

(19)



(11)

EP 2 589 887 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention
of the grant of the patent:
26.02.2020 Bulletin 2020/09

(51) Int Cl.:
F24F 1/0011 ^(2019.01) **F24F 1/0047** ^(2019.01)
F24F 1/0057 ^(2019.01) **F24F 13/20** ^(2006.01)

(21) Application number: **11800081.9**

(86) International application number:
PCT/CN2011/072380

(22) Date of filing: **01.04.2011**

(87) International publication number:
WO 2012/000336 (05.01.2012 Gazette 2012/01)

(54) INDOOR UNIT OF AIR CONDITIONER

INNENRAUMEINHEIT EINER KLIMAAANLAGE

UNITÉ DE CLIMATISEUR D'INTÉRIEUR

(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**

(30) Priority: **29.06.2010 CN 201010214620**

(43) Date of publication of application:
08.05.2013 Bulletin 2013/19

(73) Proprietor: **Gree Electric Appliances, Inc. of
Zhuhai
Zhuhai, Guangdong 519070 (CN)**

(72) Inventors:
• **ZHANG, Hui**
Zhuhai
Guangdong 519070 (CN)
• **CHEN, Shaolin**
Zhuhai
Guangdong 519070 (CN)
• **YANG, Jianqun**
Zhuhai
Guangdong 519070 (CN)

• **JI, Wenwei**
Zhuhai
Guangdong 519070 (CN)
• **MENG, Zhi**
Zhuhai
Guangdong 519070 (CN)
• **LI, Jian**
Zhuhai
Guangdong 519070 (CN)
• **CAO, Liu**
Zhuhai
Guangdong 519070 (CN)

(74) Representative: **Maiwald Patent- und
Rechtsanwalts-gesellschaft mbH**
Elisenhof
Elisenstraße 3
80335 München (DE)

(56) References cited:
EP-A1- 0 962 717 EP-A1- 1 553 358
EP-A1- 1 712 798 WO-A1-2007/012163
CN-A- 1 158 968 CN-A- 1 675 504
CN-U- 201 787 704 JP-A- 6 147 527
JP-A- 9 324 925 JP-A- 2002 250 534

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).

EP 2 589 887 B1

Description

FIELD OF THE INVENTION

5 **[0001]** The present application relates to a structure of an indoor unit of an air conditioner, in particular, to an indoor unit of an air conditioner having optimized performances and excellent effects.

BACKGROUND OF THE INVENTION

10 **[0002]** Generally, the air conditioner is a device that can cool or warm a room, or purify air in the room via an air cooler, a heater or an air cleaner, such that the indoor environment is more comfortable. Such an air conditioner is provided with a ventilation device, an air cooling and heating device, and an air cleaner. The ventilation device can forcibly circulate the air indoors, and specifically absorb the indoor air, perform heat exchange, or purify the air, and then can discharge the air into the room. In the prior art, people have made improvements frequently to the air conditioner.

15 Generally, an indoor unit of an air conditioner includes: a rear housing encasing the side and rear portions of the air conditioner, and a panel body located in front of the rear housing and closely connected to the rear housing. The rear housing and the panel body define the inner cavity of the air conditioner. A heat exchanger, a control element and a ventilation component are provided in the inner cavity. The panel body is typically fixed on the rear housing with screws or in a snap-fit coupling manner. As the air conditioner market is increasingly mature, the requirement of energy-saving performance of the air conditioner becomes increasingly higher. There is thus a need to make various improvements to the air conditioner, and to research and develop an air conditioner having a higher energy efficiency ratio to meet the energy-saving requirement of the air conditioner. Air conditioners are known from EP 0 962 717 A1, where a diffuser has an inverted T-shaped cross section and is provided at a position on a front panel side within an air outlet. Further, Air conditioners are known from EP 1 712 798 A1, and EP 1 553 358 A1.

SUMMARY OF THE INVENTION

25 **[0003]** An object of the present application is to provide an indoor unit of an air conditioner having a simple structure and improving the performance of the air conditioner, so as to increase the production efficiency and ensure the reliability of the product.

30 **[0004]** In order to achieve the above object, the present application provides the following technical solution.

[0005] An indoor unit of an air conditioner includes: a panel body encasing side portions and a top portion of the air conditioner and configured to mount a front panel; a rear housing encasing a rear portion of the air conditioner; and the front panel located in front of the panel body and closely connected to the panel body. The rear housing, the panel body and the front panel define an inner cavity of the air conditioner. An air outlet is provided at a lower portion of the front panel. An air deflector is provided on the front panel or the panel body, and is configured to open and close the air outlet. An air baffle rib is provided at a top portion of the air outlet and extends from the top portion of the air outlet towards the air outlet. The air baffle rib is configured as an elongated rib-like member attached closely to the top portion of the air outlet in a horizontal direction, and has a horizontal width dimension smaller than or equal to a width dimension of the air outlet. The panel body is provided with a notch for mounting the front panel and a rabbet for fixing the rear housing, the air baffle rib is formed by extending the panel body towards the top of the air outlet, and a water film region is formed between a bottom portion of the front panel and the air baffle rib.

[0006] In summary, the present application has the following advantageous effects.

