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(54) AIR CONDITIONER

(57) Provided is an air conditioner, in which a toggle blade (341) is movably mounted on a component adjacent to an impeller (320), including a pushing portion (3412) and a driving portion (3413), the pushing portion (3412) is adapted to contact with the impeller (320) and to drive the impeller (320) to move axially. The driving portion (3413) is fixedly connected to the pushing portion (3412). This structure serves to facilitate the disassembly work of the impeller (320) and the motor (141).

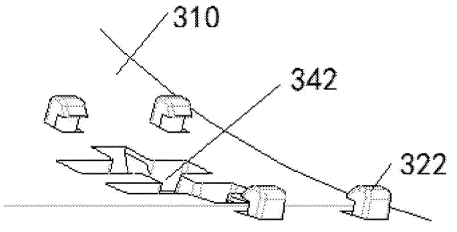

Fig. 3

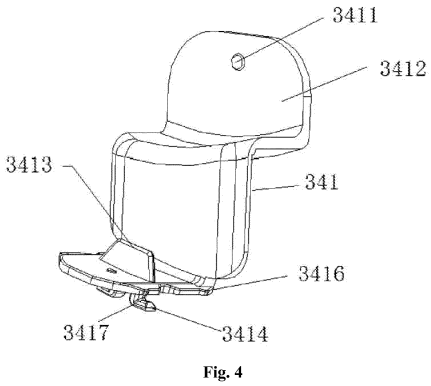

Fig. 4

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Description

Technical Field

[0001] The present disclosure relates to an air conditioner, and falls within a technical field of an air conditioning.

Background

[0002] The air conditioner is a commonly used household appliance, and a conventional air conditioner, in which an air duct and water duct system and a bottom housing are taken as a whole, and the air conditioner is firstly assembled and fixed as a base portion, and if washing is required for the air condition, a professional is required to disassemble and clean each portion of the air conditioner, which is very inconvenient.

[0003] However, during the long-term use of the air conditioner, impurities such as dust entering the air duct and water duct system from the air inlet make the whole air duct and water duct system contaminate severely, and if the cleaning is not performed in time, the environment will be dangerous during the operation of the air conditioner by a contamination source, which is important to the health of the user.

[0004] For the convenience of washing, the patent No. CN205037533U discloses a housing of an indoor unit of an air conditioner and an indoor unit of the air conditioner with the housing, which includes an upper chassis, a lower chassis and a guide assembly, in which a mask is detachably mounted on the upper chassis, and a heat exchanger is mounted on the upper chassis. The blower is detachably mounted on the lower chassis. In the related art, the heat exchanger is a water duct, a impeller below the heat exchanger forms an air passage, the blower is fixedly connected with the impeller, and the rotation of the blower drives the impeller to rotate, and therefore, when the blower is detached in the related art, the blower and the impeller need to be dismantled together and then the contaminants in the impeller are cleaned, and this dismantled mode needs to dismount and clean the motor assembly together with the air duct component, which has the following problems: during cleaning, the sewage water can easily enter into the motor portion connected with the impeller to damage the motor by virtue of the sewage water into the motor. Alternatively, when the user cleans, if the user forgets to turn off the power supply of the blower, a situation in which the user touches electricity may cause.

[0005] In order to solve above technical problem, Chinese patent document CN202792451 U discloses a wall-mounted air-conditioner indoor housing that facilitates disassembly, which includes a housing and a frame that are mutually buckled, in which the frame is of a split type, and when cleaning, the housing is first removed and a fixing screw between an upper frame and a lower frame is dismantled. Then, the lower frame is dismantled, a fixing screw between the impeller and a motor shaft is dismantled, and an upper and lower reinforcing rings of a side support frame are continuously dismantled, so that the impeller can be easily dismantled. However, in the related art, a disassembly process of the impeller and the motor is troublesome, a screw needs to be dismantled first, then the reinforcing ring needs to be dismantled, the impeller can be dismantled from the motor, that is, the disassembly process of the impeller and the motor is complicated. On the other hand, when cleaning, the user needs to disconnect the connecting electric wire between the motor of the blower and the electric power supply, and reconnecting the electric power supply wire may cause poor connection. This is lightly influencing the use, and heavily may cause damage to the electric motor, and even a situation where the user stores electricity occurs.

[0006] In order to be able to conveniently and independently dismantle the impeller, Chinese patent CN2823621Y discloses a blower device for a household appliance, wherein the blower device includes a connecting device, the connecting device includes an impeller nesting nested in a center of the other end surface of a fan and a motor shaft sleeve fixedly mounted on a main shaft of a drive motor. One or more installation grooves are disposed in the impeller nesting, and one or more installation buckles are disposed in the motor shaft sleeve, and when the fan needs to be removed for cleaning, the fan can be conveniently removed only by moving the fan in the direction of the end shaft of the fan. However, in the related art, the blower is actually supported on the bottom housing and is located in a cavity with downwardly opening surrounded by the heat exchanger, and only a gap remaining between the blower and the heat exchanger is generally not opposite to the impeller, so it is difficult to access the impeller from an outside through the gap. An appropriate tool must be sought to contact and toggle the impeller through the gap. On one hand, the operation process of using the tool is troublesome. On the other hand, it is difficult to control such as collision or inclination that occurs during the extraction process, so that when the motor shaft sleeve is operated to jacketed together with the motor shaft, and the motor shaft sleeve is easily damaged. Therefore, there is only such a connecting device, and it is still difficult for general users to dismantle and remove the impeller for cleaning.

Summary

[0007] Some embodiments of the present disclosure provide an air conditioner that is easier to disassemble the impeller and the motor, solving the technical problem that it is difficult to disassemble a impeller during a disassembly process of a fan in a blower device in the related art.

