

(19)



(11)

EP 4 001 783 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention of the grant of the patent:

08.07.2026 Bulletin 2026/28

(51) International Patent Classification (IPC):

F24F 1/22 ^(2011.01)

F24F 1/24 ^(2011.01)

F24F 13/08 ^(2006.01)

(21) Application number: **21209890.9**

(52) Cooperative Patent Classification (CPC):

F24F 1/24; F24F 1/22; F24F 13/08; F24F 2221/52

(22) Date of filing: **23.11.2021**

(54) **ELECTRIC CABINET OF AIR CONDITIONER AND AIR CONDITIONER HAVING THE SAME**

SCHALTSCHRANK EINER KLIMAAANLAGE UND KLIMAAANLAGE DAMIT

ARMOIRE ÉLECTRIQUE DE CLIMATISEUR ET CLIMATISEUR L'UTILISANT

(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**

(72) Inventor: **LIU, Xueshu**

Foshan City (CN)

(30) Priority: **23.11.2020 CN 202022732306 U**

(74) Representative: **Dehns**

10 Old Bailey

London EC4M 7NG (GB)

(43) Date of publication of application:

25.05.2022 Bulletin 2022/21

(56) References cited:

EP-A1- 2 244 024

EP-A1- 3 604 943

EP-A2- 2 040 008

CN-A- 106 440 101

CN-B- 104 833 011

CN-U- 210 379 834

(73) Proprietor: **Guangdong Giwee Technology Co., Ltd.**

Foshan City Guangdong (CN)

EP 4 001 783 B1

Note: Within nine months of the publication of the mention of the grant of the European patent in the European Patent Bulletin, any person may give notice to the European Patent Office of opposition to that patent, in accordance with the Implementing Regulations. Notice of opposition shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

Description

[0001] The present invention relates to the technical field of air conditioning devices, especially to an electric cabinet of an air conditioner.

[0002] When an air-conditioning device is running for a long time, electronic components inside the electric cabinet will generate heat. When the heat cannot be dissipated or the heat dissipation is not good, it will seriously affect the normal operation of the machine and the service life of the electronic components. Moreover, air-conditioning equipment will also be installed outdoors, facing the problem of waterproof and rainproof. In conventional compact electric cabinets, some only consider heat dissipation, and some are able to perform heat dissipation and rain protection at the same time. However, the heat dissipation channel is small, resulting in poor heat dissipation; and the design of an air duct structure is defective. In order to prevent rainwater from entering the inside of the electric cabinet, air vents are designed to be misplaced, which causes the air duct of the box body to be blocked, affecting the heat dissipation efficiency of the electric cabinet body.

[0003] CN 104 833 011 B discloses an electrical box of an air conditioner outdoor unit, wherein the bottom of the electrical box is provided with ventilation holes. Airflow passing through the ventilation holes may be guided, via a wind baffle, to exit through an air guide channel, formed by a water blocking plate and a bending structure, with an outlet facing downwards. This enables good airflow out of the electrical box whilst preventing impurities such as dust and rain from entering the electrical box.

[0004] CN 106 440 101 A discloses an outdoor unit of an air conditioner and the air conditioner.

[0005] A main purpose of the present invention is to provide an electric cabinet of an air conditioner and an air conditioner having the same, which solves the technical problem of low heat dissipation efficiency while preventing rain in the prior art.

[0006] According to a first aspect, the present invention provides an electric cabinet for an air conditioner as defined in claim 1. In particular, it comprises a box body, a bottom plate, and a ventilation cover plate, wherein the bottom plate is installed at the bottom of the box body, the ventilation cover plate is installed at the bottom of the bottom plate and forms a cavity with the bottom plate; air vents are provided on the bottom plate, shutters are provided on the ventilation cover plate, and the shutters are aligned with the air vents on the bottom plate. Slats of the shutters are opened downwards. Air inlets and air outlets are formed between the slats of the shutters and the ventilation cover plate, and the air outlets are aligned with the air vents so that wind may flow directly from the air vents into the box body without turning to improve the heat dissipation effect of the internal components of the electric cabinet.

[0007] Optionally, there are a plurality of air vents, and the plurality of air vents are closely arranged on the

bottom plate.

