(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 3 745 043 A1**

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

(43) Date of publication:
02.12.2020 Bulletin 2020/49

(21) Application number: **18902044.9**

(22) Date of filing: **29.12.2018**

(51) Int Cl.:
F24F 13/12 *(2006.01)* ***F24F 13/20*** *(2006.01)*
F24F 13/24 *(2006.01)*

(86) International application number:
PCT/CN2018/125512

(87) International publication number:
WO 2019/144774 (01.08.2019 Gazette 2019/31)

(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:
KH MA MD TN

(30) Priority: **27.01.2018 CN 201820141544 U**

(71) Applicants:
- **Ningbo Aux Electric Co., Ltd.**
  Yinzhou District,
  Ningbo
  Zhejiang 315000 (CN)
- **Aux Air Conditioner Co., Ltd**
  Jiangshan Town, Yinzhou District
  Ningbo
  Zhejiang 315191 (CN)

(72) Inventors:
- **WU, Qingzhuang**
  Ningbo, Zhejiang 315191 (CN)
- **LUO, Huibin**
  Ningbo, Zhejiang 315191 (CN)
- **HUANG, Tao**
  Ningbo, Zhejiang 315191 (CN)
- **ZOU, Bo**
  Ningbo, Zhejiang 315191 (CN)
- **ZHANG, Xiaohong**
  Ningbo, Zhejiang 315191 (CN)

(74) Representative: **Zaboliene, Reda**
Metida
Business center Vertas
Gyneju str. 16
01109 Vilnius (LT)

(54) SLIDING DOOR DEVICE AND AIR CONDITIONER

(57) A sliding door device and an air conditioner are provided in the invention, which relate to the field of household appliances. The sliding door device includes a sliding plate assembly and a sliding plate assembly driving structure. The sliding plate assembly driving structure includes a front panel liner and a driving device, wherein the front panel liner is slidably connected to the sliding plate assembly, a drive mounting structure and an air outlet are disposed on the front panel liner, the driving device is mounted to the front panel liner through the drive mounting structure and cooperates with the sliding plate assembly, and the driving device is used to drive the sliding plate assembly to slide relative to the front panel liner for shielding the air outlet or opening the air outlet. A first guide sliding structure is disposed on the front panel liner, a second guide sliding structure is disposed on the sliding plate assembly, and the first guide sliding structure slidably cooperates with the second guide sliding structure. The first guide sliding structure and the first guide sliding structure are disposed at one side portion on a long side of the air outlet. The sliding door device and the air conditioner can effectively prevent abnormal noise and jitter during the process of opening or closing the air outlet by a sliding door device, so as to smooth the operation.

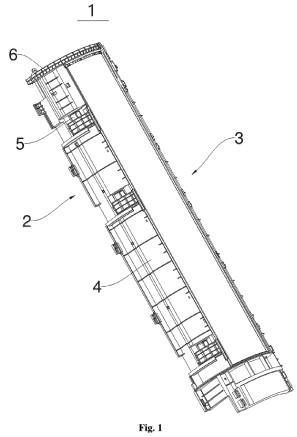

Fig. 1

EP 3 745 043 A1

Description

FIELD OF THE INVENTION

[0001] The invention relates to the technical field of household appliances, in particular to a sliding door device and an air conditioner.

BACKGROUND OF THE INVENTION

[0002] At present, the vertical air conditioner provided with an air outlet in the market has an air outlet region generally located in the indoor human activity area. Since the air outlet is set in the middle of the machine body, the air outlet needs to be hidden when the power is off in order to ensure the beauty of the product. However, an existing vertical air conditioner hides the air outlet in order to rotate the air outlet as a whole in the market. This kind of moving structure has many parts and complicated structure, and it is easy to produce abnormal noise and jitter during the process of opening or closing the air outlet by a sliding door.

SUMMARY OF THE INVENTION

[0003] In view of this, the invention aims at providing a sliding door device, which has a simple structure and is easy to assemble, and may effectively prevent abnormal noise and jitter during the process of opening or closing the air outlet by a sliding door, so as to smooth the operation.

[0004] To achieve the above purpose, the technical solution of the invention is implemented as follows.

[0005] A sliding door device includes a sliding plate assembly and a sliding plate assembly driving structure. The sliding plate assembly driving structure includes a front panel liner and a driving device, wherein the front panel liner is slidably connected to the sliding plate assembly, a drive mounting structure and an air outlet are disposed on the front panel liner, the driving device is mounted to the front panel liner through the drive mounting structure and cooperates with the sliding plate assembly, and the driving device is used to drive the sliding plate assembly to slide relative to the front panel liner for shielding the air outlet or opening the air outlet. A first guide sliding structure is disposed on the front panel liner, a second guide sliding structure is disposed on the sliding plate assembly, and the first guide sliding structure slidably cooperates with the second guide sliding structure. The first guide sliding structure and the first guide sliding structure are disposed at one side portion on a long side of the air outlet.

[0006] Compared to the prior art, the sliding door device of the invention has the following advantages:

For the sliding door device of the invention, a driving device is disposed on a front panel liner such that a sliding plate assembly is driven by the driving device to slide relative to the front panel liner for shielding an air outlet or opening the air outlet; when the sliding plate assembly slides relative to the front panel liner, the sliding of the sliding plate assembly may be effectively guided through the sliding cooperation between a first guide sliding structure and a second guide sliding structure, so as to effectively prevent abnormal noise and jitter during the process of opening or closing the air outlet by the sliding plate assembly, thereby smoothing the operation, simplifying the structure and facilitating the assembly.

[0007] Another object of the invention is to provide an air conditioner, which has a simple structure and is easy to assemble, and may effectively prevent abnormal noise and jitter during the process of opening or closing the air outlet by a sliding door, so as to smooth the operation.

[0008] To achieve the above purpose, the technical solution of the invention is implemented as follows.

[0009] An air conditioner is provided in the invention, which includes a front panel and a sliding door device. The sliding door device includes a sliding plate assembly and a sliding plate assembly driving structure. The sliding plate assembly driving structure includes a front panel liner and a driving device, wherein the front panel liner is slidably connected to the sliding plate assembly. A drive mounting structure and an air outlet are disposed on the front panel liner, the driving device is mounted to the front panel liner through the drive mounting structure and cooperates with the sliding plate assembly, and the driving device is used to drive the sliding plate assembly to slide relative to the front panel liner for shielding the air outlet or opening the air outlet. A first guide sliding structure is disposed on the front panel liner, a second guide sliding structure is disposed on the sliding plate assembly, and the first guide sliding structure slidably cooperates with the second guide sliding structure. The first guide sliding structure and the first guide sliding structure are disposed at one side portion on a long side of the air outlet.

[0010] The air conditioner has the same advantages as the above-mentioned sliding door device over the prior art, and the advantages are not repeated here.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] Aspects of the invention are best understood from the following detailed description when read with the accompanying figures. The exemplary embodiments of the invention and the description thereof are used to explain the invention, and do not constitute improper limitations on the preset invention. In the drawings:

Fig. 1 is an overall structural diagram of a sliding door device according to an embodiment of the invention.

Fig. 2 is a structural diagram of a sliding plate assembly driving structure and a sliding plate assembly of the sliding door device according to an embodiment of the invention.

Fig. 3 is a structural diagram of a front panel liner of the sliding door device according to an embodiment of the invention.

Fig. 4 is a partially-enlarged view at Location I in Fig. 3.

Fig. 5 is a partial structural diagram of an upper end of a front panel liner of the sliding door device at a first perspective according to an embodiment of the invention.

Fig. 6 is a partial structural diagram of an upper end of a front panel liner of the sliding door device at a second perspective according to an embodiment of the invention.

Fig. 7 is a partial structural diagram of an upper end of the sliding door device according to an embodiment of the invention.

Fig. 8 is a partial structural diagram of a lower end of a front panel liner of the sliding door device according to an embodiment of the invention.

Fig. 9 is a structural diagram of a driving device of the sliding door device at a third perspective according to an embodiment of the invention.

Fig. 10 is a structural diagram of a driving device of the sliding door device at a fourth perspective according to an embodiment of the invention.

Fig. 11 is a structural diagram of an upper cover plate of the sliding door device according to an embodiment of the invention.

Fig. 12 is a structural diagram of a sliding plate assembly of the sliding door device according to an embodiment of the invention.

Fig. 13 is a structural diagram of a sliding plate of the sliding door device according to an embodiment of the invention.

Fig. 14 is a structural diagram of a sliding plate liner of the sliding door device according to an embodiment of the invention.

Fig. 15 is a structural diagram of a first transmission mechanism of the sliding door device according to an embodiment of the invention.

Fig. 16 is a structural diagram of a guide sliding plate of the sliding door device according to an embodiment of the invention.

Fig. 17 is an assembly structural diagram of a sliding plate, a first transmission mechanism, and a driving device of the sliding door device according to an embodiment of the invention.