40 **[0007]** In the indoor unit of the air conditioner according to the present application, the air baffle rib is provided at the top portion of the air outlet, and extends from the top portion of the air outlet towards the air outlet, which can ensure a relatively uniform temperature at the air outlet and avoid a partial excessive temperature difference to generate condensate water, thereby reducing the occurrence of condensation and efficiently preventing the resulting condensate water from dropping.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008]

55 Figure 1 is a perspective structural schematic view of an indoor unit of an air conditioner according to the present application;

Figure 2 is a structural schematic view showing a position of an eddy formation device of an indoor unit of an air conditioner according to the present application;

Figure 3 is a structural schematic view of an air outlet of an indoor unit of an air conditioner according to the present application;

Figure 4 is a front structural schematic view of a panel body of an indoor unit of an air conditioner according to the present application;

Figure 5 is a perspective structural schematic view of a panel body of an indoor unit of an air conditioner according to the present application;

Figure 6 is a sectional structural schematic view taken along line A-A of figure 4;

Figure 7 is a structural schematic view showing a position of an air baffle rib of an indoor unit of an air conditioner according to the present application;

Figure 8 is a structural schematic view of a first embodiment of an air baffle rib of an indoor unit of an air conditioner according to the present application;

Figure 9 is a structural schematic view of a second embodiment of an air baffle rib of an indoor unit of an air conditioner according to the present application; and

Figure 10 is a structural schematic view of a third embodiment of an air baffle rib of an indoor unit of an air conditioner according to the present application.

[0009] Reference numerals in the figures:

- | | | |
|-------------------|-------------------|--------------------------|
| 1. rear housing | 2. panel body | 3. front panel |
| 4. air outlet | 5. air deflector | 6. eddy formation device |
| 7. concave groove | 8. air baffle rib | 9. water film region |

DETAILED DESCRIPTION

[0010] The present application provides an indoor unit of an air conditioner. As is shown in figures 1 to 6, the indoor unit of the air conditioner includes: a panel body 2 encasing side portions and a top portion of the air conditioner and configured to mount a front panel; a rear housing 1 encasing a rear portion of the air conditioner; and the front panel 3 located in front of the panel body and closely connected to the panel body. The rear housing 1, the panel body 2 and the front panel 3 define an inner cavity of the air conditioner, and a heat exchanger, a control element and a ventilation component are provided in the inner cavity. An air outlet 4 is provided at a lower portion of the front panel 3. An air deflector 5 is mounted on the front panel 3 or is provided on the panel body 2, and is configured to open and close the air outlet 4.

[0011] An eddy formation device 6 is provided at a bottom portion of the air outlet 4, and is fixed on the front panel 3 or the panel body 2 in a horizontal direction and is of an elongated strip-like structure. The eddy formation device 6 includes at least one concave groove 7 extending in a horizontal direction. A concave direction of the concave groove 7 intersects an air outlet direction of the air conditioner at an angle.

[0012] Preferably, the eddy formation device 6 is formed by closely attaching an elongated strip-like member to a bottom surface of the air outlet 4 in the horizontal direction.

[0013] Preferably, the eddy formation device 6 is formed by closely attaching two or more elongated strip-like members to the bottom surface of the air outlet 4 in the horizontal direction in sequence.

[0014] The eddy formation device 6 has a horizontal width dimension smaller than or equal to a width dimension of the air outlet 4.

[0015] As shown in figure 7, an air baffle rib 8 is provided at the top portion of the air outlet 4.

[0016] The air baffle rib 8 extends from the top portion of the air outlet 4 towards the air outlet 4.

[0017] The air baffle rib 8 is an elongated rib-like member attached closely to the top portion of the air outlet 4 in the horizontal direction, and has a horizontal width dimension smaller than or equal to the width dimension of the air outlet 4.

[0018] When an air flow passes through the air baffle rib 8 after passing through the heat exchanger, a pressure of the air flow is changed under the action of the air baffle rib 8, a moving direction of the air flow is impeded to be changed, which can ensure a relatively uniform temperature at the air outlet and avoid a partial excessive temperature difference to generate condensate water, thereby reducing the occurrence of condensation.

[0019] As shown in figure 8, the panel body 2 is provided with a notch for mounting the front panel 3 and a rabbet for fixing the rear housing 1. The panel body 2 extends towards the top of the air outlet 4 to form the air baffle rib 8. A water film region 9 is formed between a bottom portion of the front panel 3 and the air baffle rib 8.

[0020] As shown in figure 9, the rear housing 1 extends towards the top of the air outlet 4 to form the air baffle rib 8, and the rear housing 1 encases the panel body 2 such that the panel body 2 is located behind the air outlet 4.

[0021] As shown in figure 10, the air baffle rib 8 is adhered to the front panel 3; or the front panel 3 extends towards the top of the air outlet 4 to form the air baffle rib 8.

[0022] The above embodiments are not used to limit the invention.