[0008] Optionally, sizes and shapes of the air vents are different from each other.

[0009] Optionally, the air outlets are communicated with the cavity.

[0010] Optionally, there are a plurality of shutters, and the plurality of shutters are arranged in an array on the ventilation cover plate.

[0011] Optionally, the air outlets of the shutters are each aligned with at least one air vent.

[0012] Optionally, the slats of the plurality of shutters are opened in the same direction.

[0013] Viewed from another aspect, the present invention further provides an air conditioner comprising the electric cabinet of an air conditioner.

[0014] In an electric cabinet of an air conditioner and an air conditioner having the same provided in the present invention, air vents are arranged on a bottom plate, shutters are arranged on a ventilation cover plate, a cavity is formed between the bottom plate and the ventilation cover plate, and the air vents are aligned with the shutters, which can reduce air duct resistance and accelerate heat dissipation inside the electronic cabinet body. The shutters can also achieve the purpose of waterproof and rainproof while improving the ventilation and heat dissipation effect inside the electric cabinet.

[0015] Certain exemplary embodiments will now be described in greater detail by way of example only and with reference to the accompanying drawings in which:

FIG. 1 is an exploded view of an electric cabinet of an air conditioner;

FIG. 2 is a schematic cross section of an electric cabinet of an air conditioner;

FIG. 3 is an enlarged schematic diagram of a wind field in area B of FIG. 2;

FIG. 4 is an enlarged schematic diagram of a wind field and a rainwater path in area B of FIG. 2; and

FIG. 5 is a schematic structural diagram of a ventilation cover plate.

[0016] In the drawings, box body 1, bottom plate 2, air vent 21, ventilation cover plate 3, shutter 31, air inlet 311, air outlet 312, cavity 4 are shown.

[0017] The realization of the purpose, functional characteristics, and advantages of the present invention will be further described in conjunction with the embodiments and with reference to the accompanying drawings.

[0018] With reference to FIGs. 1 and 2, the present invention provides an electric cabinet of an air conditioner, comprising box body 1, bottom plate 2, and ventilation cover plate 3. Bottom plate 2 is installed at the bottom of box body 1, ventilation cover plate 3 is installed at the bottom of bottom plate 2 and forms cavity 4 with bottom plate 2. Air vents 21 are provided on bottom plate 2, shutters 31 are provided on ventilation cover plate 3, and shutters 31 are aligned with air vents 21 on bottom plate 2.

[0019] Box body 1 is used to install and electrically control main electronic components, circuit boards, etc.; bottom plate 2 is used for air intake and protection; and ventilation cover plate 3 is mainly used for ventilation, heat dissipation, and rain prevention of the electric cabinet.

[0020] Shutters 31 are aligned with air vents 21 on bottom plate 2. It may be understood that after entering cavity 4 from shutters 31, wind may directly flow out through air vents 21 since shutters 31 are aligned with air vents 21, thereby reducing air duct resistance and improving heat dissipation efficiency of the electric cabinet.

[0021] It should be noted that the electrical components in the electric cabinet are compactly arranged and generate a large amount of heat. Electrical components under high temperature have great safety risks. After ventilation, the heat of electrical components can be taken away in time to prevent the electrical components from being damaged under high temperature. As shown in FIG. 4, a plurality of air vents 21 are arranged on bottom plate 2 in a spaced way, and shutters 31 are arranged in an array on ventilation cover plate 3. Wind flows into cavity 4 from the direction of the arrow shown in the figure, and may flow directly from air vents 21 into box body 1 without turning to cool down the electrical components inside the electric cabinet. Hence, by aligning air vents 21 with shutters 31, the air duct resistance can be effectively reduced, and the heat dissipation efficiency of the electric cabinet can be improved. Moreover, shutters 31 can effectively prevent water vapor from entering box body 1 which damages the electrical components and affects the normal operation of the air conditioner.

[0022] Optionally, there are a plurality of air vents 21, and the plurality of air vents 21 are closely arranged on bottom plate 2.

[0023] After wind enters cavity 4 from shutters 31, it flows out from the plurality of air vents 21 arranged on bottom plate 2. The more the air vents 21 are, the faster the wind flows out, which can further improve the heat dissipation efficiency of the electric cabinet, making the ventilation and heat dissipation effect of the electric cabinet better.