List of serial numbers in the figures:

1- Sliding door device; 2 - Sliding plate assembly driving structure;

(continued)

3 - Sliding plate assembly;	4 - Front panel liner;	5 - Driving device.
6 - Upper cover plate;	7 - Drive mounting structure;	8 - Air outlet;
9 - Receiving groove;	10 - First clamping structure;	11 - Latching port;
12 - First connecting portion;	13 - First positioning structure;	
14 - Positioning hole;	15 - First receiving space;	16 - Second receiving space;
17 - First guide sliding structure;	18 - First guide sliding portion;	
19 - Second guide sliding portion;	20 - First chute;	
21 - Upper cover assembly portion;	22 - Third sliding structure;	
23 - First upper cover buckling structure;		24 - Upper cover connecting portion;
25 - Buckling hole;	26 - Second chute ;	27 - Fourth sliding structure;
28 - Third guide sliding portion;	29 - Fourth guide sliding portion;	
30 - Third chute;	31 - Driving box;	32 - Driving member;
33 - Second transmission mechanism;	34 - Second clamping structure;	
35 - Buckle;	36 - Second connecting portion;	37 - Second positioning structure;
38 - Positioning post;	39 - Second upper cover buckling structure;	
40 - Hook;	41 - Upper cover connecting hole;	42 - Sliding plate;
43 - Sliding plate liner;	44 - First transmission mechanism;	45 - Guide sliding plate;
46 - First clamping strip;	47 - second clamping strip;	48 - Latching notch;
49 - First clamping portion;	50 - Second clamping portion;	
51 - Third clamping portion;	52-Limiting portion;	53 - Positioning groove;
54 - Insertion opening;	55 - First limit portion;	56 - Second limit portion;
57 - First bump;	58 - Second bump;	59 - Third connecting portion;
60 - Third guide sliding member;	61 - Second guide sliding structure;	
62 - Transmission body;	63 - Transmission member;	
64 - Transmission cooperating portion;	65 - First transmission cooperating portion;	
66 - Second transmission cooperating portion;	67 - Clamping groove;	
68 - Protrusion;	69 - Fourth connecting portion;	
70 - First guide sliding member;	71- Second guide sliding member;	
72 - First sliding structure;	73 - Second sliding structure;	
74 - Third receiving space;	75 - clamping space.	

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0012] It should be noted that, in the case of no conflicts, the embodiments and features in the embodiments of the invention can be combined mutually.

[0013] The invention is described in detail with reference to drawings and with combination of embodiments.

Embodiments

[0014] With reference to Figs. 1 and 2, a sliding door device 1 is provided in an embodiment of the invention, which is applied to an air conditioner (not shown) that may be a cylindrical vertical air conditioner for vertical air supply. The air conditioner may include a front panel (not shown) and the above sliding door device 1, wherein the front panel is connected to the sliding door device 1. The front panel is provided with an air inlet (not shown), and the sliding door device 1 may shield the air inlet or open the air inlet. The sliding door device 1 has a compact structure, few structural parts, and may effectively improve the problem of generating abnormal noise and jitter during the process of opening or closing the air inlet.

[0015] The sliding door device 1 includes a sliding plate assembly 3 and a sliding plate assembly driving structure 2. The sliding plate assembly driving structure 2 includes a front panel liner 4, a driving device 5 and an upper cover plate 6. The front panel liner 4 is used to be connected to the front panel, and the front panel liner 4 is slidably connected to

the sliding plate assembly 3. An end of the front panel liner 4 is connected to the upper cover plate 6.

[0016] With reference to Fig. 3, the front panel liner 4 is provided with a drive mounting structure 7 and an air outlet 8, the sliding plate assembly 3 is located between the front panel liner 4 and the front panel, and the air outlet 8 is opposite to the air inlet. The driving device 5 is mounted to the front panel liner 4 through the drive mounting structure 7, and connected rotatably to the sliding plate assembly 3 for driving the sliding plate assembly 3 to slide relative to the front panel liner 4, so as to shield the air outlet 8 and the air inlet or open the air outlet 8 and the air inlet. It should be understood that when the sliding plate assembly 3 opens the air outlet 8 and the air inlet, the air outlet 8 is communicated correspondingly to the air inlet, and then an air generated by the air conditioner may pass through the air outlet 8 and the air inlet in sequence to feed the air to the outside.

[0017] Further, in this embodiment, the front panel liner 4 is roughly an elongated plate-like shell structure with an arc-shaped cross section, and the front panel liner 4 is connected to an inner side of the front panel. The air outlet 8 is disposed in the middle of the front panel liner 4, and the air outlet 8 has substantially a rectangle shape with a length direction consistent with an extension direction of the front panel liner 4.

[0018] The drive mounting structure 7 disposed on the front panel liner 4 is used to mount the driving device 5. The drive mounting structure 7 may be disposed on an end of the front panel liner 4, close to an end of the air outlet 8, or may be disposed on a portion of the front panel liner 4 located on one side of the air outlet 8. In this embodiment, the drive mounting structure 7 is disposed on one side portion of a long side of the air outlet 8, so that the driving device 5 is mounted on one side portion on the long side of the air outlet 8, which may save the space and make the drive more convenient and effective.

[0019] With reference to Fig. 4, the drive mounting structure 7 includes a receiving groove 9 opened on the front panel liner 4, the driving device 5 is received in the receiving groove 9, and the driving device 5 is connected to a wall of the receiving groove 9. In this embodiment, the receiving groove 9 has substantially a rectangle groove. It should be noted that the receiving groove 9 may have one groove, or a plurality of grooves, and the plurality of grooves 9 may be sequentially disposed along the length direction of the front panel liner 4.

[0020] In this embodiment, the receiving groove 9 includes a first receiving space 15, a second receiving space 16 and a third receiving space 74, wherein both the first receiving space 15 and the second receiving space 16 are disposed at a bottom wall of the third receiving space 74 and are communicated with the third receiving space 74, and the first receiving space 15 is communicated with the second receiving space 16. The first receiving space 15 has a substantially arc-shaped groove structure, the second receiving space 16 has a substantially through-hole structure, and the third receiving space 74 is a substantially rectangle-shaped groove structure.

[0021] Further, the drive mounting structure 7 includes a first clamping structure 10, and the first clamping structure 10 is disposed on the wall of the receiving groove 9. The first clamping structure 10 is used be latched with the driving device 5. In this embodiment, the first clamping structure 10 may include a plurality of latching ports 11, and the latching ports 11 are used to be engaged with the driving device 5. The plurality of latching ports 11 are opened on bottom walls of two opposite ends of the third receiving space 74, respectively. The number of latching ports 11 is not limited, and may be two, three or even more. In this embodiment, the latching ports 11 have two ports, and the two latching ports 11 are disposed on the bottom walls of two ends of the third receiving space 74 provided in a width direction of the front panel liner 4.

[0022] In addition, the drive mounting structure 7 may further include a first connecting portion 12. The first connecting portion 12 is disposed on the wall of the receiving groove 9 for being connected to the driving device 5. In this embodiment, the first connecting portion 12 is connected to the driving device 5 through a connecting member. The first connecting portion 12 may be a hole opened on the bottom wall of the third receiving space 74, and the above connecting member may be a screw. Further, the number of the first connecting portions 12 is not specifically limited, and it may be one, two or even more. In this embodiment, the first connecting portion 12 has one portion, which is disposed in the middle on the bottom wall of one end of the third receiving space 74 provided in the length direction of the front panel liner 4.

[0023] In addition, the drive mounting structure 7 may further include a first positioning structure 13. The first positioning structure 13 is disposed on the wall of the receiving groove 9 for cooperating with the driving device 5 to position the driving device 5. Further, the first positioning structure 13 may include a plurality of positioning holes 14, the positioning holes 14 cooperate with the driving device 5, and the plurality of positioning holes 14 are opened on the bottom walls of two opposite ends of the third receiving space 74, respectively. The number of the first positioning holes 14 is not specifically limited, and it may be one, two or even more. In this embodiment, the number of positioning holes 14 may be two, and the two positioning holes 14 are disposed on the bottom walls of two ends of the third receiving space 74 in the width direction of the front panel liner 4, respectively, and is located on an end of corresponding latching ports 11 away from the first connecting portion 12, respectively.

[0024] It should be noted that the number of the drive mounting structures 7 is not specifically limited, and it may be one, two or even more. The number of the driving devices 5 corresponds to the number of the drive mounting structures 7 one by one. The position where the drive mounting structure 7 is provided is not specifically limited. Optionally, the drive mounting structure 7 is disposed in the middle region of the front panel liner 4 on one side close to the air outlet

8, and its strength and operating conditions are good. When the drive mounting structure 7 has one structure, it may be disposed on a position close to the middle of the front panel liner 4; when the drive mounting structure 7 has two structures, the two drive mounting structures 7 may be disposed on the same sides close to two ends of the air outlet 8, respectively. In this embodiment, the drive mounting structure 7 has three structures, and three drive mounting structure 7 may be located at the same sides of the air outlet 8, wherein two drive mounting structures 7 are disposed on two ends close to the air outlet 8, respectively, and the other one drive mounting structure 7 is disposed in a position close to the middle of the front panel liner 4. The number and positions of the drive mounting structures 7 are set correspondingly under the condition of satisfying the use performance, so as to ensure that the sliding operation of the sliding plate assembly 3 is more smoothly.

[0025] Further, one side of the front panel liner 4 close to the drive mounting structure 7 is provided with the first guide sliding structure 17, and the first guide sliding structure 17 is disposed on one side of the long side of the air outlet 8. The first guide sliding structure 17 is used to cooperate with the sliding plate assembly 3 to guide the sliding of the sliding plate assembly 3 when the sliding plate assembly 3 slides relative to the front panel liner 4.

[0026] With reference to Fig. 5, in this embodiment, the first guide sliding structure 17 includes a first guide sliding portion 18 and a second guide sliding portion 19 that are connected with each other and disposed at intervals, and the second guide sliding portion 19 is disposed on an outer side of the first guide sliding portion 18. The first chute 20 is formed between the first guide sliding portion 18 and the second guide sliding portion 19, and the first chute 20 is used to cooperate slidably with the sliding plate assembly 3. The first chute 20 is in an arc shape.