Claims

1. An indoor unit of an air conditioner comprising: a panel body (2) encasing side portions and a top portion of the air conditioner and configured to mount a front panel; a rear housing (1) encasing a rear portion of the air conditioner; and the front panel (3) located in front of the panel body and closely connected to the panel body, wherein the rear housing (1), the panel body (2) and the front panel (3) define an inner cavity of the air conditioner; an air outlet (4) is provided at a lower portion of the front panel (3); and an air deflector (5) is provided on the front panel (3) or the panel body (2), and is configured to open and close the air outlet (4),
an air baffle rib (8) is provided at a top portion of the air outlet (4), and extends from the top portion of the air outlet (4) towards the air outlet (4); and
the air baffle rib (8) is configured as an elongated rib-like member attached closely to the top portion of the air outlet (4) in a horizontal direction, and has a horizontal width dimension smaller than or equal to a width dimension of the air outlet (4),
characterized in that,
the panel body (2) is provided with a notch for mounting the front panel (3) and a rabbet for fixing the rear housing (1), the air baffle rib (8) is formed by extending the panel body (2) towards the top of the air outlet (4), and a water film region (9) is formed between a bottom portion of the front panel (3) and the air baffle rib (8).
2. The indoor unit of the air conditioner according to claim 1, wherein an eddy formation device (6) is provided at a bottom portion of the air outlet (4).
3. The indoor unit of the air conditioner according to claim 2, wherein the eddy formation device (6) is provided on the front panel (3) or the panel body (2) in a horizontal direction and is of an elongated strip-like structure; and the eddy formation device (6) comprises at least one concave groove (7) extending in a horizontal direction, a concave direction of the concave groove (7) intersecting an air outlet direction of the air conditioner at an angle.
4. The indoor unit of the air conditioner according to claim 2, wherein the eddy formation device (6) is formed by closely attaching an elongated strip-like member to a bottom surface of the air outlet (4) in a horizontal direction.
5. The indoor unit of the air conditioner according to claim 2, wherein the eddy formation device (6) is formed by closely attaching two or more elongated strip-like members to a bottom surface of the air outlet (4) in a horizontal direction in sequence.
6. The indoor unit of the air conditioner according to claim 4 or 5, wherein the eddy formation device (6) has a horizontal width dimension smaller than or equal to a width dimension of the air outlet (4).

Patentansprüche

1. Inneneinheit einer Klimaanlage, umfassend: einen Plattenkörper (2), der Seitenteile und einen oberen Teil der Klimaanlage umschließt und so konfiguriert ist, dass eine Frontplatte montiert werden kann; ein hinteres Gehäuse (1), das einen hinteren Teil der Klimaanlage umschließt; und die Frontplatte (3), die vor dem Plattenkörper und nahe an dem Plattenkörper angeordnet ist, wobei das hintere Gehäuse (1), der Plattenkörper (2) und die Frontplatte (3) einen inneren Hohlraum der Klimaanlage bilden; wobei ein Luftauslass (4) an einem unteren Abschnitt der Frontplatte (3) bereitgestellt ist; und
ein Luftdeflektor (5) ist an der Frontplatte (3) oder am Plattenkörper (2) vorgesehen, der zum Öffnen und Schließen des Luftauslasses (4) ausgebildet ist, eine Luftleitrippe (8) ist an einem oberen Abschnitt des Luftauslasses (4) vorgesehen und erstreckt sich von dem oberen Abschnitt des Luftauslasses (4) in Richtung des Luftauslasses (4);

und wobei

die Luftleitrippe (8) als ein längliches rippenartiges Element ausgebildet ist, das nahe an dem oberen Abschnitt des Luftauslasses (4) in einer horizontalen Richtung angeordnet ist, und eine horizontale Breitenabmessung aufweist, die kleiner oder gleich einer Breitenabmessung des Luftauslasses (4) ist,

dadurch gekennzeichnet, dass

der Plattenkörper (2) mit einer Aussparung zum Anbringen der Frontplatte (3) und einem Falz zum Befestigen des hinteren Gehäuses (1) versehen ist, wobei die Luftleitrippe (8) durch Verlängern des Plattenkörpers (2) in Richtung der Oberseite des Luftauslasses (4) gebildet wird, und ein Wasserfilmbereich (9) zwischen einem unteren Abschnitt der Frontplatte (3) und der Luftleitrippe (8) ausgebildet ist.

2. Inneneinheit der Klimaanlage nach Anspruch 1, wobei eine Wirbelbildungsvorrichtung (6) an einem unteren Abschnitt des Luftauslasses (4) vorgesehen ist.
3. Inneneinheit der Klimaanlage nach Anspruch 2, wobei die Wirbelbildungsvorrichtung (6) an der Frontplatte (3) oder dem Plattenkörper (2) in einer horizontalen Richtung vorgesehen ist und eine längliche, streifenförmige Struktur aufweist; und die Wirbelbildungsvorrichtung (6) zumindest eine konkave Nut (7) umfasst, die sich in einer horizontalen Richtung erstreckt, wobei eine konkave Richtung der konkaven Nut (7) eine Luftauslassrichtung der Klimaanlage unter einem Winkel schneidet.
4. Inneneinheit der Klimaanlage nach Anspruch 2, wobei die Wirbelbildungsvorrichtung (6) durch nahes Anbringen eines länglichen streifenförmigen Elements an einer Bodenfläche des Luftauslasses (4) in einer horizontalen Richtung ausgebildet ist.
5. Inneneinheit der Klimaanlage nach Anspruch 2, wobei die Wirbelbildungsvorrichtung (6) durch nahes Anbringen von zwei oder mehr länglichen streifenförmigen Elementen an einer Bodenfläche des Luftauslasses (4) in horizontaler Richtung in Folge ausgebildet ist.
6. Inneneinheit der Klimaanlage nach Anspruch 4 oder 5, wobei die Wirbelbildungsvorrichtung (6) eine horizontale Breitenabmessung aufweist, die kleiner oder gleich einer Breitenabmessung des Luftauslasses (4) ist.