[0024] Optionally, sizes and shapes of air vents 21 are different from each other.

[0025] There are a plurality of air vents 21 with different sizes and shapes. Air vents 21 can be set larger in some parts where strong heat dissipation is required, so as to speed up wind from air vents 21 into box body 1 and improve the heat dissipation efficiency of the electric cabinet.

[0026] Slats of shutters 31 are opened downwards.

[0027] As shown in FIG. 5, the slats of shutters 31 are opened downwards and form a certain angle with box body 1, thus preventing rainwater from entering cavity 4 and then entering box body 1 when rain is falling, so as to prevent rainwater from damaging the components in box body 1.

[0028] Air inlets 311 and air outlets 312 are formed between the slats of shutters 31 and ventilation cover plate 3, and air outlets 312 are aligned with air vents 21.

[0029] As shown in FIG. 5, wind enters cavity 4 through air inlets 311 and air outlets 312 of shutters 31. Because air outlets 312 are aligned with air vents 21, wind may flow directly from air vents 21 into box body 1 without turning to improve the heat dissipation effect of the internal components of the electric cabinet.

[0030] Optionally, air outlets 312 are communicated with cavity 4.

[0031] Air outlets 312 on shutters 31 are communicated with cavity 4, thus wind enters from air inlets 311 and flows directly into cavity 4, and then flows into box body 1 through air vents 21 to conduct heat dissipation for the electrical components in box body 1.

[0032] Optionally, there are a plurality of shutters 31, and the plurality of shutters 31 are arranged in an array on ventilation cover plate 3.

[0033] As shown in FIG. 3, there are a plurality of shutters 31; wind enters cavity 4 from shutters 31 and then enters box body 1 to conduct heat dissipation for the components, and therefore, setting the number of shutters 31 as multiple can increase the air volume, so that more wind can be achieved inside box body 1, and the heat dissipation efficiency of the electric cabinet can be further improved.

[0034] Optionally, air outlets 312 of shutters 31 are each aligned with at least one air vent 21.

[0035] Hence, all the wind entering from shutters 31 can flow into box body 1 directly through air vents 21 without turning in cavity 4 to conduct heat dissipation for the components in box body 1 and improve the heat dissipation efficiency.

[0036] Optionally, the slats of the plurality of shutters 31 are opened in the same direction.

[0037] As shown in FIG. 5, the slats of the plurality of shutters 31 are arranged in the same direction. When rainwater is falling, it can prevent rainwater from entering cavity 4 and then entering box body 1, avoiding that part of rainwater enters box body 1 from air inlets 311 when shutters 31 are opened in the reverse direction, causing damage to the components in box body 1.

[0038] An air conditioner can be provided, and the air conditioner is provided with the above electric cabinet of an air conditioner. Since the air conditioner has the above electric cabinet of an air conditioner, and the electric cabinet of an air conditioner has above advantages, by setting the electric cabinet of an air conditioner, the air conditioner has corresponding advantages. Therefore, the air conditioner of this embodiment has good ventilation and heat dissipation effects, good electric control and rainproof effects, low air duct resistance, and high electric cabinet heat dissipation efficiency.

[0039] It should be noted that the terms "comprise," "include," or any other variants thereof herein are intended to cover non-exclusive inclusion, thus a process, a device, an article, or a method that includes a series of

elements not only includes those elements, but also includes other elements that are not explicitly listed, or also includes elements inherent to such a process, device, article, or method. If there are no more restrictions, the element defined by the sentence "comprising a..." does not exclude the existence of other identical elements in the process, device, article, or method that includes the element.

[0040] The above description is only concerned with preferred embodiments of the present invention, and do not limit the patent scope of the present invention, which is instead as defined by the appended claims.