[0027] The first guide sliding portion 18 is substantially in an arc boss shape, which is protruded from a position of the front panel liner 4 close to the drive mounting structure 7. The first guide sliding portion 18 extends from a side edge of the front panel liner 4 toward the drive mounting structure 7 to below the drive mounting structure 7. One side surface of the first guide sliding portion 18 close to the drive mounting structure 7 is flush with a side wall of the third receiving space 74.

[0028] The second guide sliding structure 19 is substantially in an arc-shaped strip structure, which is disposed on the outer side of the first guide sliding portion 18 at intervals, and has a bottom connected to a bottom of the first guide sliding portion 18. An arc-shaped first chute 20 is formed between the first guide sliding portion 18 and the second guide sliding portion 19.

[0029] In addition, it is to be understood that the number and position of the first guide sliding structures 17 corresponds to the drive mounting structures 7 one by one. In this embodiment, the first guide sliding structure 17 has three structures, which correspond to the three drive mounting structures 7 one by one, respectively.

[0030] With reference to Figs. 6 and 7, one end of the front panel liner 4 is provided with an upper cover assembly portion 21, the upper cover assembly portion 21 cooperates with the upper cover plate 6 to form a third sliding structure 22, and the third sliding structure 22 may cooperate with one end of the sliding plate assembly 3. The upper cover assembly portion 21 is provided with a first upper cover buckling structure 23 and an upper cover connecting portion 24, wherein the first upper cover buckling structure 23 is used to be buckled to the upper cover plate 6, and the upper cover connecting portion 24 is used to be connected to the upper cover plate 6. In this embodiment, the upper cover assembly portion 21 is disposed on an upper end of the front panel liner 4. The upper cover assembly portion 21 is in an arc shape, the first upper cover buckling structure 23 includes a plurality of buckling holes 25, and the plurality of buckling holes 25 are disposed uniformly in sequence at intervals along a width direction of the front panel liner 4; the upper cover connecting portion 24 is disposed on one end of the upper cover assembly portion 21, and the upper cover connecting portion 24 is provided with screw holes, which are used to connected to the upper cover plate 6 through screws.

[0031] In this embodiment, the third sliding structure 22 is a second chute 26 formed between an outer side of the upper cover assembly portion 21 and an inner side of the upper cover plate 6; one end of the sliding plate assembly 3 extends into the second chute 26, and slidably cooperates with the second chute 26 to guide the sliding of one end of the sliding plate assembly 3, and during the assembly of the sliding plate assembly 3, the upper cover plate 6 may fix the sliding plate assembly 3 to fix one end of the sliding plate assembly 3 between the upper cover plate 6 and the front panel liner 4.

[0032] It should be noted that in other embodiments of the invention, the third sliding structure 22 may also be a slide rail structure disposed on the front panel liner 4 as long as it may cooperate slidably with the sliding plate assembly 3.

[0033] With reference to Fig. 8, one end of the front panel liner 4 away from the upper cover plate 6 is provided with a fourth sliding structure 27, and the fourth sliding structure 27 may cooperate with one end of the sliding plate assembly 3 to guide the sliding of one end of the sliding plate assembly 3. In this embodiment, the fourth sliding structure 27 is disposed below the front panel liner 4, the fourth sliding structure 27 includes a third guide sliding portion 28 and a fourth guide sliding portion 29 that are connected to each other and disposed at intervals, a third chute 30 is formed between the third guide sliding portion 28 and the fourth guide sliding portion 29, and one end of the sliding plate assembly 3 extends into the third chute 30 and slidably cooperates with the third chute 30. In this way, the third chute 30 may guide the sliding of the sliding plate assembly 3, so as to ensure that the process of opening or closing the sliding plate assembly 3 is more reliable.

[0034] With reference to Figs. 9 and 10, the driving device 5 includes a driving box 31, a driving member 32 and a second transmission mechanism 33. The second transmission mechanism 33 is mounted in the driving box 31. The driving member 32 is mounted on the driving box 31 and connected to the second transmission mechanism 33 to drive the second transmission mechanism 33 to move. In this embodiment, the first receiving space 15 and the third receiving space 74 receive the driving member 32 together, and the second receiving space 16 and the third receiving space 74 receive the driving box 31 together. In addition, in this embodiment, the driving member 32 is a driving motor, the second transmission mechanism 33 is a gear, and an output shaft of the driving motor is connected to the gear. One side of the driving box 31 is provided with an opening, and the gear extends out of the driving box 31 from the opening so as to cooperate with the sliding plate assembly 3.

[0035] The driving box 31 is provided with a second clamping structure 34, and the second clamping structure 34 is latched with the first clamping structure 10. Optionally, the second clamping structure 34 include a plurality of buckles 35, the plurality of buckles 35 are disposed on two opposite ends of the driving box 31, respectively, and the plurality of buckles 35 are buckled correspondingly to the plurality of latching ports 11 one by one. In this embodiment, the buckle 35 has two buckles, and the two buckles 35 are located at two opposite ends of the driving box 31, respectively.

[0036] The driving box 31 is provided with a second connecting portion 36, and the second connecting portion 36 is connected to the first connecting portion 12 through a connecting member. The number and position of the second connecting portion 36 corresponds to those of the first connecting portion 12. In this embodiment, the second connecting portion 36 is disposed on one side of the driving box 31 away from the driving member 32, and the second connecting portion 36 is opened with holes; the above connecting member may be a screw, and the first connecting portion 12 is connected to the second connecting portion 36 through the screw.

[0037] The driving box 31 is provided with a second positioning structure 37, and the first positioning structure 13 cooperates with the second positioning structure 37 for positioning the driving box 31. Optionally, the second positioning structure 37 include a plurality of positioning posts 38, the plurality of positioning posts 38 are disposed on two opposite ends of the driving box 31, respectively, and the plurality of positioning posts 38 cooperate correspondingly to the plurality of positioning holes 14 one by one. In this embodiment, the positioning post 38 has two posts, and the two positioning posts 38 are disposed at two opposite ends of the driving box 31, respectively and disposed correspondingly on one side of the two buckles 35 close to the driving member 32.

[0038] When the driving device 5 is assembled to the front panel liner 4, the driving device 5 is entirely received in the receiving groove 9, wherein the driving member 32 is received in the first receiving space 15 and the third receiving space 74, and the driving box 31 is received in the second receiving space 16 and the third receiving space 74 and is positioned on the first positioning structure 13 through the second positioning structure 37, so that the driving device 5 is latched with the front panel liner 4 through the first clamping structure 10 and the second clamping structure 34, and then the first connecting portion 12 is fixedly connected to the second connecting portion 36 through the connecting member. In this embodiment, the driving device 5 is mounted to the drive mounting structure 7, and the positioning, latching and fixed connecting between the driving device 5 and the drive mounting structure 7 through the positioning structures, the latching structures and the fixedly-connecting structures are achieved, so that not only the driving device 5 is positioned accurately and connected more firmly to smooth the driving of the sliding plate assembly 3, but also the connected member is saved while simplifying the structure, reducing the cost and facilitating the assembly.

[0039] It should be noted that in other embodiments of the invention, the driving device 5 may also be connected to the front panel liner 4 through latching structures, or through positioning structures in combination with latching structures, or may be fixedly connected through fixedly-connecting structures or also through positioning structures in combination with the fixedly-connecting structures.

[0040] With reference to Fig. 11, the upper cover plate 6 is substantially in arc-shaped plate-like structure, which has a shape matched with the cross section shape of the front panel liner 4. The inner side of the upper cover plate 6 is provided with a second upper cover buckling structure 39, and the second upper cover buckling structure 39 cooperates with the first upper cover buckling structure 23, so that the upper cover plate 6 is buckled to the upper assembly portion 21. In this embodiment, the second upper cover buckling structure 39 includes a plurality of hooks 40, the plurality of hooks 40 are disposed in sequence at intervals along an extension direction of the upper cover plate 6, and optionally, the hook 40 has an L-shaped shape. In addition, one end of the upper cover plate 6 is provided with an upper cover connecting hole 41 (see Fig. 7), and the upper cover connecting hole 41 is connected to the upper cover connecting portion 24 through screws.

[0041] When the upper cover plate 6 is assembled with the upper cover assembly portion 21 of the front panel liner 4, the plurality of hooks 40 on the upper cover plate 6 are extended into the plurality of buckling holes 25 correspondingly one by one, the upper cover plate 6 is slided relative to the front panel liner 4 such that the hooks 40 are clamped in the buckling holes 25, and then the upper cover connecting hole 41 is fixedly connected to the upper cover connecting portion 24 through screws. After the upper cover plate 6 is assembled with the front panel liner 4, the second chute 26 is formed between the outer side of the upper cover assembly portion 21 and the inner side of the upper cover plate 6. The upper cover plate 6 is connected to the front panel liner 4 through cooperation between the hooks 40 and the

buckling holes 25 and the connecting member, so that the upper cover plate 6 is firmly connected to the front panel liner 4, and through the limitation of one end of the sliding plate assembly 3 between the upper cover plate 6 and the front panel liner 4 by the upper cover plate 6, the sliding of the sliding plate assembly 3 relative to the front panel liner 4 is further more smooth, so as to prevent abnormal noise and jitter during the process of opening or closing the air inlet by the sliding plate assembly 3.