Revendications

1. Unité intérieure d'un climatiseur comprenant : un corps de panneau (2) entourant des parties latérales et une partie supérieure du climatiseur et étant conçu pour le montage d'un panneau avant ; un logement arrière (1) entourant une partie arrière du climatiseur ; et le panneau avant (3) se trouvant à l'avant du corps de panneau et étant étroitement relié au corps de panneau, dans laquelle le logement arrière (1), le corps de panneau (2) et le panneau avant (3) définissent une cavité intérieure du climatiseur ; une sortie d'air (4) est située sur une partie inférieure du panneau avant (3) ; et un déflecteur d'air (5) est situé sur le panneau avant (3) ou le corps de panneau (2), et est conçu pour ouvrir et fermer la sortie d'air (4),
une nervure formant chicane d'air (8) est située en une partie supérieure de la sortie d'air (4) et s'étend de la partie supérieure de la sortie d'air (4) vers la sortie d'air (4) ; et
la nervure formant chicane d'air (8) est conçue sous la forme d'un élément allongé en forme de nervure, étroitement fixé à la partie supérieure de la sortie d'air (4) dans une direction horizontale, et présente une dimension de largeur horizontale inférieure ou égale à une dimension de largeur de la sortie d'air (4),
caractérisée en ce que :
le corps de panneau (2) est doté d'une encoche permettant de monter le panneau avant (3) et d'une feuillure permettant de fixer le logement arrière (1), la nervure formant chicane d'air (8) est formée par prolongement du corps de panneau (2) vers le haut de la sortie d'air (4), et une région de pellicule d'eau (9) est formée entre une partie inférieure du panneau avant (3) et la nervure formant chicane d'air (8).
2. Unité intérieure du climatiseur selon la revendication 1, dans laquelle un dispositif de formation de tourbillon (6) est situé en une partie inférieure de la sortie d'air (4).
3. Unité intérieure du climatiseur selon la revendication 2, dans laquelle le dispositif de formation de tourbillon (6) est situé sur le panneau avant (3) ou le corps de panneau (2) dans une direction horizontale et possède une structure allongée en forme de bande ; et le dispositif de formation de tourbillon (6) comprend au moins une rainure concave (7) s'étendant dans une direction horizontale, une direction concave de la rainure concave (7) coupant une direction

de sortie d'air du climatiseur à un angle.

4. Unité intérieure du climatiseur selon la revendication 2, dans laquelle le dispositif de formation de tourbillon (6) est formé par fixation étroite d'un élément allongé en forme de bande à une surface inférieure de la sortie d'air (4) dans une direction horizontale.
5. Unité intérieure du climatiseur selon la revendication 2, dans laquelle le dispositif de formation de tourbillon (6) est formé par fixation étroite successive d'au moins deux éléments allongés en forme de bandes à une surface inférieure de la sortie d'air (4) dans une direction horizontale.
6. Unité intérieure du climatiseur selon la revendication 4 ou 5, dans laquelle le dispositif de formation de tourbillon (6) présente une dimension de largeur horizontale inférieure ou égale à une dimension de largeur de la sortie d'air (4).

