacent at least one second wind shield ranges from 1 mm to 50 mm;
a distance between two adjacent at least one second wind shield ranges from 1 mm to 50 mm.
7. The heat dissipation assembly according to any one of claims 1 to 5, further comprising:

a water pan arranged below the base plate, wherein
a distance between a bottom of the at least one first wind shield and/or the at least one second wind shield and the water pan ranges from 1 mm to 10 mm.
8. The heat dissipation assembly according to claim 7, wherein,
a bottom of the at least one first wind shield and/or a bottom of the at least one second wind shield are/is arranged with a notch.
9. The heat dissipation assembly according to claim 7, wherein,
an upper portion of the water pan is arranged with an overflow port.
10. The heat dissipation assembly according to any one of claims 1 to 5, wherein,
the at least one fastener comprises a plurality of fastening fins; and
a condenser tube of the condenser is arranged between the fastening fins.
11. The heat dissipation assembly according to claim
- 10, wherein,
the fastening fins are arranged in parallel.
12. The heat dissipation assembly according to claim 11, wherein,
the fastening fins are arranged with a plurality of U-shaped mounting slots, the condenser tube is arranged in the mounting slots.
13. A refrigeration device, wherein comprises:
the heat dissipation assembly according to any one of claims 1 to 12.
14. The refrigeration device according to claim 13, wherein further comprises:

a fan, arranged on one side of the base plate;
a condenser, arranged on the at least one fastener;
a compressor;
wherein the condenser and the compressor are arranged on both sides of the fan respectively.
15. The refrigeration device according to claim 14, wherein further comprises:
a compressor compartment assembly comprising a compressor compartment base, wherein a water outlet is arranged on the compressor compartment base, the heat dissipation assembly, the fan, the condenser, the compressor are arranged inside the compressor compartment assembly.
16. The refrigeration device according to claim 14, wherein:

the compressor comprises a rotational speed detecting device for detecting a rotational speed of the compressor;
the fan comprises a rotational speed control device, which is connected to the rotational speed detecting device and is configured to control the rotational speed of the fan according to the rotational speed of the compressor.
17. The refrigeration device according to any one of claims 13 to 10, wherein,
the refrigeration device is selected from the group consisting of: a refrigerator, a freezer, an air conditioner.