[0042] With reference to Fig. 12, the sliding plate assembly 3 includes a sliding plate 42, a sliding plate liner 43, a first transmission mechanism 44 and a guide sliding plate 45. One end of the sliding plate 42 is connected to the guide sliding plate 45, an inner side of the sliding plate 42 is connected to the sliding plate liner 43, the sliding plate liner 43 is connected to the first transmission mechanism 44, and the first transmission 44 is slidably connected to the front panel liner 4. One end of the sliding plate 42 is provided with a first sliding structure 72, and the other end of the sliding plate 42 is provided with a second sliding structure 73. The first sliding structure 72 may cooperate slidably with the third sliding structure 22, and the second sliding structure 73 may cooperate slidably with the fourth sliding structure 27. In this embodiment, the first sliding structure 72 is disposed on the guide sliding plate 45.

[0043] It should be understood that in an embodiment of the invention, the first transmission mechanism 44 is slidably connected to the front panel liner 4, or an upper end of the sliding plate 42 is slidably connected to the front panel liner 4, or a lower end of the sliding plate 42 is slidably connected to the front panel liner 4, or the combination thereof; or the upper and lower ends of the sliding plate 42 is not provided with a sliding structure cooperating slidably with the front panel liner 4, but is slidably connected to the front panel liner 4 through one or more first transmission mechanisms 44.

[0044] With reference to Fig. 13, the sliding plate 42 is substantially in a rectangle shape, and has an arc-shaped plate-like cross section, which may slide relative to the front panel liner 4, so as to shield the air outlet 8 and the air inlet or to open the air outlet 8 and the air inlet.

[0045] In this embodiment, two sides of the sliding plate 42 are provided with a first clamping strip 46 and a second clamping strip 47, respectively, and the first clamping strip 46 and the second clamping strip 47 are buckled to the two sides of the sliding plate liner 43, respectively. The second clamping strip 47 may be at least two strips, the adjacent two second clamping strips 47 are disposed at intervals and form a latching notch 48, and the latching notch 48 cooperates with the sliding plate liner 43.

[0046] With reference to Fig. 14, the sliding plate liner 43 is substantially in a rectangle shape as a whole, and has an arc-shaped cross section. The sliding plate liner 43 is connected to the inner side of the sliding plate 42. The two sides of the sliding plate liner 43 are provided with a first clamping portion 49 and a second clamping portion 50, the first clamping portion 49 is clamped between the first clamping strip 46 and the sliding plate 42, and the second clamping portion 50 is clamped between the second clamping strip 47 and the sliding plate 42. The second clamping portion 50 may be at least two portions, the at least two second clamping portions 50 are buckled correspondingly to the at least two second clamping strips 47 one by one, a third clamping portion 51 is protruded from the sliding plate liner 43 between the adjacent two second clamping portions 50, and the third clamping portion 51 extends outward from the latching notch 48 and is clamped between the third clamping portion 51 and the sliding plate liner 43 together with one side of the sliding plate 42.

[0047] The sliding plate liner 43 is provided with a limit portion 52, and the limit portion 52 cooperates with the first transmission mechanism 44 to limit the first transmission mechanism 44, and the sliding plate liner 43 is connected to the first transmission mechanism 44; optionally, the sliding plate liner 43 is connected to the first transmission mechanism 44 through a connecting member, and the connecting member may be a screw and the like. That is, the sliding plate liner 43 and the first transmission mechanism 44 may both achieve limitation through the limit portion 52 and achieve fixed connection through the connecting member,

[0048] The sliding plate liner 43 is provided with a positioning groove 53, and one end of the first transmission mechanism 44 extends into the positioning groove 53. One end of the positioning groove 53 is opened with an insertion opening 54, and one end of the first transmission mechanism 44 extends into the positioning groove 53 through the insertion opening 54.

[0049] The limit portion 52 includes a first limit portion 55 and a second limit portion 56. The first limit portion 55 includes a first bump 57 protruded from the sliding plate liner 43 in a first direction. The second limit portion 56 includes a second bump 58 protruded from one side of the sliding plate liner 43 in a second direction, and the second bump 58 and the sliding plate liner 43 form a clamping space 75. It should be noted that the first direction is an extension direction of the sliding plate liner 43, and after the sliding plate liner 43 is assembled onto the sliding plate 42, the first direction coincides with a length direction of the sliding plate 42. The second direction is an arc-shaped extension direction of the cross section of the sliding plate liner 43, the second direction is perpendicular to the first direction, and after the sliding plate liner 43 is assembled onto the sliding plate 42, the first direction coincides with a width direction of the sliding plate 42.

[0050] In this embodiment, the first limit portion 55 extends in the first direction from a side wall of the positioning groove 53. The first limit portion 55 has a plurality of portions, and the plurality of first limit portions 55 are distributed on one side of the positioning groove 53 in sequence in the second direction. The second limit portion 56 extends in the second direction from a wall on one end of the positioning groove 53 away from the insertion opening 54. The second

limit portion 56 may have two portions, and the two second limit portions 56 are disposed on two ends of the wall on one end of the positioning groove 53 away from the insertion opening 54, respectively. The insertion opening 54 is opened at one end of the sliding plate liner 43 where the third clamping portion 51 is provided.

[0051] The sliding plate liner 43 is provided with a third connecting portion 59, and the third connecting portion 59 is fixedly connected to the first transmission mechanism 44. In this embodiment, the third connecting portion 59 is disposed at a position on the sliding plate liner 43 close to the first limit portion 55.

[0052] In this embodiment, through the first limit portion 55 and the second limit portion 56, the first transmission mechanism 44 may be effectively limited, and through the fixed connection between the third connecting portion 59 and the first transmission mechanism 44, the connection between the sliding plate liner 43 and the first transmission mechanism 44 is firm, thereby simplifying the structure and facilitating the assembly.

[0053] One end of the sliding plate liner 43 is provided with a third guide sliding member 60, and the third guide sliding member 60 slidably cooperates with the fourth sliding structure 27. In this embodiment, the third guide sliding member 60 may extend into the third chute 30 and slidably cooperates with the third chute 30. Optionally, the third guide sliding member 60 has a plurality of members, which are distributed in sequence along one end edge of the sliding plate liner 43. The third guide sliding member 60 may be a guide sliding post, or may be a bearing.

[0054] It should be noted that in this embodiment, the sliding plate liner 43 may be a plurality of liners, in which one sliding plate liner 43 is disposed below the sliding plate 42 with one end protruded from the lower end of the sliding plate 42. In this way, the second sliding structure 73 is disposed on the end of the sliding plate liner 43 protruded from the sliding plate 42, i.e., the second sliding structure 73 may include a plurality of above third guide sliding members 60. Of course, in other embodiments of the invention, the second sliding structure 73 may also be directly disposed on the lower end of the sliding plate 42, wherein a plurality of third guide sliding members 60 are included, and then the third guide sliding member 60 is protruded from the lower end of the sliding plate 42. Or, the second sliding structure 73 is disposed on a transitional connecting structure, which is connected to the lower end of the sliding plate 42, and then, the second sliding structure 73 may also include a plurality of third guide sliding members 60, and the plurality of third guide sliding members 60 are protruded from the lower end of the sliding plate 42 by the transitional connecting structure.

[0055] With reference to Fig. 15, the thirst transmission mechanism 44 is fixedly connected to the sliding plate liner 43, and cooperates with the driving device 5, so as to slide relative to the front panel liner 4 after being driving by the driving device 5, thereby driving the sliding plate 42 to slide relative to the front panel liner 4. The first transmission mechanism 44 is provided with a second guide sliding structure 61, and the first guide sliding structure 17 slidably cooperates with the second guide sliding structure 61.

[0056] The first transmission mechanism 44 includes a transmission body 62 and a transmission member 63 disposed on the transmission body 62. The transmission body 62 is connected to the sliding plate liner 43, and the transmission member 63 is trasmittably connected to the driving device 5. The second guide sliding structure 61 is disposed on the transmission body 62. In this embodiment, the transmission member 63 is disposed inside the transmission body 62, and the transmission member 63 is a rack, which is engaged with the gear.

[0057] The transmission body 62 is substantially in a rectangle shape, and has an arc-shaped cross section. The transmission body 62 is provided with a transmission cooperating portion 64, and the transmission cooperating portion 64 cooperates with the limit portion 52 to limit the transmission cooperating portion 64. One end of the transmission body 62 extends into the positioning groove 53 through the insertion opening 54, and one end of the transmission body 62 away from the positioning groove 53 is protruded from the body of the sliding plate 42.

[0058] The transmission cooperating portion 64 includes a first transmission cooperating portion 65 and a second transmission cooperating portion 66. The first transmission cooperating portion 65 is latched with the first limit portion 55, and the second transmission cooperating portion 66 cooperates with the second limit portion 56. The first transmission cooperating portion 65 includes a clamping groove 67 recessed inward from one side of the transmission body 62, and the first bump 57 is clamped in the clamping groove 67. The second transmission cooperating portion 66 includes a protrusion 68 protruded from one end of the transmission body 62, and the protrusion 68 is clamped in the clamping space 75 between the second bump 58 and the side surface of the sliding plate liner 43.

[0059] In this embodiment, the first transmission cooperating portion 65 has a plurality of portions, and the plurality of first transmission cooperating portions 65 are distributed in sequence along one side of the transmission body 62. Two ends of the protrusion 68 extend into between the two second limit portions 56 and the sliding plate liner 43, respectively.

[0060] The transmission body 62 is provided with a fourth connecting portion 69, and the fourth connecting portion 69 is connected to the third connecting portion 59 through a connecting member to fixedly connect the sliding plate liner 43 to the transmission body 62. The connecting member may be a screw and the like. In this embodiment, the fourth connecting portion 69 is disposed on one side of the transmission body 62 provided with the first transmission cooperating portion 65, and disposed close to the first transmission cooperating portion 65.