Claims

1. An electric cabinet for an air conditioner, comprising a box body (1), a bottom plate (2), and a ventilation cover plate (3), wherein the bottom plate (2) is installed at the bottom of the box body (1), the ventilation cover plate (3) is installed at the bottom of the bottom plate (2) and forms a cavity (4) with the bottom plate (2); air vents (21) are provided on the bottom plate (2), and shutters (31) are provided;

wherein the shutters (31) are provided on the ventilation cover plate (3), and the shutters (31) are aligned with the air vents (21) on the bottom plate (2), **characterised in that** slats of the shutters (31) are opened downwards, wherein air inlets (311) and air outlets (312) are formed between the slats of the shutters (31) and the ventilation cover plate (3), and the air outlets (312) are aligned with the air vents (21) so that wind may flow directly from the air vents (21) into the box body (1) without turning to improve the heat dissipation effect of the internal components of the electric cabinet.

2. The electric cabinet of an air conditioner according to claim 1, wherein there are a plurality of air vents (21), and the plurality of air vents (21) are closely arranged on the bottom plate (2).
3. The electric cabinet of an air conditioner according to claim 1 or 2, wherein sizes and shapes of the air vents (21) are different from each other.
4. The electric cabinet of an air conditioner according to any preceding claim, wherein the air outlets (312) are communicated with the cavity (4).
5. The electric cabinet of an air conditioner according to any preceding claim, wherein there are a plurality of shutters (31), and the plurality of shutters (31) are arranged in an array on the ventilation cover plate (3).

6. The electric cabinet of an air conditioner according to any preceding claim, wherein the air outlets (312) of the shutters (31) are each aligned with at least one air vent (21).
7. The electric cabinet of an air conditioner according to any preceding claim, wherein the slats of the plurality of shutters (31) are opened in the same direction.
8. An air conditioner, comprising the electric cabinet of an air conditioner according to any preceding claim.

Patentansprüche

1. Schaltschrank für eine Klimaanlage, umfassend einen Gehäusekörper (1), eine Bodenplatte (2) und eine Lüftungsabdeckplatte (3), wobei die Bodenplatte (2) am Boden des Gehäusekörpers (1) eingebaut ist, die Lüftungsabdeckplatte (3) am Boden der Bodenplatte (2) eingebaut ist und mit der Bodenplatte (2) einen Hohlraum (4) ausbildet; wobei Lüftungsschlitze (21) an der Bodenplatte (2) bereitgestellt sind und Klappen (31) bereitgestellt sind;

wobei die Klappen (31) an der Lüftungsabdeckplatte (3) bereitgestellt sind und die Klappen (31) mit den Lüftungsschlitzen (21) an der Bodenplatte (2) ausgerichtet sind, **dadurch gekennzeichnet, dass**

Lamellen der Klappen (31) nach unten geöffnet sind, wobei Lufteinlässe (311) und Luftauslässe (312) zwischen den Lamellen der Klappen (31) und der Lüftungsabdeckplatte (3) ausgebildet sind und die Luftauslässe (312) mit den Lüftungsschlitzen (21) ausgerichtet sind, so dass Wind direkt von den Lüftungsschlitzen (21) in den Gehäusekörper (1) strömen kann, ohne zu wenden, um den Wärmeableitungseffekt der internen Komponenten des Schaltschranks zu verbessern.

2. Schaltschrank einer Klimaanlage nach Anspruch 1, wobei eine Vielzahl von Lüftungsschlitzen (21) vorhanden ist und die Vielzahl von Lüftungsschlitzen (21) dicht aneinander an der Bodenplatte (2) angeordnet ist.
3. Schaltschrank einer Klimaanlage nach Anspruch 1 oder 2, wobei sich Größen und Formen der Lüftungsschlitze (21) voneinander unterscheiden.
4. Schaltschrank einer Klimaanlage nach einem der vorhergehenden Ansprüche, wobei die Luftauslässe (312) mit dem Hohlraum (4) in Verbindung stehen.
5. Schaltschrank einer Klimaanlage nach einem der vorhergehenden Ansprüche, wobei eine Vielzahl

von Klappen (31) vorhanden ist und die Vielzahl von Klappen (31) in einem Array an der Lüftungsabdeckplatte (3) angeordnet ist.