[0008] An air conditioner provided by the present disclosure includes a bottom housing and an impeller rotatablely mounted on the bottom housing, wherein the air conditioner further includes a toggle blade, the toggle

blade includes a driving portion and a pushing portion, the driving portion is movably mounted on a component adjacent to the impeller, and the driving portion of the toggle blade drives the pushing portion to realize an axial movement of the impeller.

[0009] In an exemplary embodiment, the toggle blade further includes a limiting portion fixedly connected with the pushing portion, and the toggle blade and the component on which the toggle blade mounted are locked by the limiting portion, when the impeller is separated from a motor.

[0010] In an exemplary embodiment, the toggle blade is movablely mounted on the bottom housing of the air conditioner.

[0011] In an exemplary embodiment, the limiting portion is cooperated with a bottom housing limiting groove with an inclined surface, the bottom housing limiting groove 342 is formed on the bottom housing, when the impeller moves in a direction away from the motor to be separated from the motor, the limiting portion is locked with the bottom housing by the inclined surface of the bottom housing limiting groove; and when the impeller moves in a direction towards the motor, a locking between the limiting portion and the bottom housing is released.

[0012] In an exemplary embodiment, two toggle blades are provided, the two toggle blades are respectively arranged at two ends alone an axial direction of the impeller, and respectively toggle the impeller in opposite directions; wherein a toggle blade toggling the impeller, in a direction away from the motor, of the two toggle blades, has the limiting portion.

[0013] In an exemplary embodiment, a protrusion is formed on a contact surface, contacting to the impeller, of the pushing portion.

[0014] In an exemplary embodiment, the projection is provided at a side, close to a rotation shaft of the impeller, of the pushing portion.

[0015] In an exemplary embodiment, the toggle blade is formed with a guide flange slidably connected with a bottom housing guide member formed on the bottom housing.

[0016] In an exemplary embodiment, a hook hooked to the bottom housing limiting groove of the bottom housing is formed on the toggle blade.

[0017] In an exemplary embodiment, the toggle blade is composed of four folded surfaces, wherein any two adjacent folded surfaces in four folded surfaces are perpendicularly connected to each other, two folded surfaces provided at intervals are not opposite to each other, and the pushing portion is a folded surface provided at the uppermost end of the four folded surfaces; the driving portion is provided on an upper surface of a lowermost folded surface of the four folded surfaces.

[0018] In an exemplary embodiment, a distance which the toggle blade moves along an axial direction of the impeller is greater than an meshing amount between an impeller shaft of the impeller and a motor shaft, so as to realize a completely disengage between the impeller shaft and the motor shaft during a disassembly process.

[0019] In an exemplary embodiment, the component adjacent to the impeller is the bottom housing.

[0020] In an exemplary embodiment, the number of the toggle blade is one, the toggle blade is arranged at one end portion of the impeller, and a return spring is arranged at the other end portion of the impeller, and the return spring applies a biasing force to the impeller toward the motor.

[0021] In an exemplary embodiment, one end of the return spring is abutted against an impeller support on the bottom housing, and the other end of the return spring is abutted against the impeller shaft of the impeller.

[0022] The present disclosure has the following advantages with respect to the related art:

1. An air conditioner provided by the present disclosure, the toggle blade includes a pushing portion and a driving portion, the driving portion is movably mounted on a component adjacent to the impeller, the pushing portion is used for contacting with the impeller, and the pushing portion is used for driving the impeller to move axially; There is a problem that the impeller is hardly accessed from the outside through the gap in the related art. The driving portion of the toggle blade of the present disclosure can be contact from the gap, that is, the operator drives the pushing portion to drive the impeller to move along the axial direction of the impeller through the driving portion at the gap, thereby facilitating the disassembly work between the impeller and the motor.
2. In the air conditioner provided by the present disclosure, the toggle blade further includes a limiting portion which is fixedly connected to the pushing portion. When the impeller is separated from the motor, the toggle blade and the component for mounting the toggle blade are locked, that is to say, when the impeller is separated from the motor, the position of the toggle blade is locked, so that the impeller is limited in a position where the motor is separated from the impeller, so that the impeller can not be sleeved with the motor shaft again.
3. In the air conditioner provided by the present disclosure, the toggle blade is movable mounted on the bottom housing of the air conditioner, and the toggle blade is moved relative to the bottom housing of the air conditioner to push the impeller.
4. In the air conditioner provided by the present disclosure, the limiting portion is cooperated with a bottom housing limiting groove formed on the bottom housing, the bottom housing limiting groove is provided with an inclined surface. The limiting portion is cooperated with the inclined surface, and when the impeller moves in a direction away from the motor to be separated from the motor, the limiting portion is locked with the bottom housing, so that when the impeller is moved to be separated from the motor,

the impeller is limited in a position where the motor is separated from the impeller, so that the impeller can not be sleeved with the motor shaft again. The locking between the limiting portion and the bottom housing is released when the impeller moves in the direction close to the motor, that is, when the impeller and the motor are reinstalling and connecting, the toggle blade is freely movable, and the movement of the impeller towards the motor is not limited.

5. In the air conditioner provided by the present disclosure, the number of toggle blades is two, which are respectively arranged at two ends in the axial direction of the impeller, and respectively toggle the impeller in opposite directions. That is to say, each of the two end surfaces of the impeller is provided with a toggle blade, and the toggle blade on the left end surface of the impeller can toggle the impeller in the right to drive the impeller to move to the right, and the toggle plate on the right end surface of the impeller can toggle the impeller to the left and then drive the impeller to move to the left. The toggle blade toggling the impeller in a direction away from the motor is provided with the limiting portion, for example, the right end surface of the impeller is provided with a motor, that is, the toggle blade on the right end surface of the impeller can drive the impeller to keep away from the motor, so as to make the impeller to separate from the motor, and the toggle blade on the right end surface of the impeller is provided with the limiting portion, so that after the impeller is moved to a position separated from the motor, the impeller is limited at the position where the impeller is separated from the motor.