[0061] The second guide sliding structure 61 includes a first guide sliding member 70 disposed on one side of the transmission body 62, and the first guide sliding member 70 extends into the first chute 20 and may cooperate slidably with the first chute 20. In this embodiment, the first guide sliding member 70 is disposed on one side away from the first

transmission cooperating portion 65. The first guide sliding member 70 has a plurality of post-like structures protruded from the transmission body 62.

[0062] With reference to Fig. 16, the guide sliding plate 45 has substantially an arc-shaped plate-like structure, and the guide sliding plate 45 is connected to the upper end of the sliding plate 42. In this embodiment, the first sliding structure 72 is disposed on one side of the guide sliding plate 45, the first sliding structure 72 includes a plurality of second guide sliding members 71, and the second guide sliding members 71 cooperate slidably with the third sliding structure 22. Further, the second guide sliding members 71 may extend into the second chute 26 between the upper cover plate 6 and the front panel liner 4, and cooperate slidably with the second chute 26. The second guide sliding member 71 may be a guide sliding post, or may be a bearing. In this embodiment, the second guide sliding member 71 is a guide sliding post. Of course, in other embodiments of the invention, it is also possible to provide the first sliding structure 72 directly on one end of the sliding plate 42 without separately providing the guide sliding plate 45.

[0063] It should be noted that the sliding plate 42 may be provided with a plurality of sliding plate liners 43, and each of the sliding plate liners 43 correspondingly is connected to one first transmission mechanism 44, i.e., the number and position of the sliding plate liner 43 and the first transmission mechanism 44 correspond to those of the driving device 5. The first sliding guiding member 70 on the first transmission mechanism 44 corresponding to the plurality of sliding plate liners 43slidably cooperates with the corresponding first chute 20 on the front panel liner 4. The third sliding guiding member 60 on the first transmission mechanism 44 located on the bottommost portion of the sliding plate 42 corresponding to the sliding plate liner 43slidably cooperates with the third chute 30. In this embodiment, both the sliding plate liner 43 and the first transmission mechanism 44 have three ones. One set of the sliding plate liner 43 and the first transmission mechanism 44 is disposed close to one end of the sliding plate 42; another set of the sliding plate liner 43 and the first transmission mechanism 44 is disposed close to the middle of the sliding plate 42; the third set of the sliding plate liner 43 and the first transmission mechanism 44 is disposed on the other end of the sliding plate 42, and the third guide sliding member 60 on the first transmission mechanism 44 is protruded from an end of the sliding plate 42 so as to cooperate slidably with the third chute 30.

[0064] In addition, it should be noted that the first guide sliding structure 17slidably cooperates with the second guide sliding structure 61, the first sliding structure 72 cooperates slidatbly with the third sliding structure 22, and the second sliding structure 73 cooperates slidatbly with the fourth sliding structure 27; in other embodiments of the invention, only any one of the above sets of the cooperating structures may be disposed, or any two of the above sets may be disposed. In this embodiment, all the three sets are disposed.

[0065] With reference to Fig. 17, when the sliding plate assembly 3 is assembled, the first clamping portion 49 on one side of the sliding plate liner 43 is engaged between the first clamping strip 46 and the sliding plate 42, and the second clamping portion 50 on the other side is clamped between the second clamping strip 47 and the sliding plate 42, so that the third clamping portion 51 extends outward from the latching notch 48, and one side of the sliding plate 42 is clamped between the third clamping portion 51 and the sliding plate liner 43. The guide sliding plate 45 is assembled onto the upper end of the sliding plate 42. When the first transmission mechanism 44 is assembled onto the sliding plate 42, one end of the transmission body 62 is inserted into the positioning groove 53 through the insertion opening 54 of the sliding plate liner 43, so that two ends of the protrusion 68 extend into between the two second limit portions 56 and the sliding plate liner 43, and the first bump 57 is latched into the clamping groove 67, thereby achieving the limitation on the transmission body 62; then, the fourth connecting portion 69 is connected to the third connecting portion 59 through a connecting member, thereby assembling the transmission body 62 onto the sliding plate liner 43.

[0066] The sliding plate assembly 3 cooperates with the transmission cooperating portion 64 through the limit portion 52 for limiting the transmission cooperating portion 64, and the transmission body 62 is connected to the sliding plate liner 43, so that the sliding plate liner 43 is firmly connected to the first transmission mechanism 44, and the process of sliding the sliding plate assembly 3 is more smooth, thereby effectively preventing abnormal noise and jitter during the process of opening or closing the air inlet, and simplifying the structure and facilitating the assembly for the sliding plate assembly 3.

[0067] In summary, the sliding door device 1 provided by this embodiment assembles the driving device 5 to the drive mounting structure 7 of the front panel liner 4 during assembly. The transmission body 62 and the driving device 5 are assembled to the front panel liner 4, so that the rack on the transmission body 62 is engaged with the gear of the driving device 5, and the first guide sliding member 70 on the transmission body 62 cooperates with the first chute 20. The sliding plate liner 43 and the guide sliding plate 45 are assembled onto the sliding plate 42, and the transmission body 62 is assembled with the sliding plate liner 43. The sliding plate 42 is mounted onto the front panel liner 4, wherein the lower end of the sliding plate 42 is first assembled onto the front panel liner 4, so that the third guide sliding member 60 on the sliding plate liner 43 located on the lower portion of the sliding plate 42 extends into the third chute 30. The upper end of the front panel liner 4 is assembled with the upper cover plate 6, and the upper cover plate 6 fixes the upper end of the sliding plate 42 to the front panel liner 4; then, the second chute 26 is formed between the upper cover plate 6 and the front panel liner 4, and the second guide sliding member 71 on the guide sliding plate 45 is embedded into the second chute 26.

[0068] The following specifically describes the working principle of the sliding door device 1 provided in this embodiment: When the driving device 5 operates, the driving motor drives the gear to rotate, the gear drives the rack to translate the transmission body 62, and the sliding plate assembly 3 as a whole is slid relative to the front panel liner 4 since the transmission body 62 is connected to the sliding plate liner 43 and the sliding plate 42 as a whole; and then, the first guide sliding 70 slides in the first chute 20, and the second guide sliding member 71 on the guide sliding plate 45 at the upper end of the sliding plate 42 slides in the second chute 26. and the third guide sliding member 60 located at the lower end of the sliding plate 42 slides in the third chute 30, so that the sliding plate 42 slides leftward and rightward relative to the front panel liner 4 to shield the air outlet 8 and the air inlet or open the air outlet 8 and the air inlet.

[0069] The sliding door device 1 provided by this embodiment has a compact structure, few structural parts, and may effectively improve the problem of generating abnormal noise and jitter during the process of opening or closing the air inlet, with strong practicality and simplicity to form a standard. Further, in the sliding door device 1 provided by this embodiment, through provision of the first guide sliding structure 17 in the middle of the front panel liner 4, and provision of the third sliding structure 22 and the fourth sliding structure 27 on the upper and lower ends, respectively, the achieve stable operation and synchronous operation of upper and lower ends may be achieved, so as to ensure that the gap is uniform during the opening and closing process of the sliding plate 42, and the operation of the sliding plate 42 is smooth.

[0070] The above are only the preferred embodiments of the invention and are not intended to limit the invention. Any modification, equivalent replacement, or improvement made within the spirit of the invention shall be included in the protection scope of the invention.

Claims

1. A sliding door device, **characterized in that**, the sliding door device comprises a sliding plate assembly (3) and a sliding plate assembly driving structure (2);
   the sliding plate assembly driving structure (2) comprises a front panel liner (4) and a driving device (5), wherein the front panel liner (4) is slidably connected to the sliding plate assembly (3), a drive mounting structure (7) and an air outlet (8) are disposed on the front panel liner (4), the driving device (5) is mounted to the front panel liner (4) through the drive mounting structure (7) and cooperates with the sliding plate assembly (3), and the driving device (5) is used to drive the sliding plate assembly (3) to slide relative to the front panel liner (4) for shielding the air outlet (8) or opening the air outlet (8);
   a first guide sliding structure (17) is disposed on the front panel liner (4), a second guide sliding structure (61) is disposed on the sliding plate assembly (3), and the first guide sliding structure (17) slidably cooperates with the second guide sliding structure (61);
   the first guide sliding structure (7) and the first guide sliding structure (17) are disposed at one side portion on a long side of the air outlet (8).

2. An air conditioner, **characterized in that**, the air conditioner comprises a front panel and the sliding door device according to claim 1, wherein the front panel is connected to the front panel liner (4).