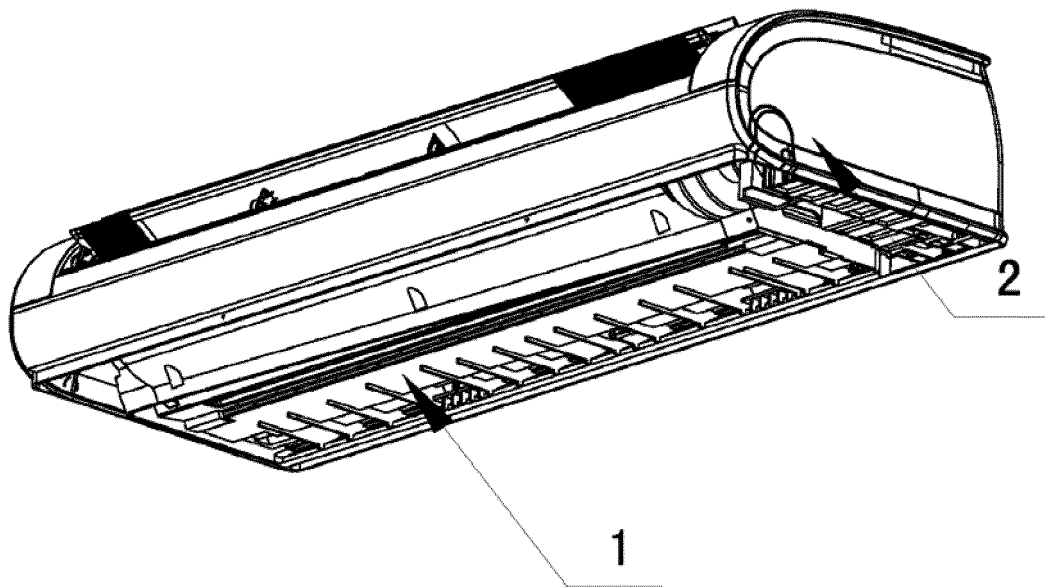


Fig. 1

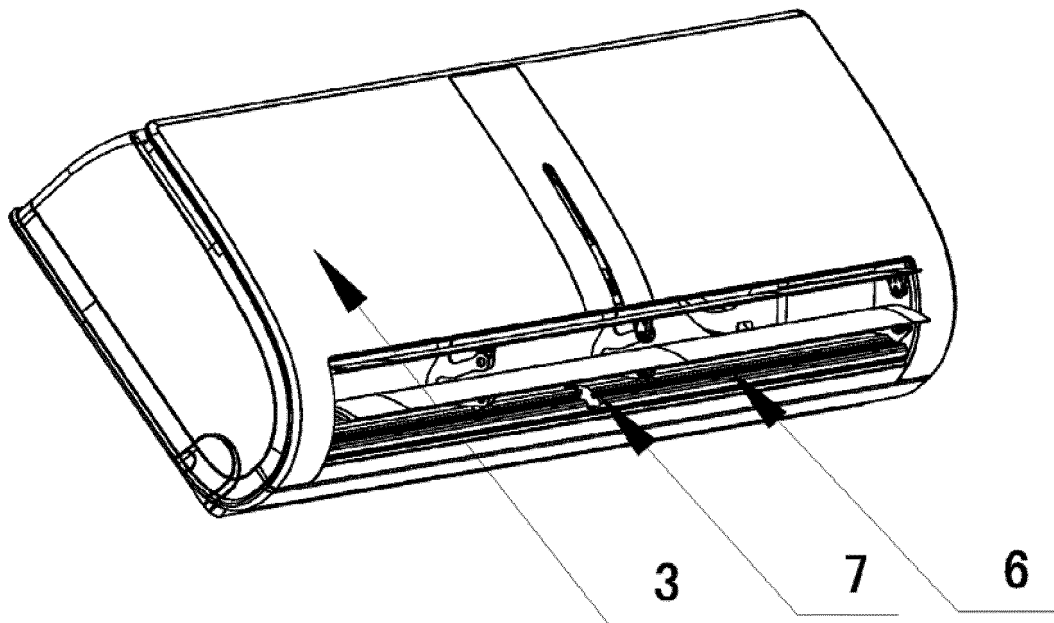


Fig. 2

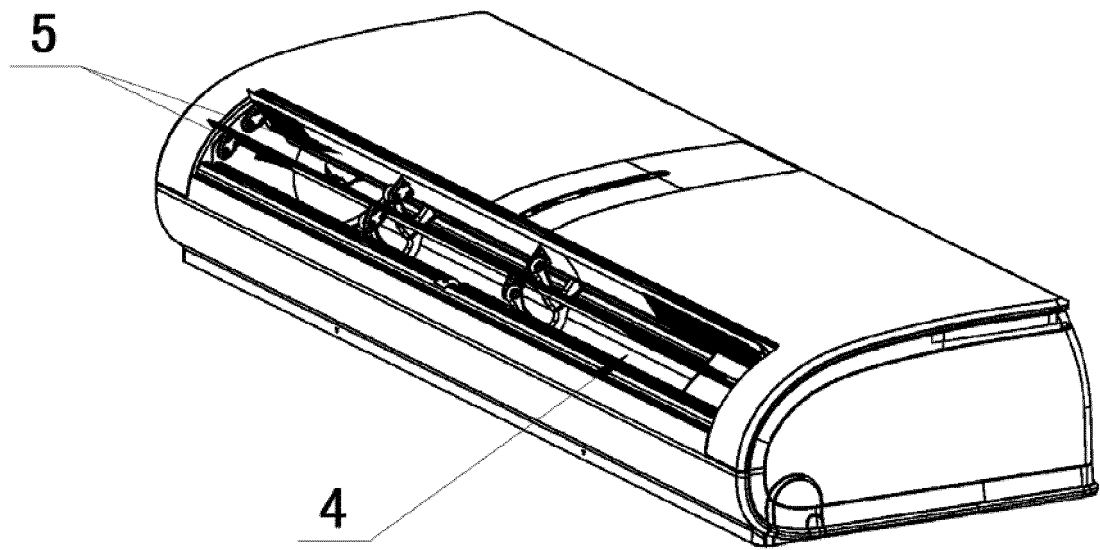


Fig. 3