6. Schaltschrank einer Klimaanlage nach einem der vorhergehenden Ansprüche, wobei die Luftauslässe (312) der Klappen (31) jeweils mit mindestens einem Luftschlitz (21) ausgerichtet sind. 5
7. Schaltschrank einer Klimaanlage nach einem der vorhergehenden Ansprüche, wobei die Lamellen der Vielzahl von Klappen (31) in der gleichen Richtung geöffnet sind. 10
8. Klimaanlage, umfassend den Schaltschrank einer Klimaanlage nach einem der vorhergehenden Ansprüche. 15

Revendications 20

1. Armoire électrique pour un climatiseur, comprenant un corps (1) de boîte, une plaque (2) de fond et une plaque (3) de recouvrement de ventilation, dans laquelle la plaque (2) de fond est installée au fond du corps (1) de boîte, la plaque (3) de recouvrement de ventilation est installée au fond de la plaque (2) de fond et forme une cavité (4) avec la plaque (2) de fond ; des événements (21) d'aération sont fournis sur la plaque (2) de fond, et des obturateurs (31) sont fournis ; 25 30

dans laquelle les obturateurs (31) sont fournis sur la plaque (3) de recouvrement de ventilation, et les obturateurs (31) sont alignés avec les événements (21) d'aération sur la plaque (2) de fond, **caractérisée en ce que** des lames des obturateurs (31) sont ouvertes vers le bas, dans lesquelles des entrées (311) d'air et des sorties (312) d'air sont formées entre les lames des obturateurs (31) et la plaque (3) de recouvrement de ventilation, et les sorties (312) d'air sont alignées avec les événements (21) d'aération de sorte que le vent puisse circuler directement des événements (21) d'aération dans le corps (1) de la boîte sans tourner pour améliorer l'effet de dissipation de chaleur des composants internes de l'armoire électrique. 35 40 45

2. Armoire électrique d'un climatiseur selon la revendication 1, dans laquelle il existe une pluralité d'événements (21) d'aération, et la pluralité d'événements (21) d'aération sont disposés étroitement sur la plaque (2) de fond. 50 55
3. Armoire électrique d'un climatiseur selon la revendication 1 ou 2, dans laquelle les dimensions et les formes des événements (21) d'aération sont différentes

les unes des autres.

4. Armoire électrique d'un climatiseur selon une quelconque revendication précédente, dans laquelle les sorties (312) d'air communiquent avec la cavité (4). 5
5. Armoire électrique d'un climatiseur selon une quelconque revendication précédente, dans laquelle il existe une pluralité d'obturateurs (31), et la pluralité d'obturateurs (31) sont disposés en réseau sur la plaque (3) de recouvrement de ventilation. 10
6. Armoire électrique d'un climatiseur selon une quelconque revendication précédente, dans laquelle les sorties (312) d'air des obturateurs (31) sont chacune alignées avec au moins un événement (21) d'aération. 15
7. Armoire électrique d'un climatiseur selon une quelconque revendication précédente, dans laquelle les lames de la pluralité d'obturateurs (31) sont ouvertes dans la même direction. 20
8. Climatiseur, comprenant l'armoire électrique d'un climatiseur selon une quelconque revendication précédente. 25 30