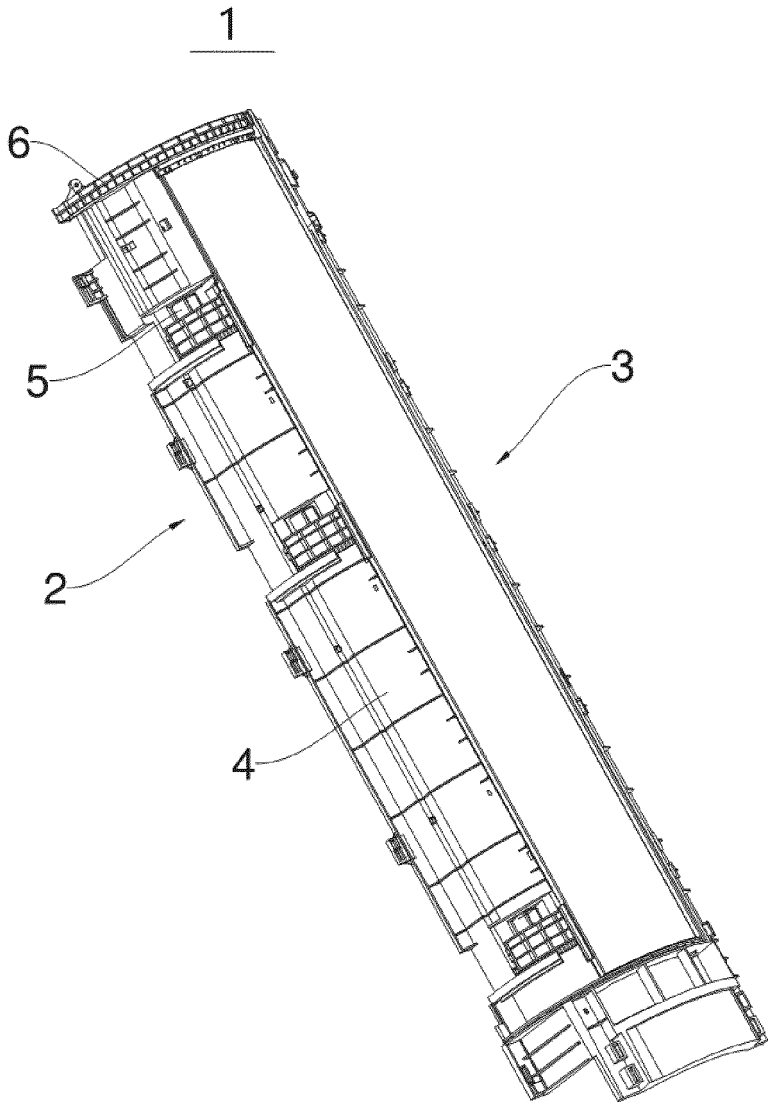

Fig. 1

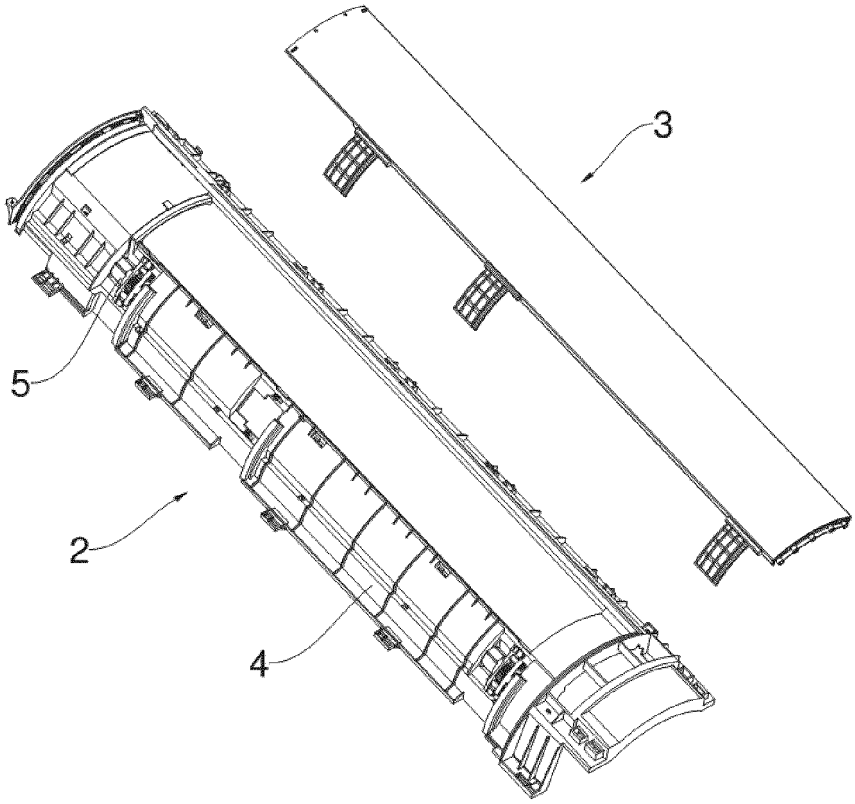

Fig. 2

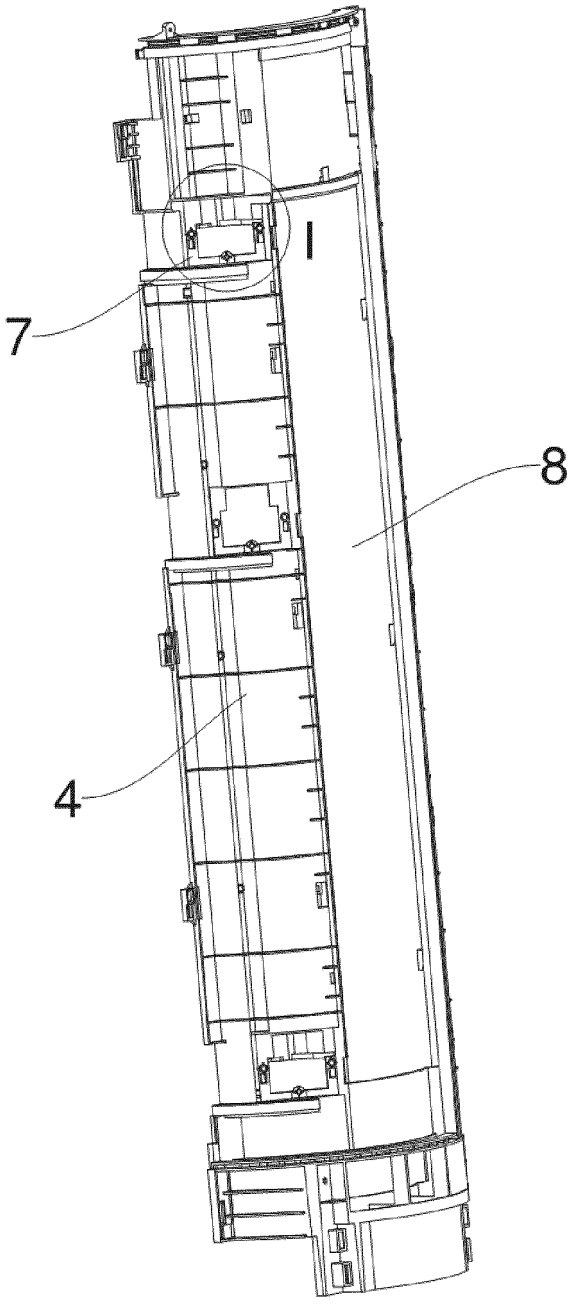

Fig. 3

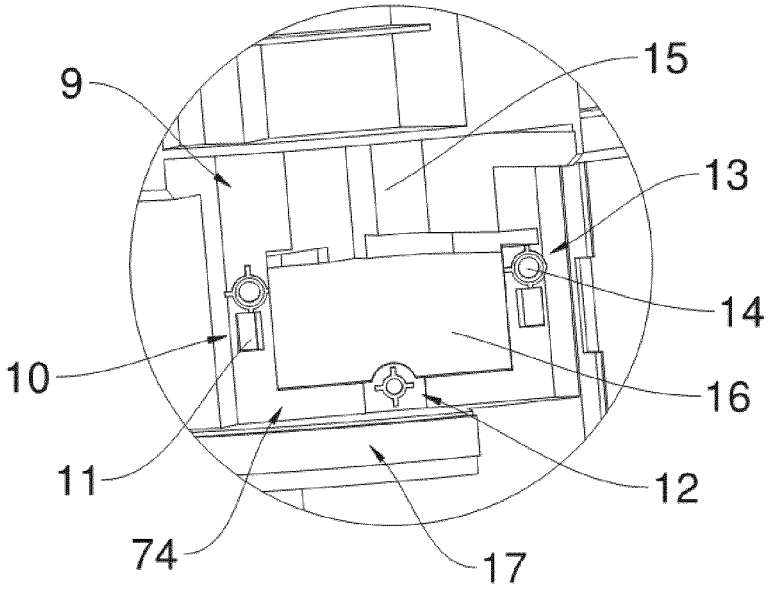

Fig. 4

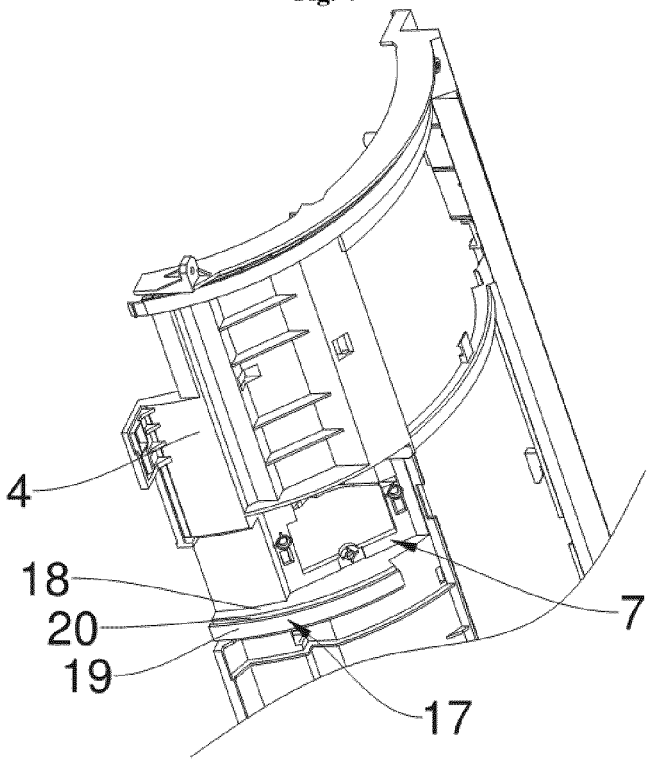

Fig. 5

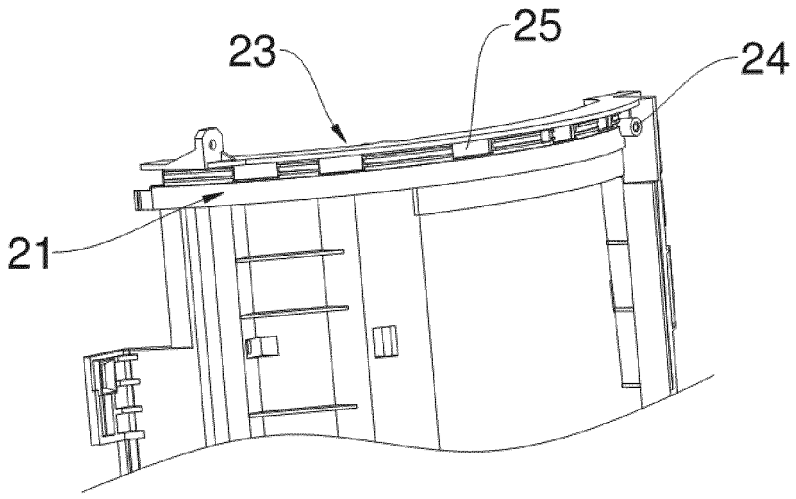

Fig. 6

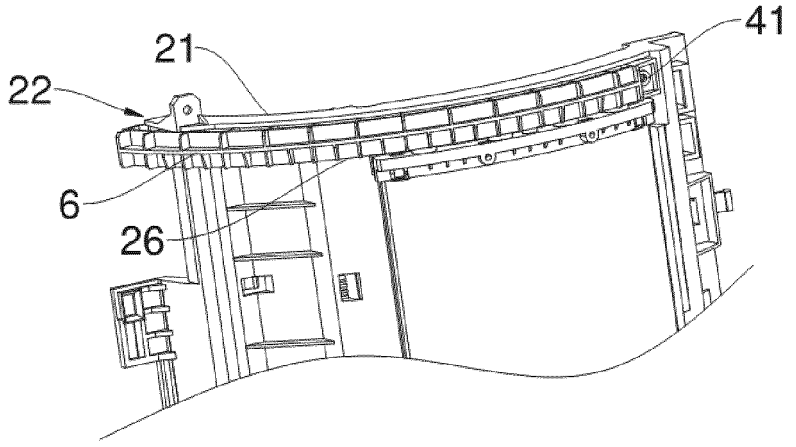

Fig. 7

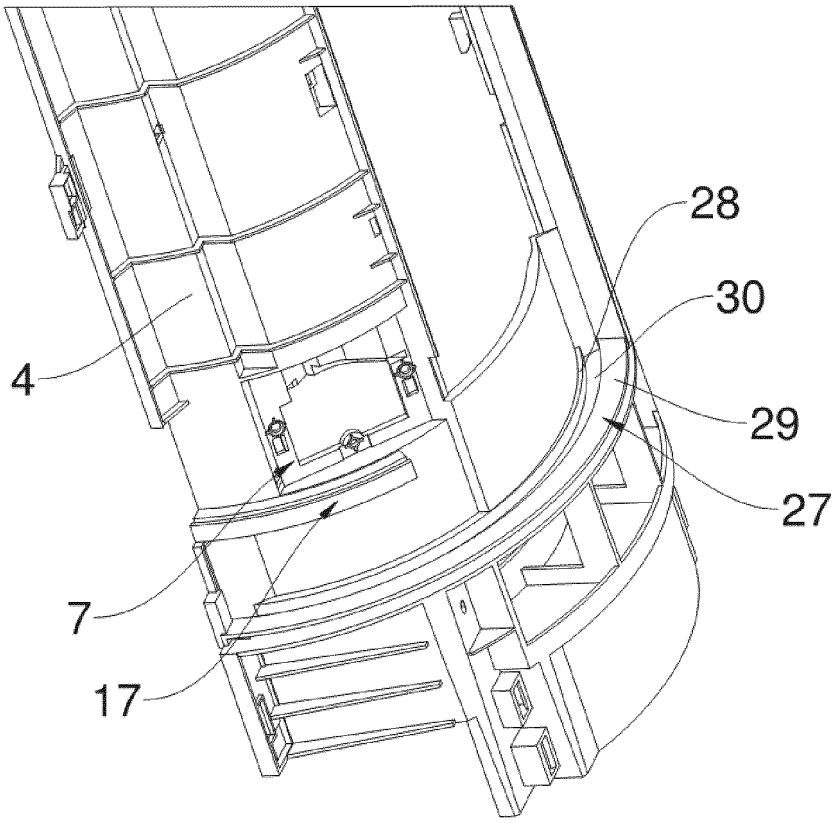

Fig. 8

5

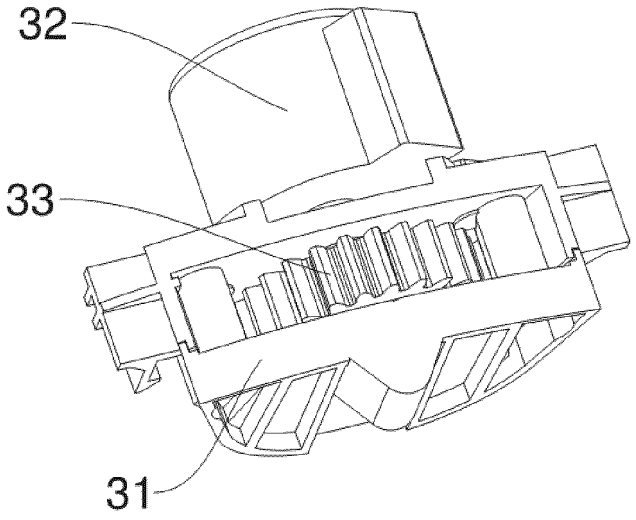

Fig. 9

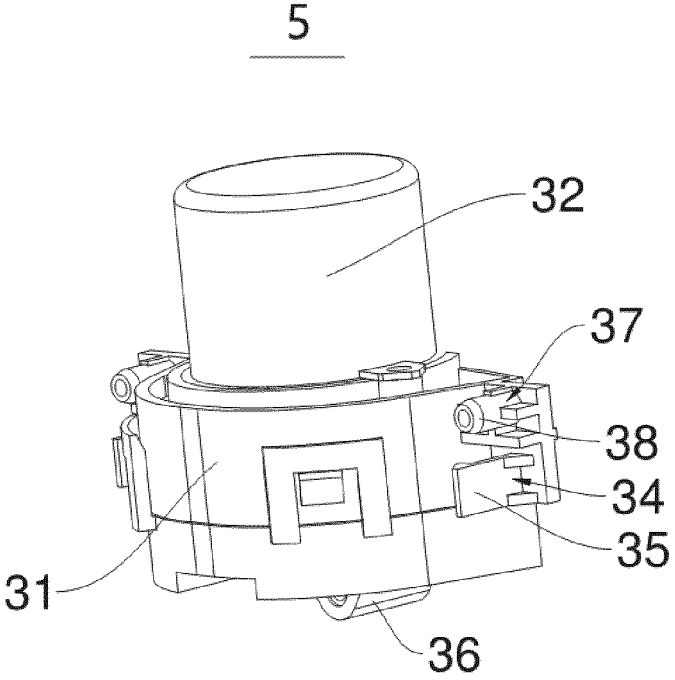

Fig. 10

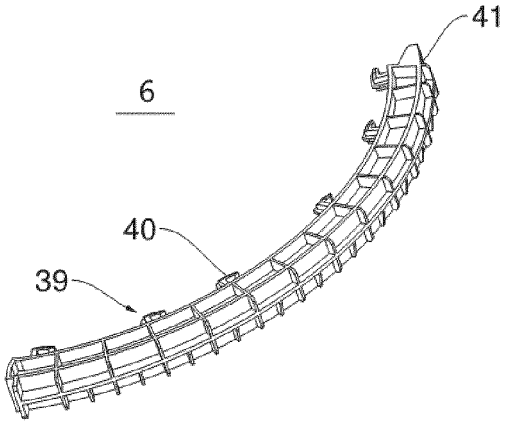

Fig. 11

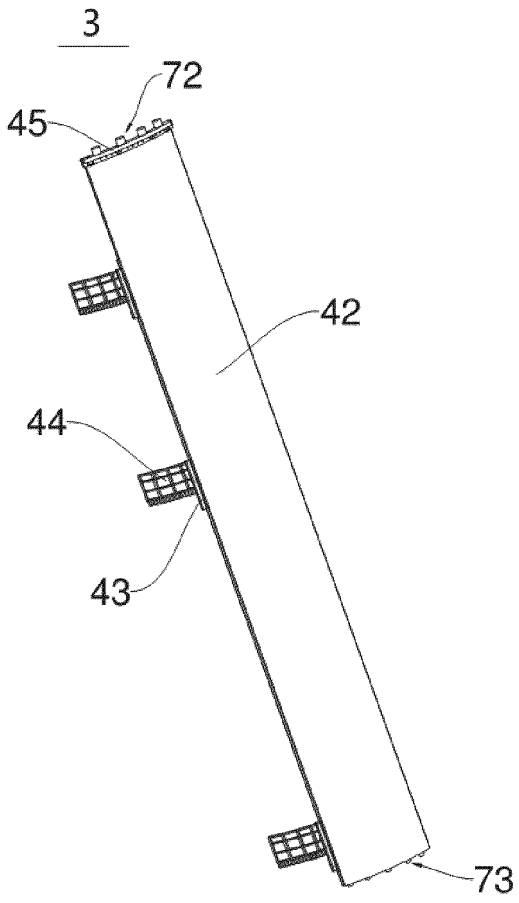

Fig. 12

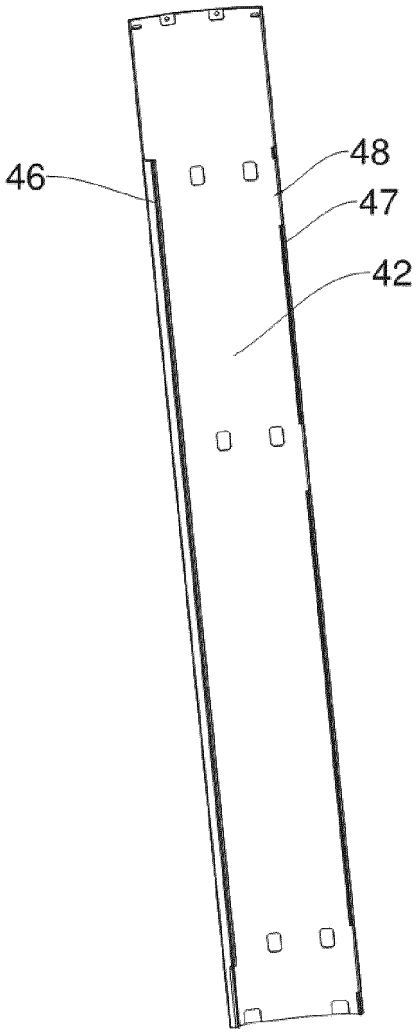

Fig. 13

43

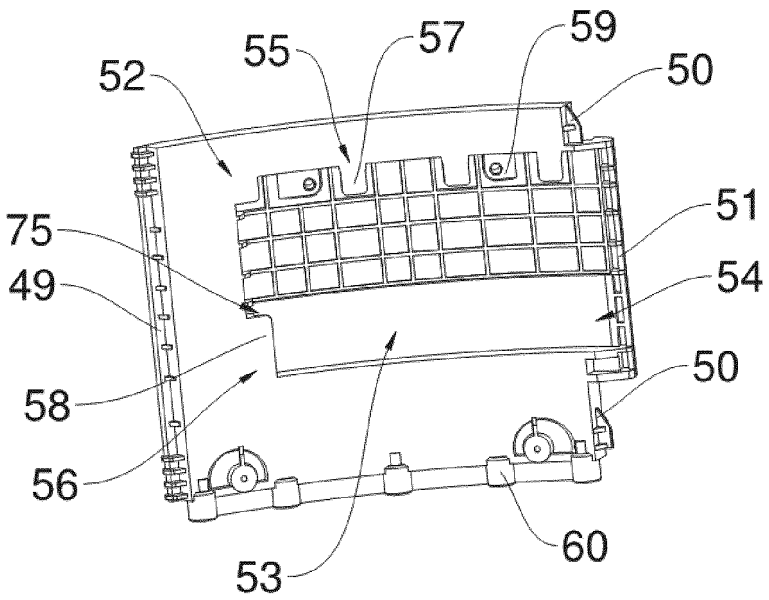

Fig. 14

44

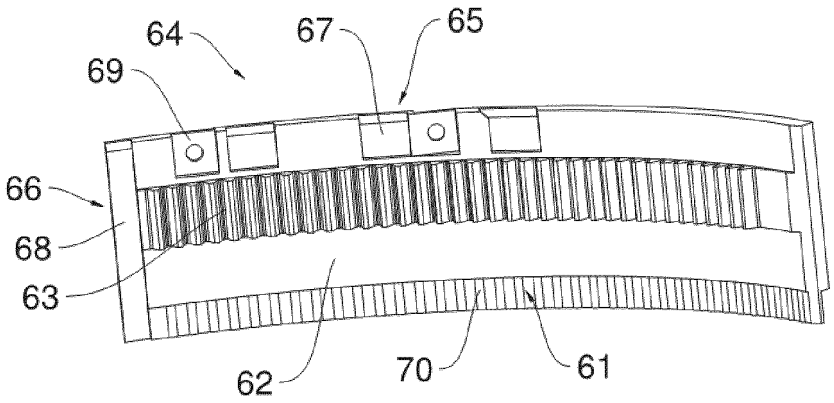

Fig. 15

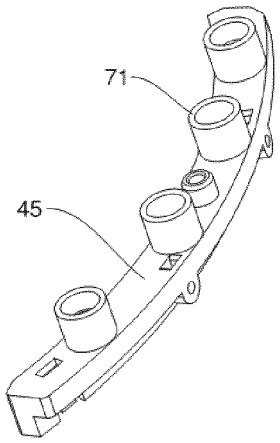

Fig. 16

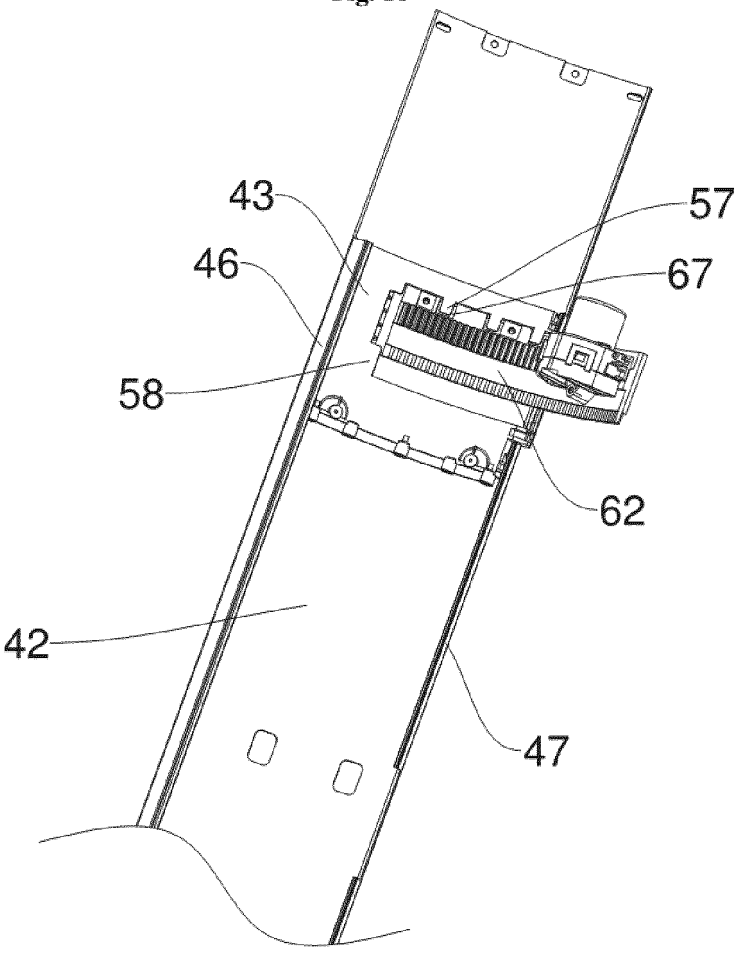

Fig. 17

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2018/125512

A. CLASSIFICATION OF SUBJECT MATTER

F24F 13/12(2006.01)i; F24F 13/20(2006.01)i; F24F 13/24(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)

F24F

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)