6. In the air conditioner provided by the present disclosure, the number of the toggle blades is one, the toggle blade is provided at one end of the impeller, and a return spring is provided at the other end of the impeller, and a biasing force towards the motor is applied to the impeller. The return spring may be disposed at the same end of the impeller as the toggle blade, or the return spring and the toggle blade may be disposed at two different ends of the impeller as the toggle blade respectively. The return spring can avoid a problem that the impeller and the motor shaft are not effectively cooperated for human reasons during a handing and installation process of the whole machine, thereby avoiding the motor to be unloaded after being powered on and not working normally.

7. In the air conditioner provided by the present disclosure, the return spring and the toggle blade are respectively provided at two ends of the impeller, one end of the return spring is abutted against an impeller support on the bottom housing, and the other end of the return spring is abutted against the impeller shaft. The force abutted against the impeller shaft, on the end surface of the impeller, caused by the return spring, is concentrated on the axis of the impeller shaft, thereby reducing the axial offset amount of the impeller relative to the motor.

8. In the air conditioner provided in the present disclosure, a projection is formed on a contact surface of the pushing portion to contact with the impeller. Since the impeller and the motor are connected by a threaded shaft sleeve, during the dismantled process of the impeller and the motor, the impeller and the motor are separated from each other by a movement rotating around the motor shaft, so that a sliding wear is produced between the toggle blade and the impeller. Therefore, the pushing portion is provided with a projection for contacting the end surface of the impeller, and the contact area between the end surface of the impeller and the toggle blade is reduced, that is, the frictional resistance is reduced, and the damage to the impeller and the abnormal sound are reduced as much as possible.

9. In the air conditioner provided by the present disclosure, the projection is provided at a side, closed to a rotating shaft of the impeller, of the pushing portion, so that the stressed point on the end surface of the impeller is close to the position of a rotation shaft of the impeller as much as possible, thereby reducing the offset amount of the impeller during the process of the impeller being separated from the motor.

10. In the air conditioner provided by the present disclosure, the toggle blade is formed with a guide flange slidablely connected with a bottom housing guide member formed on the bottom housing, so that the limiting portion slides in a direction parallel to an axis of the impeller, thereby avoiding the toggle blade jumping during the sliding process of the toggle blade.

11. In the air conditioner provided by the present disclosure, the toggle blade is formed with a hook hooked to the bottom housing limiting groove of the bottom housing, and the limiting portion slides in the bottom housing limiting groove, so that the limiting portion slides in a direction parallel to axis of the impeller, thereby avoiding the toggle blade jumping in the sliding process of the toggle blade.

12. In the air conditioner provided by the present disclosure, the toggle blade is composed of four folded surfaces, where any two folded surfaces in four folded surfaces are perpendicularly connected to each other, wherein any two adjacent folded surfaces in four folded surfaces are perpendicularly connected with each other, and two folded surfaces provided at intervals are not opposed to each other, and the pushing portion is a folded surface provided at an uppermost end of the four folded surfaces; the driving portion is provided on an upper surface of a lowermost folded surface, so it is convenient to operated to the toggle blade to move.

Brief Description of the Drawings

[0023] To illustrate the technical solutions of the present disclosure or the related art more clearly, the following briefly introduces the accompanying drawings required for describing the specific embodiments or the prior art, and obviously, the accompanying drawings in the following description are some embodiments of the present disclosure. For a person of ordinary skill in the art, other drawings can be obtained from these drawings without creative efforts.

Fig. 1 illustrates an exploded diagram of an air conditioner according to an embodiment of the present disclosure;
Fig. 2 illustrates an exploded diagram of an air duct assembly according to an embodiment of the present disclosure;
Fig. 3 illustrates a structural schematic diagram of a bottom housing limiting groove according to an embodiment of the present disclosure;
Fig. 4 illustrates a schematic structural diagram of a toggle blade according to an embodiment of the present disclosure;
Fig. 5 illustrates a schematic diagram of another toggle blade according to an embodiment of the present disclosure;
Fig. 6 illustrates a schematic diagram of another toggle according to an embodiment of the present disclosure;
Fig. 7 illustrates a structural schematic diagram of a bottom housing cooperated with the toggle blade of Fig. 6;
Fig. 8 illustrates a partial diagram of the assembly of the toggle blade of Fig. 6;
Fig. 9 illustrates a partial diagram of the assembly of the toggle blade of Fig. 6;
Fig. 10 illustrates a structural schematic diagram of another bottom housing cooperated with the toggle blade of Fig. 6;
Fig. 11 illustrates a structural installation diagram of a return spring and an impeller according to an embodiment of the present disclosure.

[0024] Herein, the drawings include the following drawing markers:
100, base module; 101, base member; 141, motor; 142, output shaft; 200, heat exchange module; 220: heat exchanger; 300, air duct module; 301, air duct assembly; 310, bottom housing; 3108, lower snap; 3109, rib; 310a, spring post; 310b: coil spring; 320, impeller; 321, impeller shaft; 322, bottom housing guide member; 341, toggle blade; 3411, projection; 3412, pushing portion; 3413, driving portion; 3414, limiting portion; 3415, toggle position; 3416, guide flange; 3417, hook; 3418, deformation groove; 342, bottom housing limiting groove; 400, appearance module; 722, return spring.

Detailed Description of the Embodiments

[0025] Hereinafter, the technical solutions of the present disclosure will be described clearly and completely with reference to the accompanying drawings, and obviously, the described embodiments are a part of the embodiments of the disclosure rather than all of the embodiments. Based on the embodiments in the present disclosure, all other embodiments obtained by a person of ordinary skill in the art without creative efforts all fall within the scope of protection of the present disclosure.