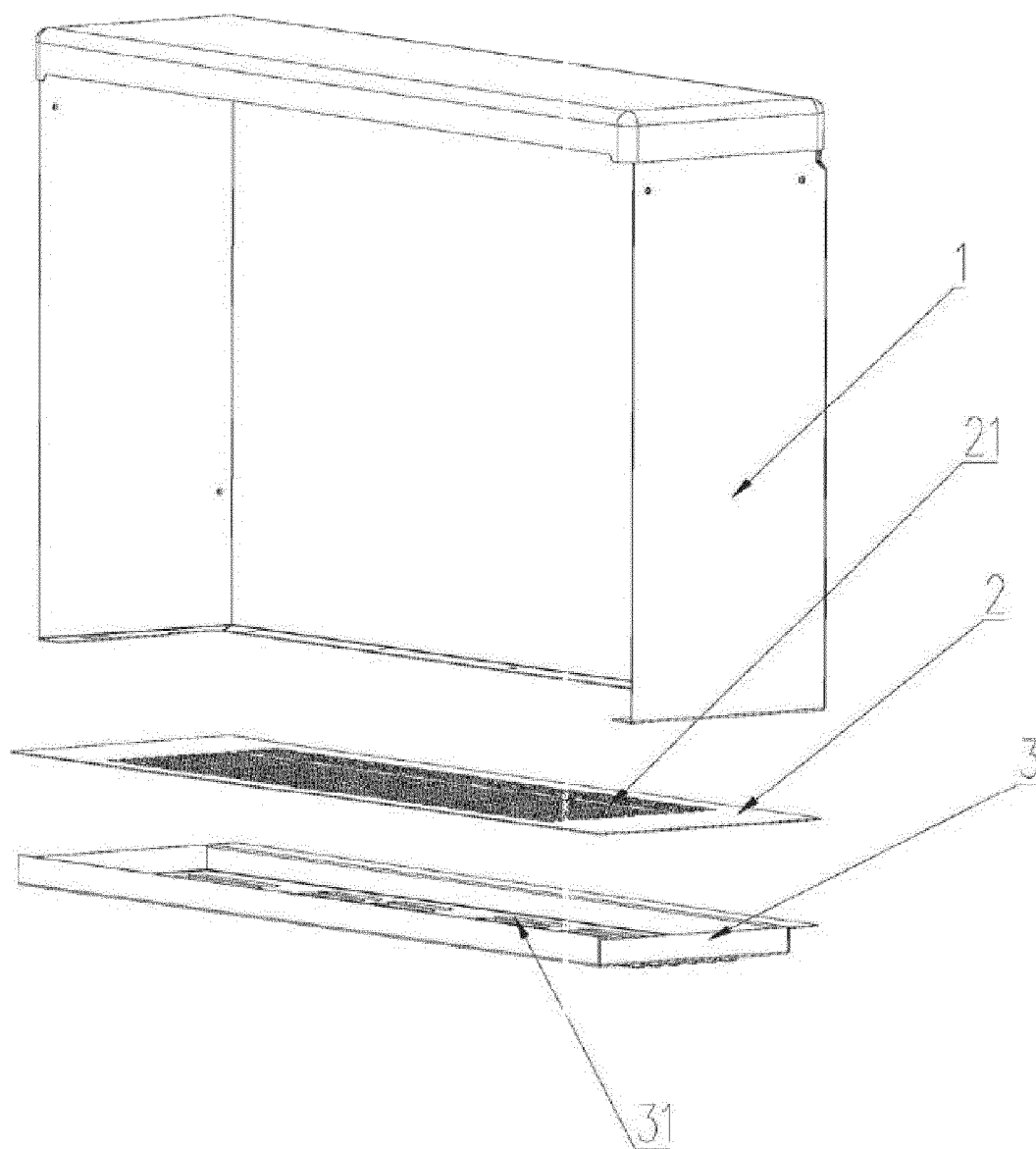


FIG. 1

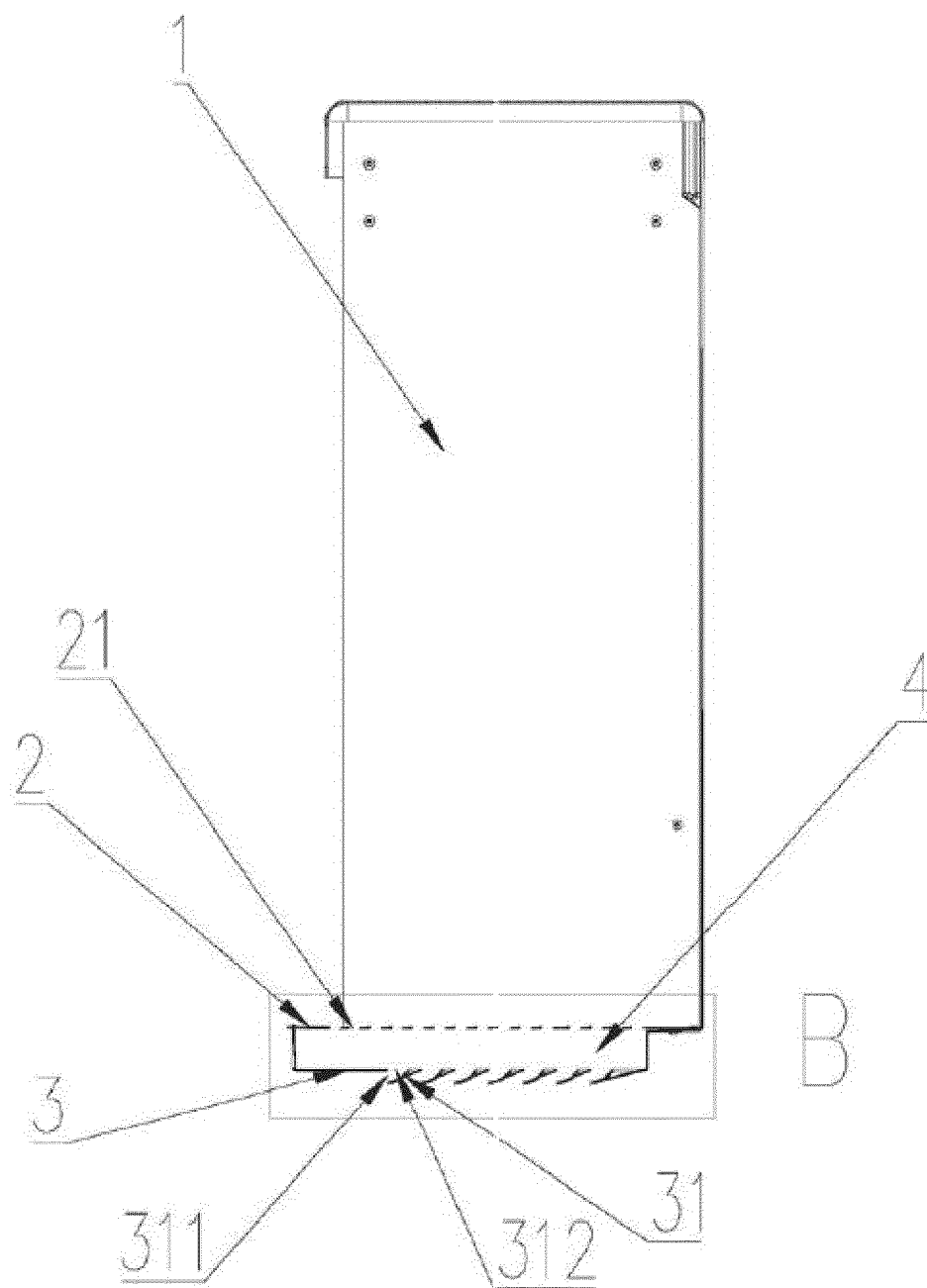


FIG. 2