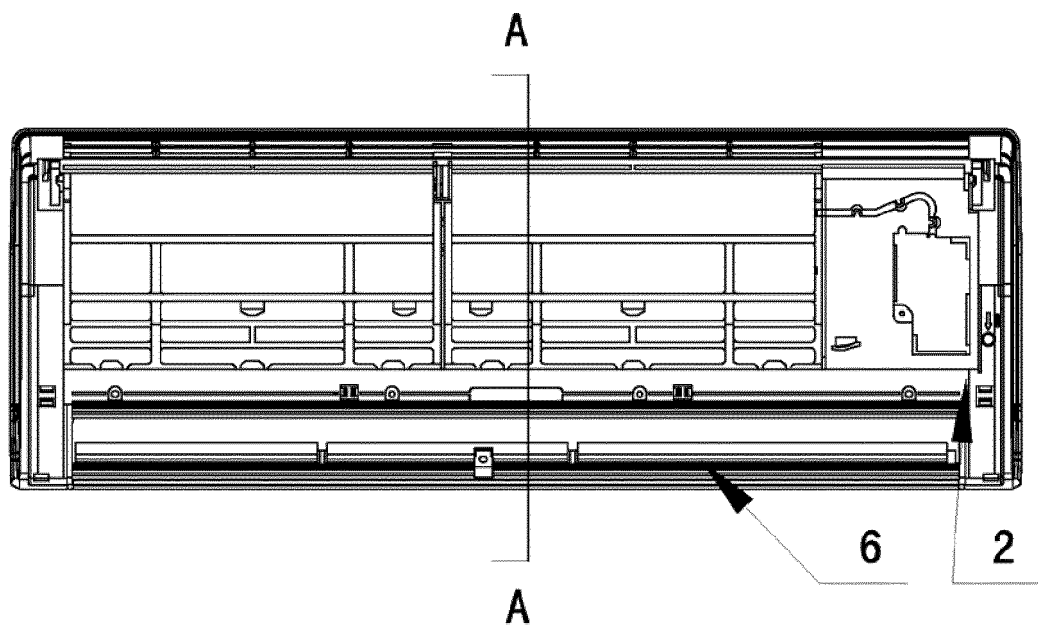


Fig. 4

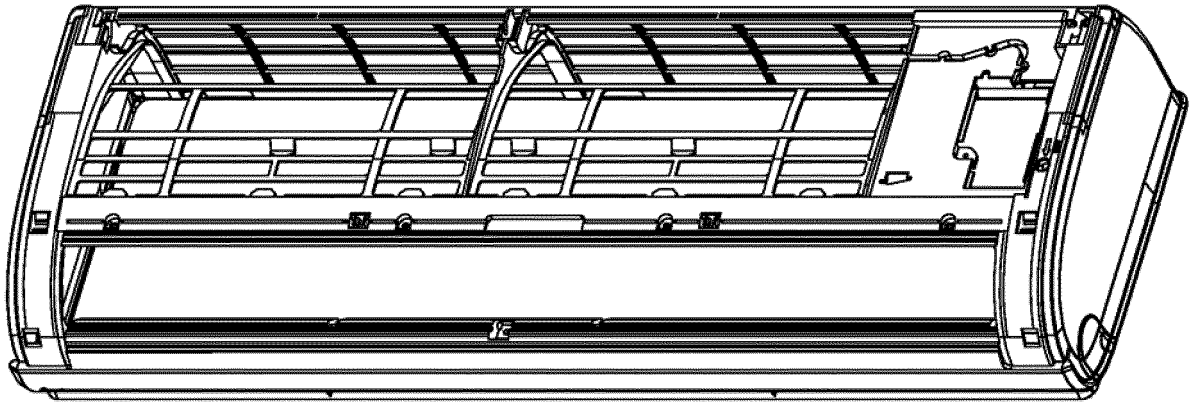


Fig. 5

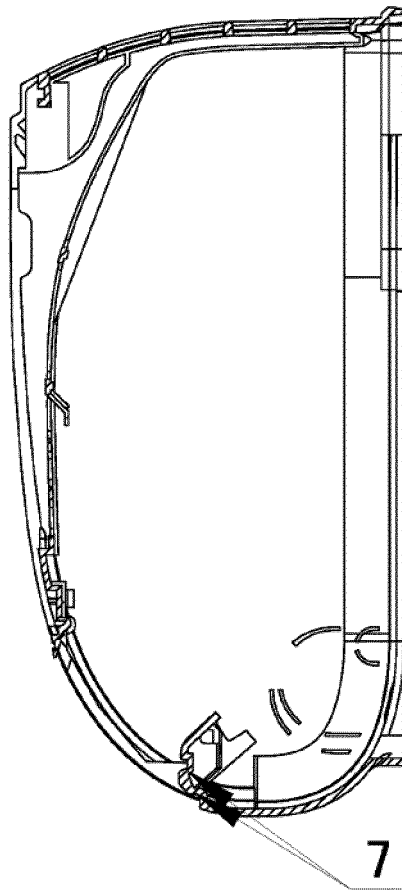


Fig. 6