[0026] Fig. 1 illustrates a modular indoor unit of an air conditioner according to an embodiment of the present disclosure, which includes a base module 100, a heat exchange module 200, an air duct module 300 and an appearance module 400.

[0027] The air duct module 300 includes an air duct assembly, and the air duct module 300 is connected with the base member 101 module. As shown in Fig. 1, an impeller assembly in an air duct assembly 301 includes an impeller 320 with an impeller shaft 321, one end, close to the motor 141, of the impeller shaft 321 is in transmission connection with the motor 141, and the other end of the impeller shaft 321 is rotatablely disposed on the bottom housing 310.

[0028] A clutch actuation mechanism is used to drive the impeller shaft 321 to move along an axial direction of the output shaft 142 of the motor 141, a return spring 722 is arranged at one end, away from a motor assembly, of the impeller shaft. And the return spring 722 can apply a continuous biasing force to the impeller 320, so that the impeller 320 is abutted against the fan motor 141 located on a side of the impeller 320, thereby avoiding a gap produced between the impeller 320 and the fan motor 141 during disassembly process. The clutch actuation mechanism includes two toggle blades 341 mounted on two sides of the impeller 320, and the two toggle blades 341 are movablely mounted on the bottom housing 310 respectively to apply a force to the impeller 320. As shown in Figs. 4 to 10, each of the two toggle blades 341 is composed of four folded surfaces, wherein any two adjacent folded surfaces in the four folded surfaces are perpendicularly connected to each other, and two folded surfaces in the four folded surfaces provided at intervals are not opposed to each other. As shown in Fig. 4, the toggle blade 341 is provided with a pushing portion 3412 provided at an uppermost end with a projection 3411, a driving portion 3413, for manual transferring, provided on an upper surface of a lowermost folded surface , and a limiting portion 3414 provided on an lower surface of the lowermost folded surface. The driving portion 3413 is fixedly connected to the pushing portion 3412. The projection 3411 is disposed at a side, close to the rotation shaft of the impeller 320, of the pushing portion 3412. The limiting portion 3414 is cooperated with the bottom housing limiting groove 342 with an inclined surface, the bottom housing limiting groove 342 is formed on the bottom housing 310, and when the impeller 320 moves in a di-

rection away from the motor 141 to be separated from the motor 141, the limiting portion 3414 is locked with the bottom housing 310 by the inclined surface of the bottom housing limiting groove 342. When the impeller 320 moves in a direction toward to the motor 141, a locking between the limiting portion 3414 and the bottom housing 310 is released. A distance which the toggle blade moves along an axial direction of the impeller 320 is greater than an meshing amount between an impeller shaft of the impeller and a motor shaft, so as to realize the completely disengage between the impeller shaft and the motor shaft during a disassembly process. The toggle blade 341 and the impeller 320 are contacting by a function of the projection 3411; the driving portion 3413 can facilitate manual operation of the toggle piece 341. By the function of limiting buckle of the limiting portion 3414, the toggle blade 341 is slidablely connected to the bottom housing limiting groove 342 formed on the bottom housing 310. A stroke of the toggle blade 341 is limited by limiting a stroke length of the bottom housing limiting groove 342. The toggle blade 341 is formed with a guide flange 3416 slidablely connected to the bottom housing guide member 322 formed on the bottom housing 310 , so that the limiting portion 3414 slides in a direction parallel to a impeller axis, so as to avoid the jump of the toggle blade during a sliding process, as shown in Fig. 4.

[0029] The base module 100 is mounted with a motor 141 for driving the impeller to rotate, that is, a impeller shaft is connected to a motor shaft, and on a side, close to the motor 141, of the impeller shaft, is provided with a toggle blade 341 for mounting and disassembling the impeller 320 and the motor.

[0030] As shown in Fig. 2, the toggle piece 341 is movably mounted on a component adjacent to the impeller 320, the toggle piece 341 includes a pushing portion 3412 and a driving portion 3413, the pushing portion 3412 is adapted to contact with the impeller 320, and is used for driving the impeller 320 to move axially. The driving portion 3413 is fixedly connected to the pushing portion 3412, and is located at a position that can be accessed from an outside through the gap. The driving portion 3413 of the toggle blade 341 of the present embodiment can be accessed from the gap, that is, the operator drives the pushing portion 3412 to push the impeller 320 to move in the axial direction by the driving portion 3413 at the gap, thereby facilitating the disassembly work between the impeller 320 and the motor. The toggle blade 341 of the present embodiment further includes a limiting portion 3414 formed on the driving portion 3413, which is fixedly connected to the pushing portion 3412. When the impeller 320 is separated from the motor, the toggle blade and the component for mounting the toggle blade are locked with each other. That is to say, when the impeller 320 is separated from the motor, the position of the toggle blade is locked, so that the impeller 320 is limited in a position where the motor is separated from the impeller 320, so that the impeller 320 can not be sleeved with the motor shaft again.

[0031] The toggle blade is movably mounted on the bottom housing 310 of air conditioner, and the toggle blade is moved relative to the bottom housing 310 of the air conditioner to push the impeller 320. A toggle blade mounting position of the bottom housing 310 is shown in Figs. 3 and 5. The limiting portion 3414 is cooperated with a bottom housing limiting groove 342 formed on the bottom housing 310, the bottom housing limiting groove 342 is provided with an inclined surface. The limiting portion 3414 is cooperated with the inclined surface, and when the impeller moves in the direction away from the motor to be separated from the motor, the limiting portion 3414 is locked with the bottom housing 310, so that when the impeller 320 is moved to be separated from the motor, the impeller 320 is limited in a motor-disengaged position, and the impeller 320 can not be nested with the shaft of the motor again. A locking between the limiting portion 3414 and the bottom housing 310 is released when the toggle blade moving in a direction close to the motor, that is, when the impeller 320 and the motor are reinstalled and connected, the toggle blade can be moved freely without restricting the movement of the impeller 320 close to the motor direction.