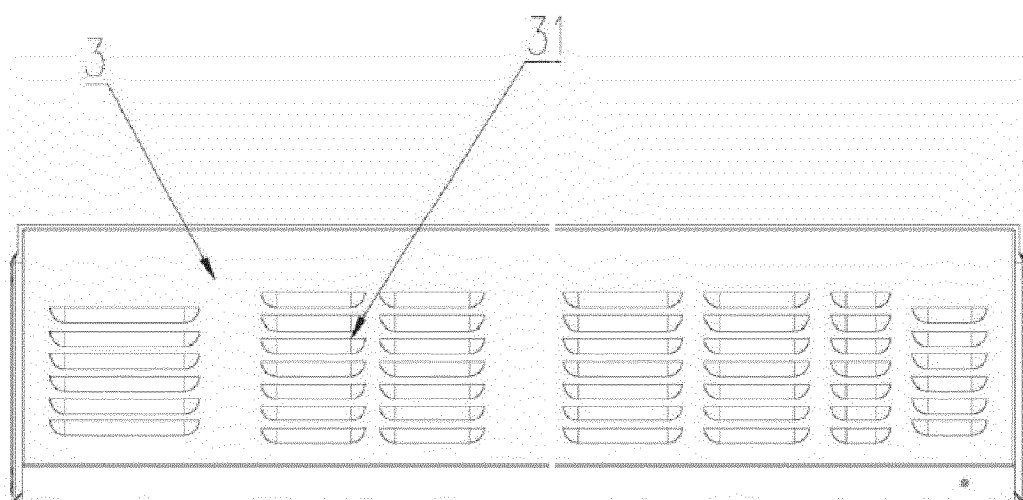


FIG. 3

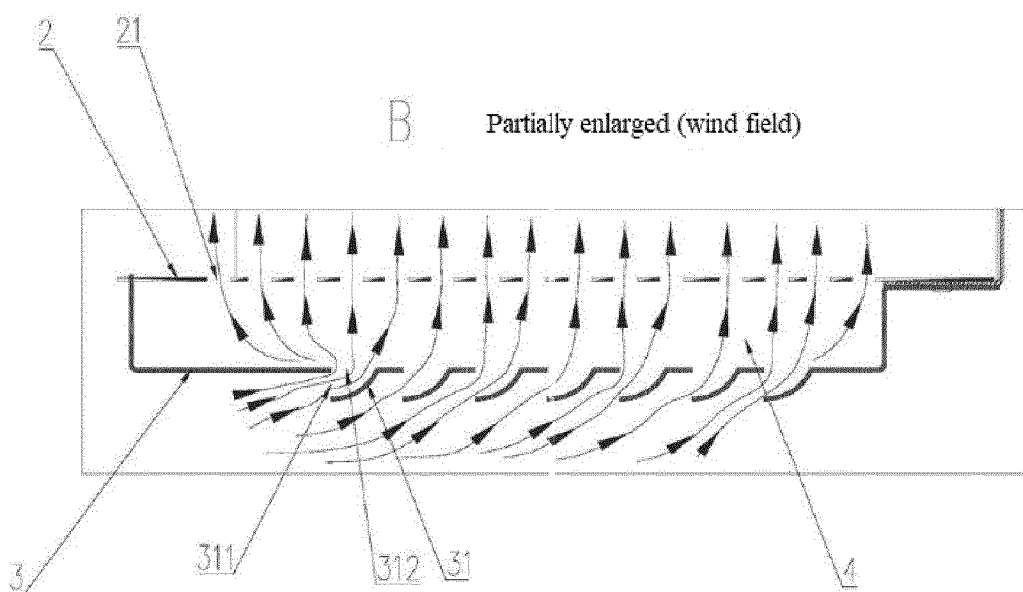


FIG. 4

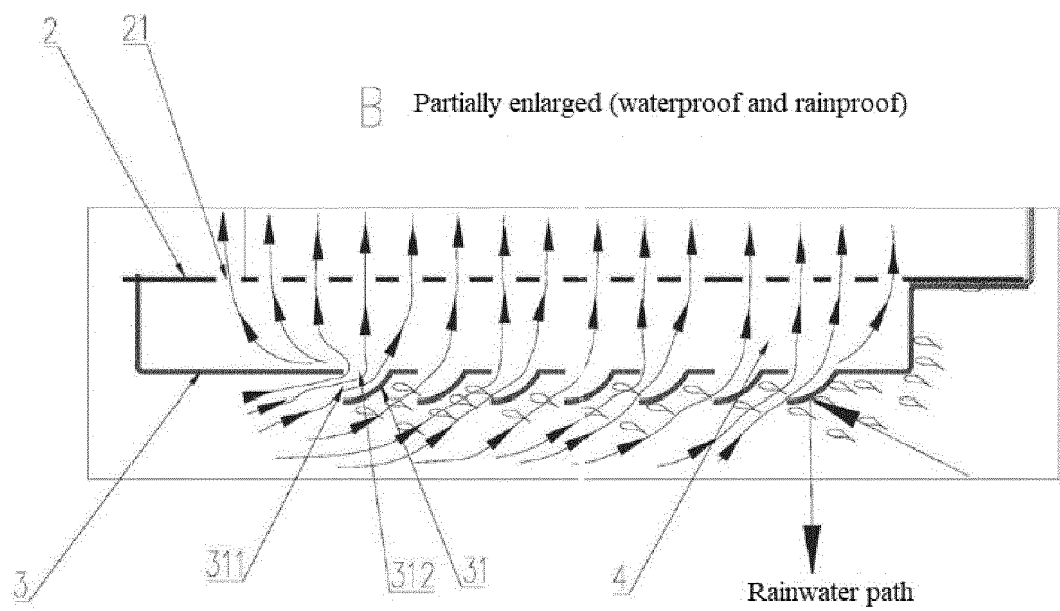


FIG. 5

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- CN 104833011 B [0003]
- CN 106440101 A [0004]