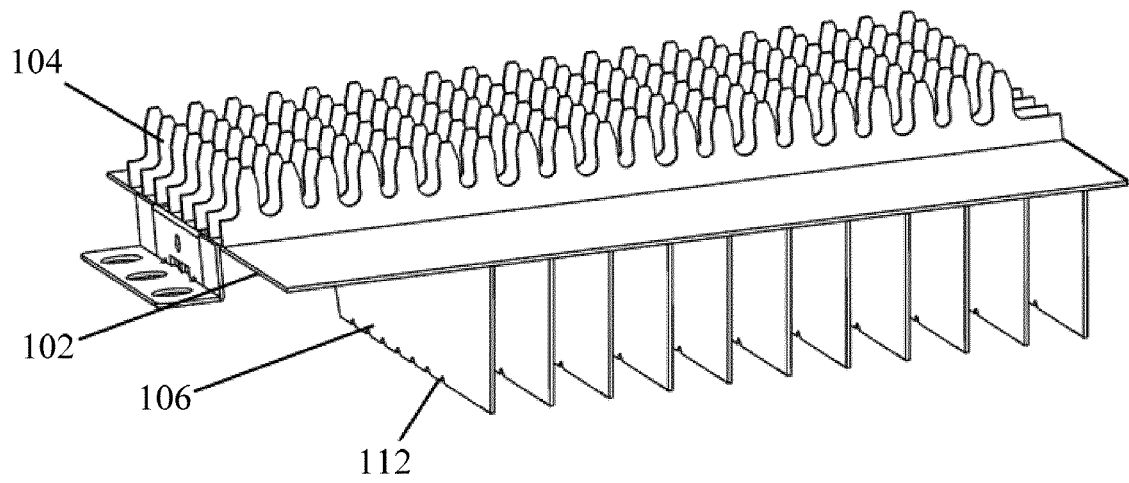


Fig. 1

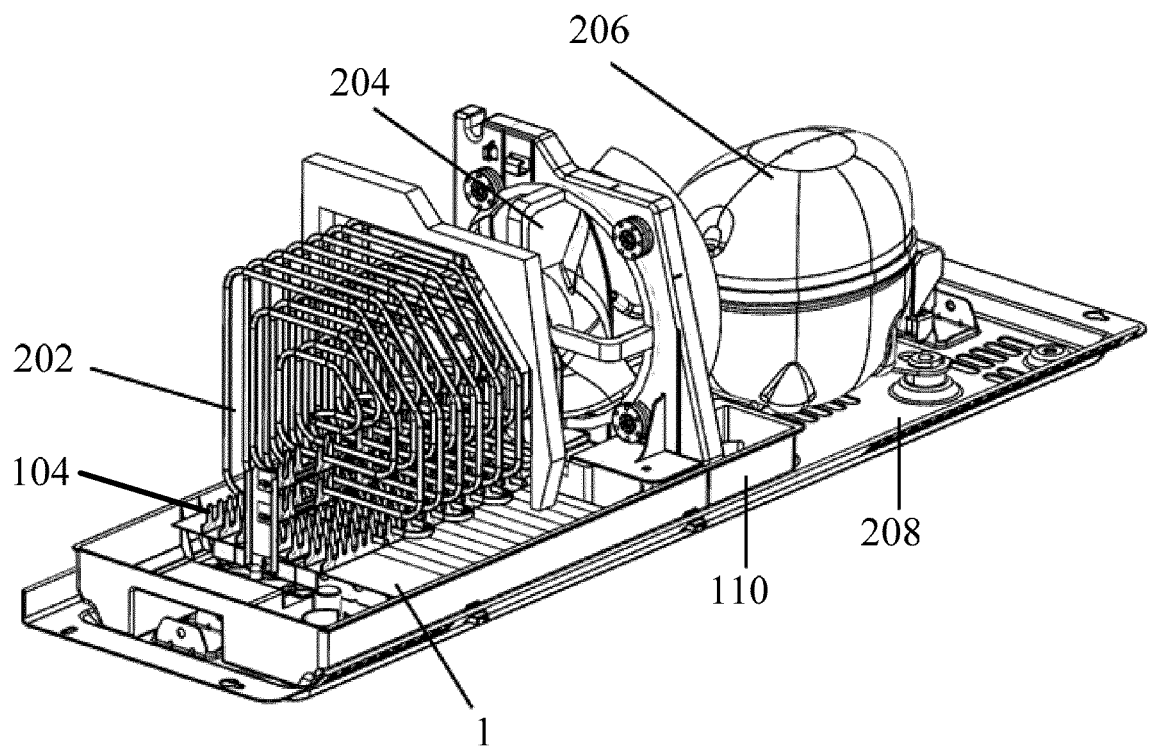


Fig. 2

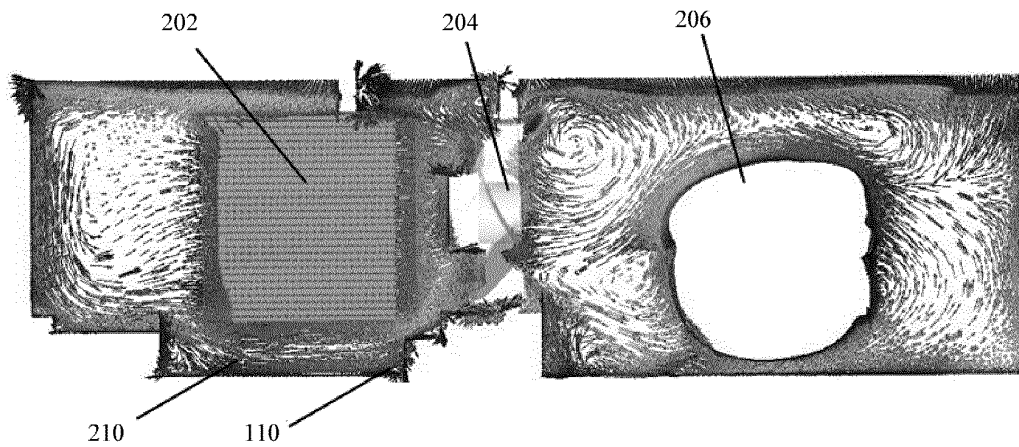


Fig. 3

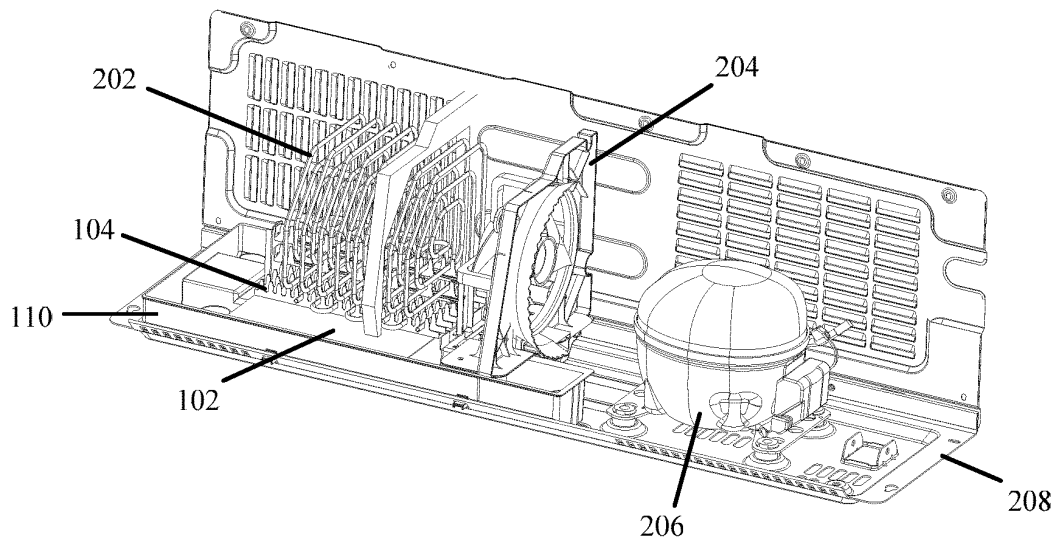


Fig. 4

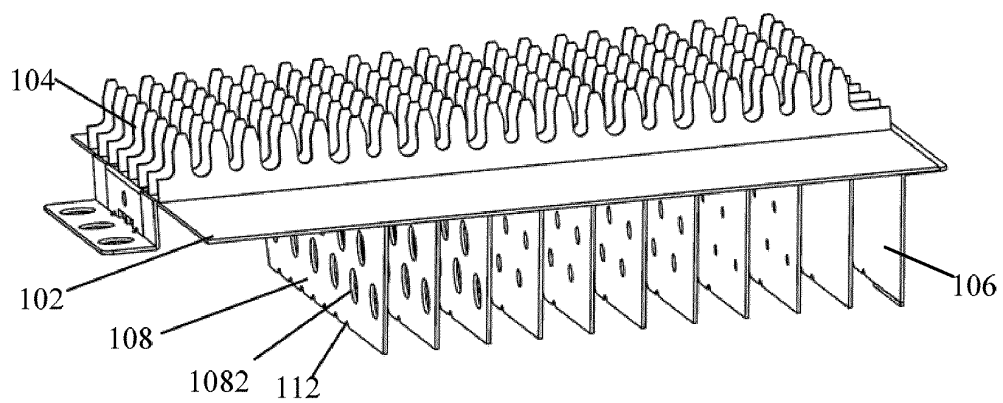


Fig. 5

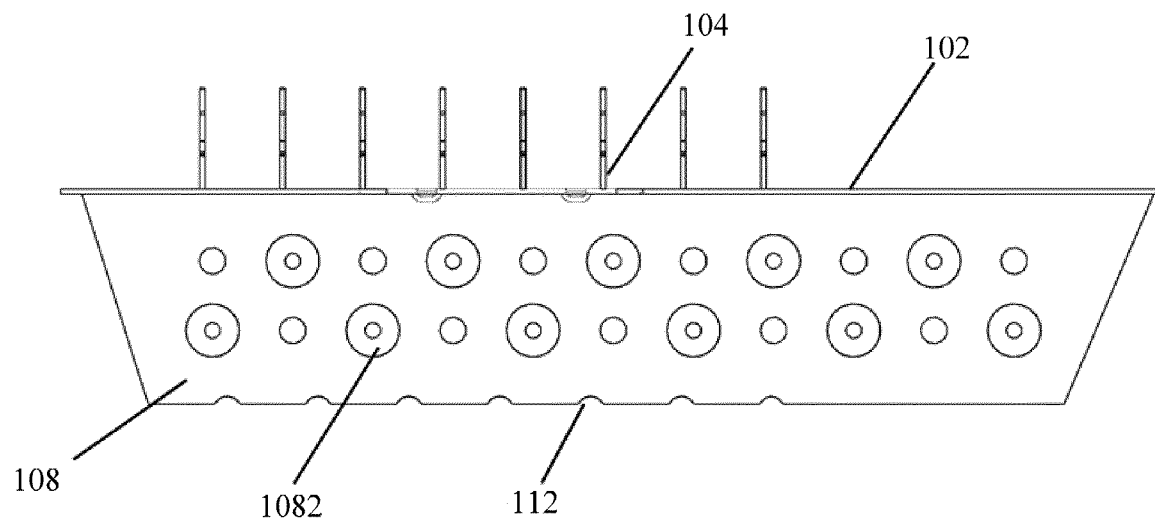


Fig. 6

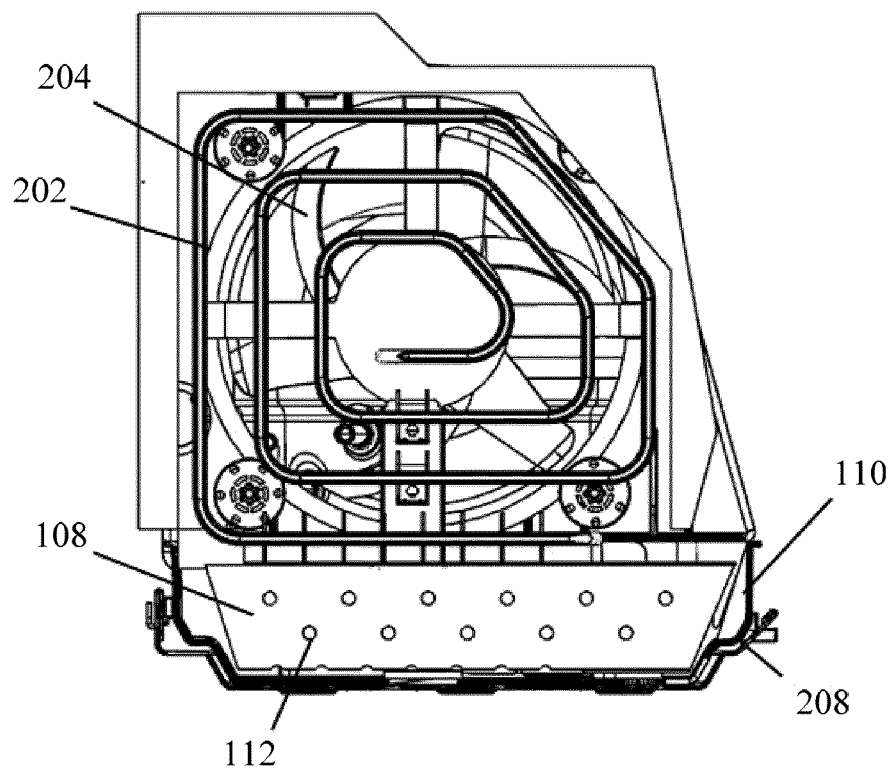


Fig. 7

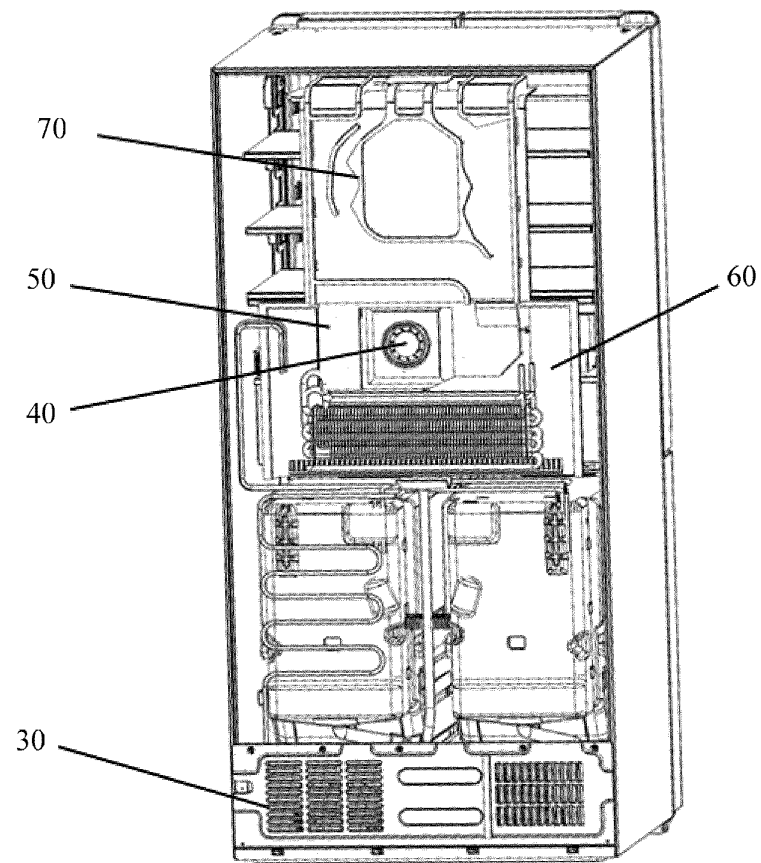


Fig. 8

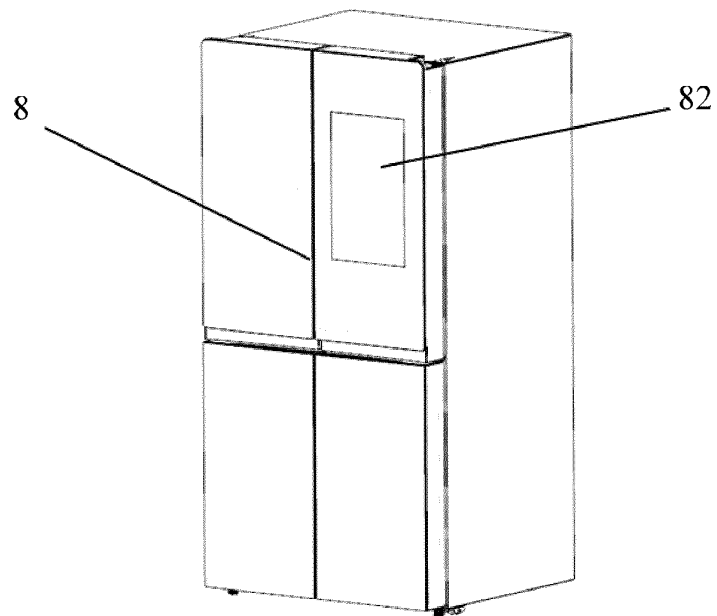


Fig. 9

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2017/082520

A. CLASSIFICATION OF SUBJECT MATTER

F25D 19/00 (2006.01) i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

F25D; F25B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

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