[0032] As shown in Fig. 2, the number of the toggle blade used for dismantling and assembling the impeller 320 and the motor is two, the two toggle blades are disposed at two axial ends of the impeller 320 respectively, and the two toggle blades toggle the impeller 320 in opposite directions. That is to say, each of the two end surfaces of the impeller 320 is provided with a toggle blade, and the toggle blade on the left end surface can toggle the impeller 320 to the right and then drive the impeller 320 to move to the right, and the toggle plate on the right end surface can toggle the impeller 320 to the left and then drive the impeller 320 to move to the left. The toggle blade which toggles the impeller 320 in a direction away from the motor is provided with the limiting portion 3414, for example, a motor is provided on the right end surface of the impeller 320, that is, the toggle blade on the right end surfaces of the impeller can drive the impeller 320 to keep away from the motor, so as to make the impeller 320 to separate from the motor, and the toggle blade on the right end surfaces is provided with the limiting portion 3414. Thus, after the impeller 320 is moved to a position separated from the motor, the impeller 320 is limited at the position where the impeller 320 is separated from the motor.

[0033] As a variant, the number of the toggle blade used for dismantling and assembling the impeller 320 and the motor is one, the toggle blade 341 is provided at one end portion of the impeller 320, the return spring is provided at another end portion of the impeller 320, and a biasing pressure towards the motor is applied to the impeller 320 by the return spring. The return spring may be disposed at the same end portion of the impeller 320 as the toggle blade, or the return spring and the toggle blade may be disposed at two different ends portion of the impeller 320 respectively. The return spring can avoid

a problem that the impeller 320 and the motor shaft are not effectively cooperated for human reasons during a handing and installation process of the whole machine, thereby avoiding the motor to be unloaded after being powered on and not working normally. The return spring and the toggle blade are respectively arranged at two ends portion of the impeller 320, one end of the return spring is abutted against an impeller support on the bottom housing 310, and the other end of the return spring is abutted against the shaft of the impeller 320. The force applied to the end surface of the impeller shaft, caused by the return spring, is concentrated on the axis of the impeller shaft, thereby reducing the axial offset amount of the impeller 320 relative to the motor. As shown in Fig. 4, a projection 3411 is formed on a contact surface of the pushing portion 3412 for contacting to the impeller 320. Since the impeller 320 and the motor are connected by a threaded shaft sleeve, during the dismantled process of the impeller 320 and the motor, the impeller 320 and the motor are separated from each other by a movement rotating around the motor shaft, so that a sliding wear is produced between the toggle blade and the impeller 320. Therefore, a projection 3411 for contacting with the end surface of the impeller 320 is provided on the pushing portion 3412, and the contact area between the end surface of the impeller 320 and the toggle blade is reduced, that is, the frictional resistance is reduced, and the damage to the impeller 320 and the abnormal sound are reduced as much as possible. The projection 3411 is provided at a side, close to the rotation shaft of the impeller 320, of the pushing portion, so that the stressed point on the end surface of the impeller 320 is close to the position of a rotation shaft of the impeller 320 as much as possible, thereby reducing the axial offset amount of the impeller 320 during the process of the impeller 320 being separated from the motor. The limiting portion 3414 includes a guide flange 3416 slidablely connected to the bottom housing guide member 322 formed on the bottom housing 310, the limiting portion 3414 slides in a direction parallel to the axis of the impeller 320, so as to avoid the toggle blade jumping during sliding process of the toggle blade. The limiting portion 3414 further includes a hook 3417 hooked to the bottom housing limiting groove 342 of the bottom housing 310, and the limiting portion 3414 slides in the bottom housing limiting groove 342, so that the limiting portion 3414 slides in a direction parallel to the axis of the impeller 320, thereby avoiding the toggle blade jumping in the sliding process of the toggle blade. The toggle blade 341 of the present embodiment further includes a toggle position 3415 configured to be subjected to an external force to toggle the toggle blade easily. The toggle blade is composed of four folded surfaces, where any two adjacent folded surfaces in four folded surfaces are perpendicularly connected to each other, and two folded surfaces provided at intervals are not opposite to each other, and the pushing portion 3412 is a folded surface arranged at an uppermost end of the four folded surfaces; The driving portion 3413 is conveniently provided on an upper surface of the lowermost folded surface of the four folded surfaces, so it is convenient to operated to the toggle blade to move.

[0034] As a changeable embodiment, the toggle blade of the present embodiment is used for dismantling and assembling the impeller 320 and the motor, a toggle blade mounting position of bottom housing 310 is sunken, a spring is arranged on a surface, away from the toggle blade, of the bottom housing 310, and a guiding control function for the toggle blade is realized by the cooperate of a coil spring 310b and a spring post 310a. A deformation groove 3418 is formed on the toggle blade, and when the toggle blade is pressed downward into the toggle blade mounting position on the bottom housing 310, the deformation groove 3418 enables the guide flange 3416 to be pressed and deformed towards to a center, and the guide flange 3416 is pressed into the bottom housing guide member 322 of the bottom housing 310. At an edge of the housing guide member 322, a deformation groove is formed on the housing body, and when the toggle blade is pressed down into the toggle blade mounting position of the bottom housing 310, the deformation groove 3418 on the bottom housing can enable the bottom housing guide member 322 to be expanded outwardly, so that the guide flange 3416 is pressed into the bottom housing guide member 322, then the deformation groove 3418 is restored, and the bottom housing guide member 322 and the guide flange 3416 are snap-fitted together. In other words, the guide flange 3416 and the bottom housing guide member 322 are cooperated to guide and limit the driving portion 3413 of the toggle blade on the toggle blade mounting position of the bottom housing 310. The toggle blade is formed with a limiting portion 3414 for hooking the lower snap 3108 of the bottom housing 310. The bottom housing 310 may be further provided with a rib 3109 for limiting the movement stroke of the toggle blade. The bottom housing guide member 322 of the toggle blade mounting position on the bottom housing 310 may be of strip-shaped as shown in Fig. 8. As a variant, as shown in Fig. 10, the bottom housing guide member 322 on the bottom housing 310 may be composed of three buckles, which are respectively a first buckle, a second buckle and a third buckle from left to right. When the guide flange 3416 is locked with the first buckle, the impeller 320 is pushed to a position where the impeller 320 is separated from the motor; when the guide flange 3416 is pushed from a locked position where the guide flange 3416 is locked with the first buckle to a locked position where the guide flange 3416 is locked with the second buckle, the push portion 3412 of the toggle blade is located between the impeller 320 and the motor without interfering with the assembly of the impeller 320 and the motor. When the toggle blade is pressed and fitted onto the bottom housing 310, the toggle blade is connected with the third buckle on the bottom housing 310 and then locked. Through the arrangement of the first buckle, the second buckle and the third buckle, the position of the pushing portion 3412 can be clearly determined, that is,