CNKI, CNABS, CNTXT, VEN: 滑动, 导滑, 轨道, 滑轨, 驱动, 动力, 传动, 抖动, 噪声, 噪音, 响动, 异响, 响声, sliding, guiding, track, driving, power, noise, shaking, sound

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	CN 107246724 A (AUX AIR CONDITIONER CO., LTD.) 13 October 2017 (2017-10-13) description, paragraphs 0025-0029, and figures 1-6	1, 2
X	CN 105972789 A (NINGBO AUX AIR-CONDITION CO., LTD.) 28 September 2016 (2016-09-28) detailed description of the preferred embodiments, and figures 1-9	1, 2
PX	CN 108006937 A (AUX AIR CONDITIONER CO., LTD.) 08 May 2018 (2018-05-08) detailed description of the preferred embodiments, and figures 1-17	1, 2
PX	CN 108105977 A (AUX AIR CONDITIONER CO., LTD.) 01 June 2018 (2018-06-01) detailed description of the preferred embodiments, and figures 1-17	1, 2
PX	CN 208296239 U (AUX AIR CONDITIONER CO., LTD.) 28 December 2018 (2018-12-28) detailed description of the preferred embodiments, and figures 1-17	1, 2
A	JP 2008-111636 A (FUJITSU GENERAL LTD.) 15 May 2008 (2008-05-15) entire document	1, 2

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

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"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)

"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

"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

"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

"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

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
12 March 2019	**25 March 2019**

Name and mailing address of the ISA/CN	Authorized officer
National Intellectual Property Administration, PRC (ISA/CN) **No. 6, Xitucheng Road, Jimenqiao Haidian District, Beijing 100088** **China**	
Facsimile No. **(86-10)62019451**	Telephone No.

Form PCT/ISA/210 (second sheet) (January 2015)

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2018/125512

Patent document cited in search report	Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
CN 107246724 A	13 October 2017	None	
CN 105972789 A	28 September 2016	CN 105972789 B	08 January 2019
CN 108006937 A	08 May 2018	CN 207893986 U	21 September 2018
CN 108105977 A	01 June 2018	CN 207893966 U	21 September 2018
CN 208296239 U	28 December 2018	None	
JP 特开2008-111636 A	15 May 2008	JP 4687630 B2	25 May 2011

Form PCT/ISA/210 (patent family annex) (January 2015)