SIPOABS, CNPAT, EPODOC, WPI: 冰箱, 散热, 冷凝器, 压缩机, 风机, 风扇, 挡板, 挡风, 风板, refrigerator, heat, condenser, compressor, fan, wind, plate, air

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	CN 102401526 A (LG ELECTRONICS INC.), 04 April 2012 (04.04.2012), description, paragraphs [0022]-[0042], and figures 1-9	1-17
A	KR 20030056416 A (SAMSUNG ELECTRONICS CO., LTD.), 04 July 2003 (04.07.2003), entire document	1-17
A	JP 0526562 A (MATSUSHITA REFRIGERATION), 02 February 1993 (02.02.1993), entire document	1-17
A	CN 2639814 Y (SUZHOU SAMSUNG ELECTRONICS CO., LTD.), 08 September 2004 (08.09.2004), entire document	1-17
A	CN 105571236 A (HISENSE RONSHEN (GUANGDONG) REFRIGERATOR CO., LTD.), 11 May 2016 (11.05.2016), entire document	1-17

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

* Special categories of cited documents:	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E" earlier application or patent but published on or after the international filing date	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"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)	"&" document member of the same patent family
"O" document referring to an oral disclosure, use, exhibition or other means	
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search 25 October 2017	Date of mailing of the international search report 15 November 2017
Name and mailing address of the ISA State Intellectual Property Office of the P. R. China No. 6, Xitucheng Road, Jimenqiao Haidian District, Beijing 100088, China Facsimile No. (86-10) 62019451	Authorized officer WANG, Ying Telephone No. (86-10) 62084892

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

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2017/082520

Patent Documents referred in the Report	Publication Date	Patent Family	Publication Date
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		US 2012067075 A1	22 March 2012
		CN 102401526 B	30 July 2014
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JP 0526562 A	02 February 1993	None	
CN 2639814 Y	08 September 2004	None	
CN 105571236 A	11 May 2016	None	

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

REFERENCES CITED IN THE DESCRIPTION

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- CN 201710080370 [0001]