whether to interfere with the engagement of the fan blade and the motor.

[0035] As a changeable embodiment, the number of the toggle blade is one, and the toggle blade is disposed at one end portion of the impeller 320. A return spring is disposed at the other end portion of the impeller 320. As shown in Fig. 11, the return spring applies a biasing force towards the motor to the impeller 320. When the return spring and the toggle blade are respectively arranged at two ends of the impeller 320, one end of the return spring is abutted against a support of the impeller 320 of the bottom housing 310, and the other end of the return spring is abutted against the shaft of the impeller 320. When the impeller 320 is mounted to cooperate with the motor, the return spring directly acts to push the impeller 320 towards to the motor.

[0036] As shown in Fig. 4, the impeller 320 is provided with a toggle blade 341, and the toggle blade 341 is adapted to drive the impeller 320 to move along an axial direction of the impeller. When the impeller 320 is needed to be separated from the motor, only the toggle blade 341 needs to be toggled, and the toggle blade drives the impeller 320 to move away from the motor 141, thereby completing the disassembly process of the impeller 320.

[0037] Obviously, the above-described embodiments are merely examples made for clarity, and are not limited to the embodiments. Other variations or variations in different forms can also be made by those skilled in the art on the basis of the above description. All embodiments need not be exhaustive here. Apparently obvious variations or variations that are thus introduced are still within the scope of protection created by the present disclosure.

Claims

1. An air conditioner, comprising a bottom housing (310), and an impeller (320) rotatablely mounted on the bottom housing (310), wherein the air conditioner further comprises a toggle blade (341), wherein the toggle blade (341) comprises a driving portion (3413) and a pushing portion (3412), the driving portion (3413) is movably mounted on a component adjacent to the impeller (320), and the driving portion (3413) of the toggle blade (341) drives the pushing portion (3412) to realize an axial movement of the impeller (320).

2. The air conditioner as claimed in claim 1, wherein the toggle blade (341) further comprises a limiting portion (3414) fixedly connected with the pushing portion (3412), and the toggle blade (341) and the component on which the toggle blade (341) is mounted are locked by the limiting portion (3414), when the impeller (320) is separated from a motor.

3. The air conditioner as claimed in claim 2, wherein the toggle blade (341) is movablely mounted on the bottom housing (310) of the air conditioner.

4. The air conditioner as claimed in claim 3, wherein the limiting portion (3414) is cooperated with a bottom housing limiting groove (342) with an inclined surface, the bottom housing limiting groove (342) is formed on the bottom housing (310), when the impeller (320) moves in a direction away from the motor to be separated from the motor, the limiting portion (3414) is locked with the bottom housing (310) by the inclined surface of the bottom housing limiting groove (342); and when the impeller (320) moves in a direction toward to the motor, a locking between the limiting portion (3414) and the bottom housing (310) is released.

5. The air conditioner as claimed in claim 3, wherein two toggle blades (341) are provided, the two toggle blades (341) are respectively arranged at two ends along an axial direction of the impeller (320), and respectively toggle the impeller (320) in opposite directions; wherein a toggle blade (341) toggling the impeller (320), in a direction away from the motor (141), of the two toggle blades (341), has the limiting portion (3414).

6. The air conditioner as claimed in claim 1, wherein a projection (3411) is formed on a contact surface, contacting with the impeller (320), of the pushing portion (3412).

7. The air conditioner as claimed in claim 6, wherein the projection (3411) is provided at a side, close to a rotation shaft of the impeller (320), of the pushing portion (3412).

8. The air conditioner as claimed in claim 3, wherein the toggle blade (341) is formed with a guide flange (3416) slidablely connected with a bottom housing guide member (322) formed on the bottom housing (310).

9. The air conditioner as claimed in any one of claims 3 to 6, wherein a hook (3417) hooked to the bottom housing limiting groove (342) of the bottom housing (310) is formed on the toggle blade (341).

10. The air conditioner as claimed in claim 4, wherein the toggle blade (341) is composed of four folded surfaces, wherein any two adjacent folded surfaces in the four folded surfaces are perpendicularly connected to each other, two folded surfaces in the four folded surfaces provided at intervals are not opposed to each other, and the pushing portion (3412) is a folded surface provided at an uppermost end of the four folded surfaces; the driving portion (3413) is provided on an upper surface of a lowermost folded surface of the four folded surfaces.

11. The air conditioner as claimed in any one of claims 1 to 6, wherein a distance which the toggle blade (341) moves along an axial direction of the impeller (320) is greater than an meshing amount between an impeller shaft of the impeller (320) and a motor shaft, so as to realize a completely disengage between the impeller shaft and the motor shaft during a disassembly process.