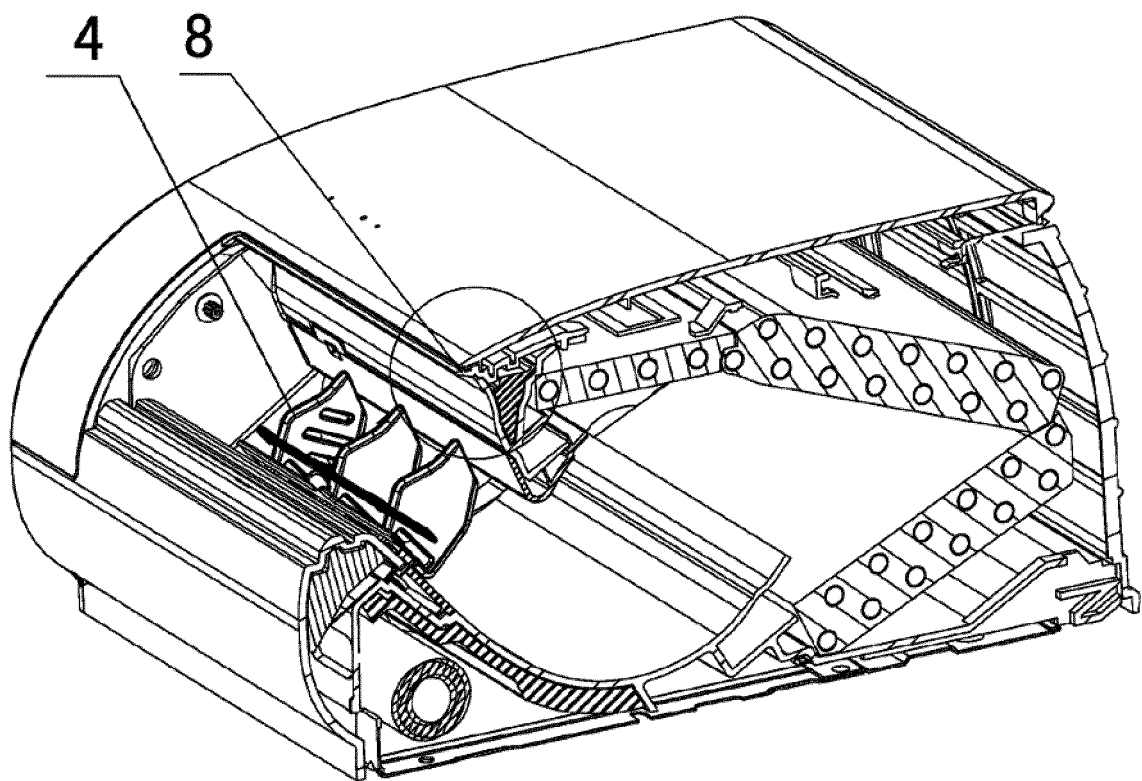


Fig. 7

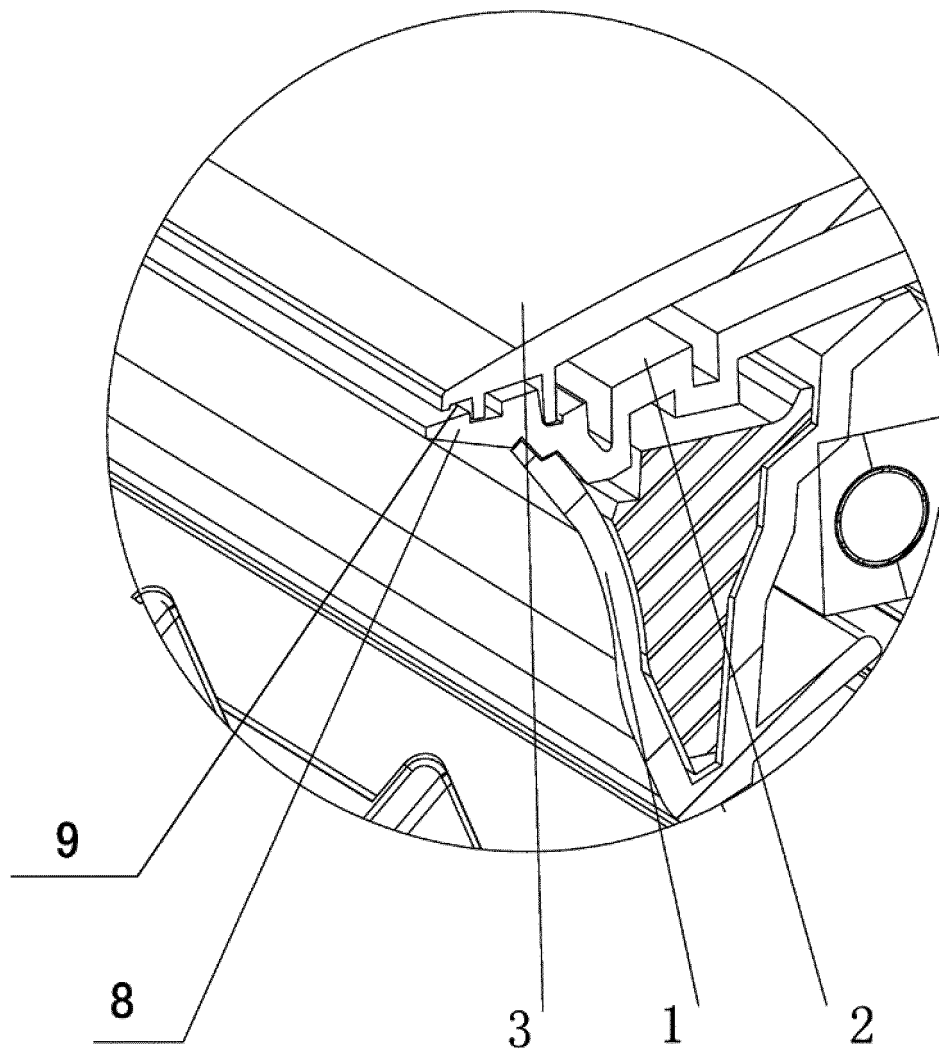


Fig. 8

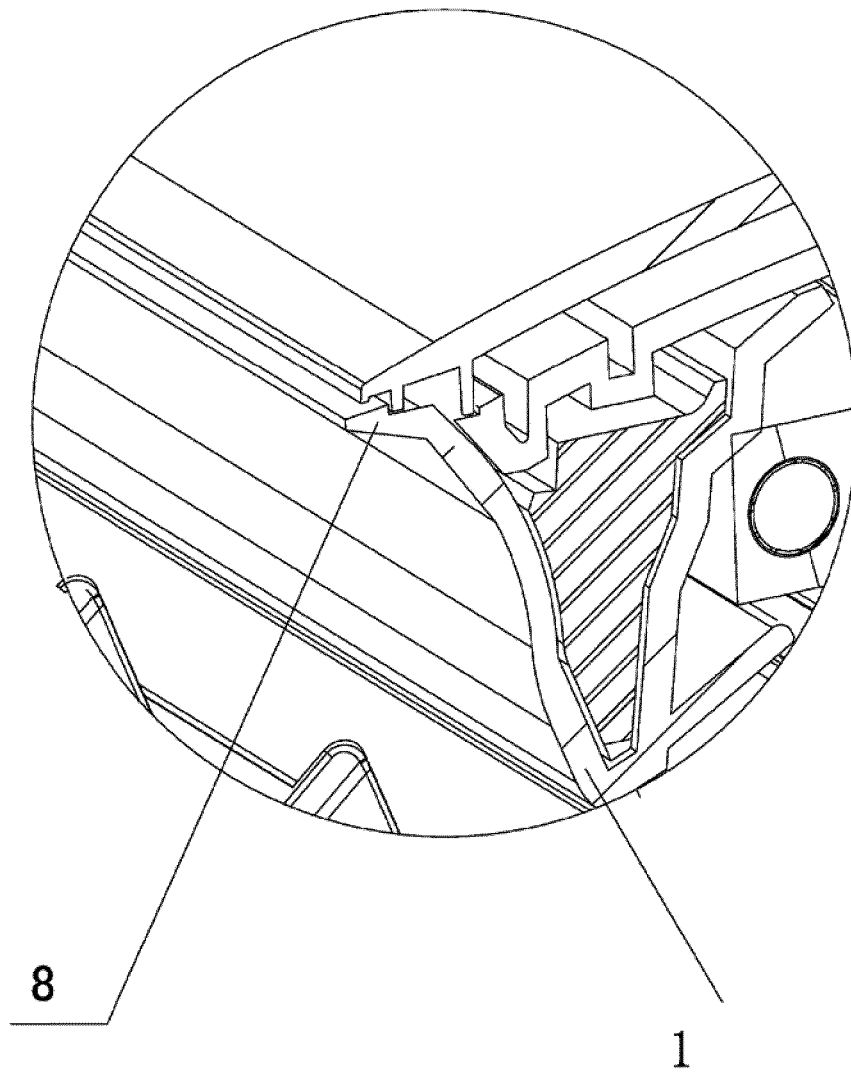


Fig. 9

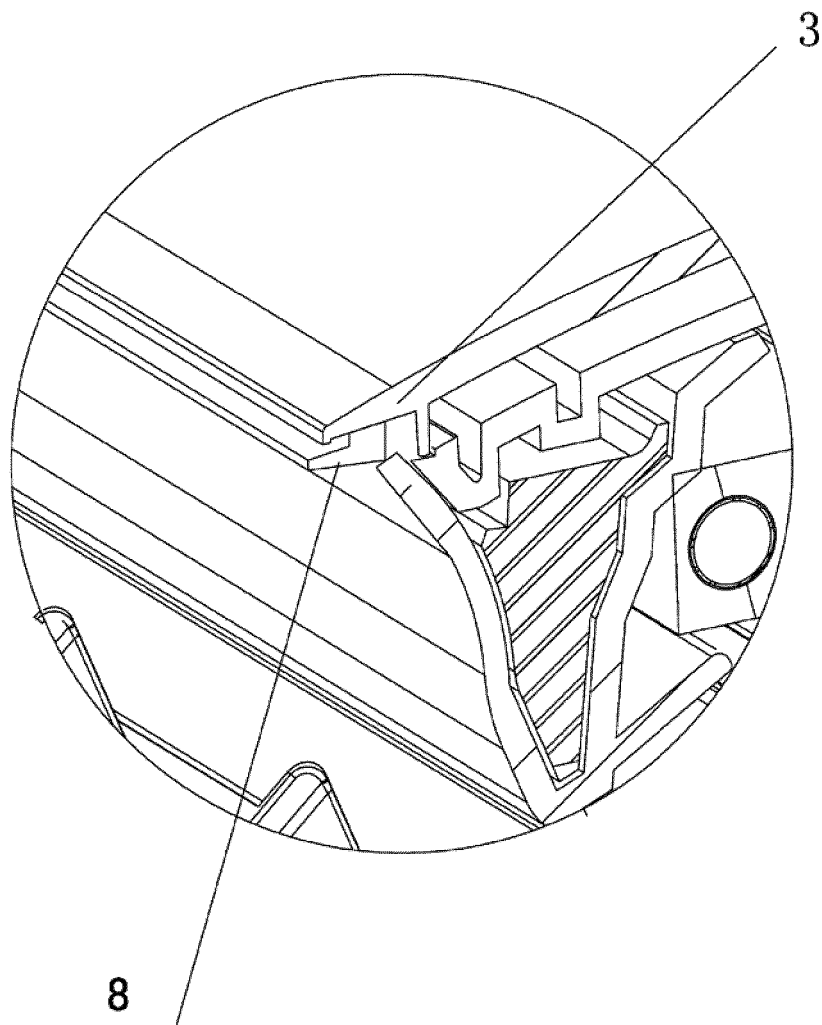


Fig. 10

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

- EP 0962717 A1 [0002]
- EP 1712798 A1 [0002]
- EP 1553358 A1 [0002]