12. The air conditioner as claimed in claim 2, wherein the component adjacent to the impeller (320) is the bottom housing (310).

13. The air conditioner as claimed in claim 12, wherein the number of the toggle blade (341) is one, the toggle blade (341) is arranged at one end portion of the impeller (320), a return spring (722) is arranged at the other end portion of the impeller (320), and the return spring (722) applies a biasing force to the impeller (320) toward the motor (141).

14. The air conditioner as claimed in claim 13, wherein one end of the return spring (722) is abutted against an impeller support on the bottom housing (310), and the other end of the return spring (722) is abutted against the impeller shaft of the impeller (320).

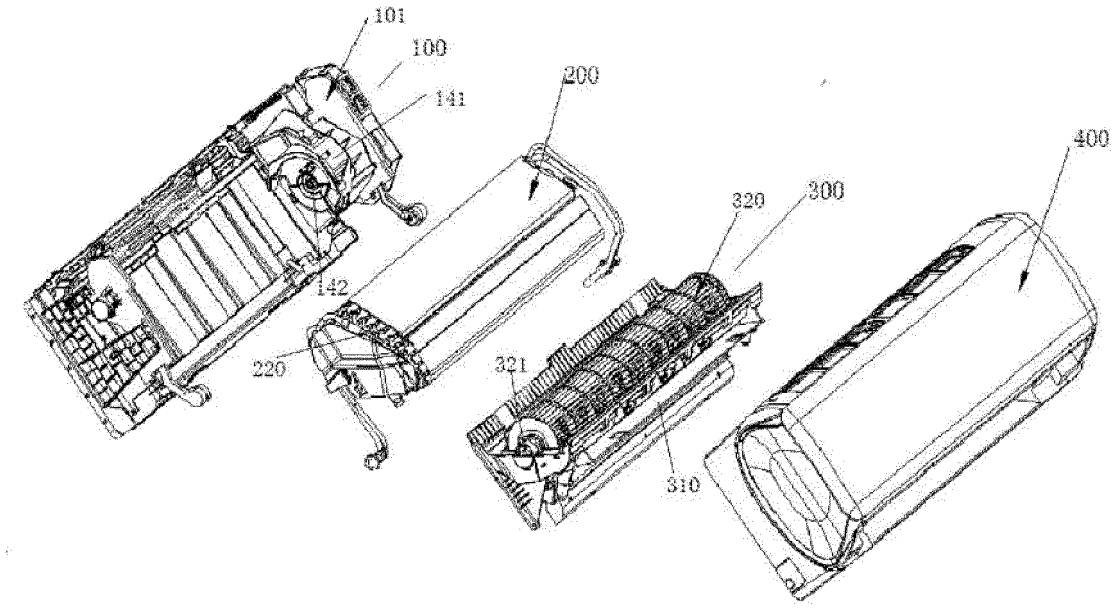

Fig. 1

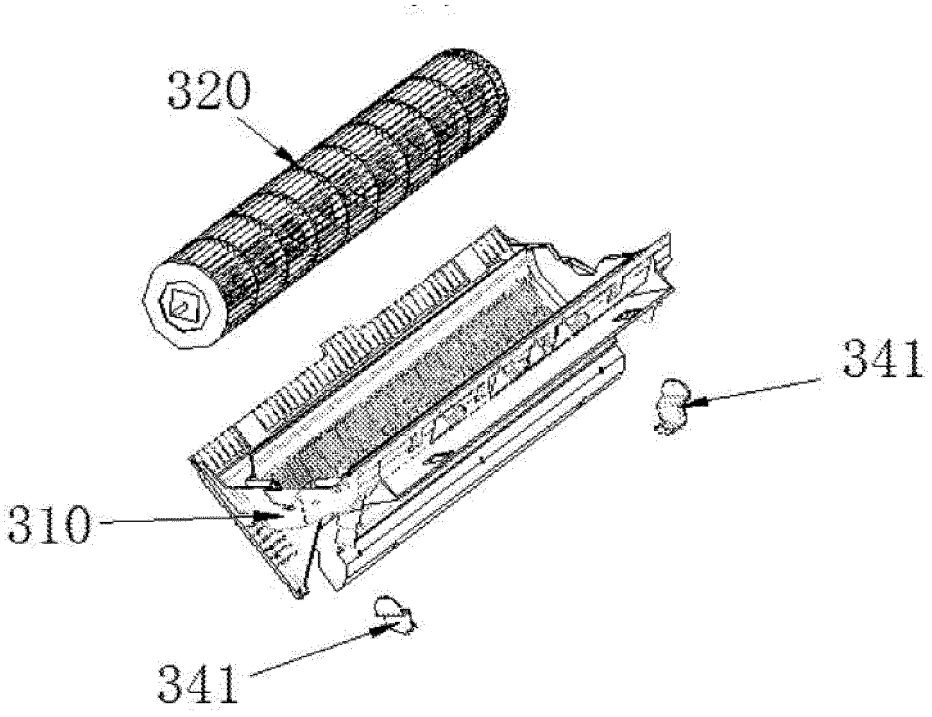

Fig. 2

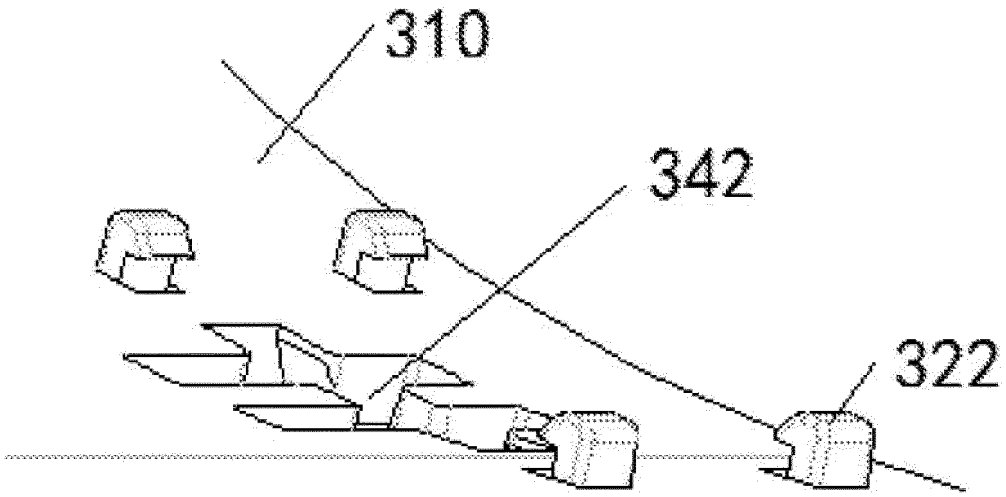

Fig. 3

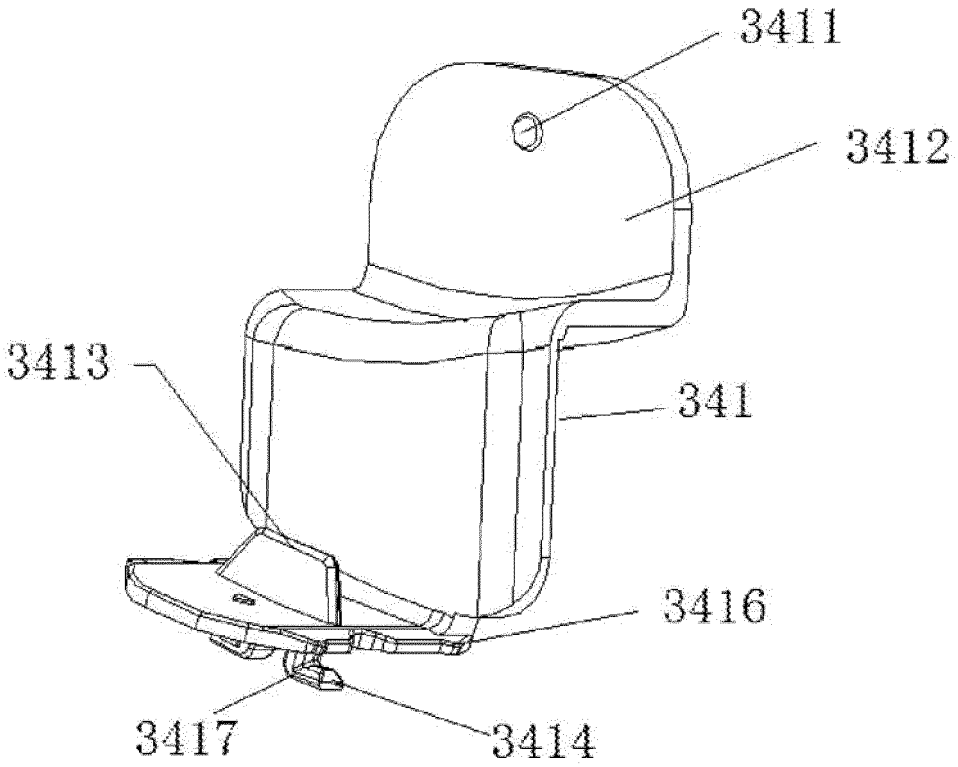

Fig. 4

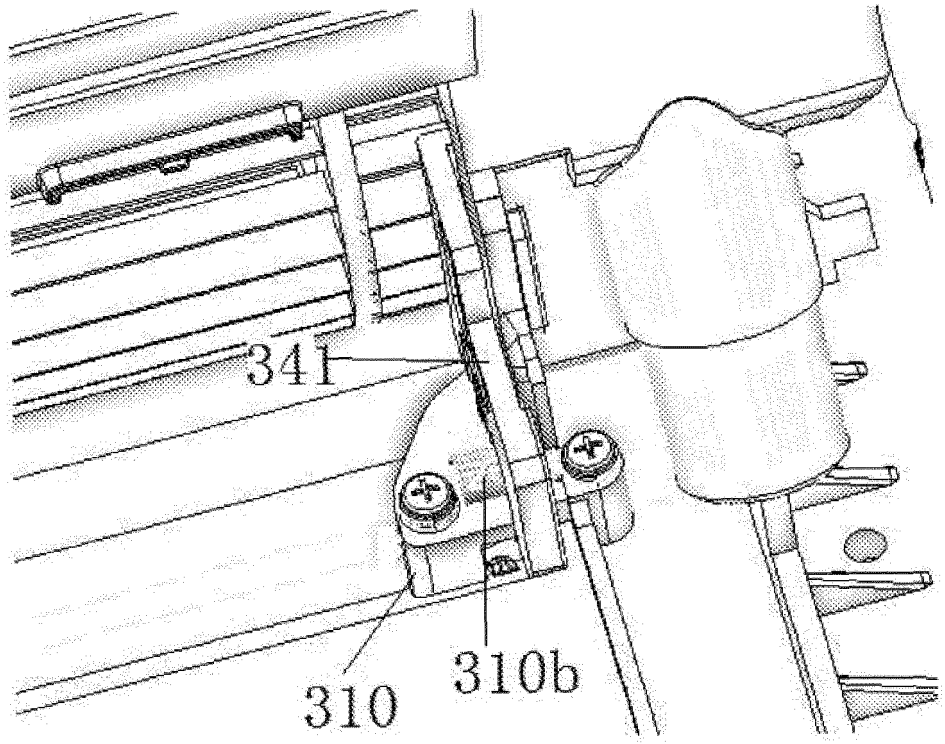

Fig. 5

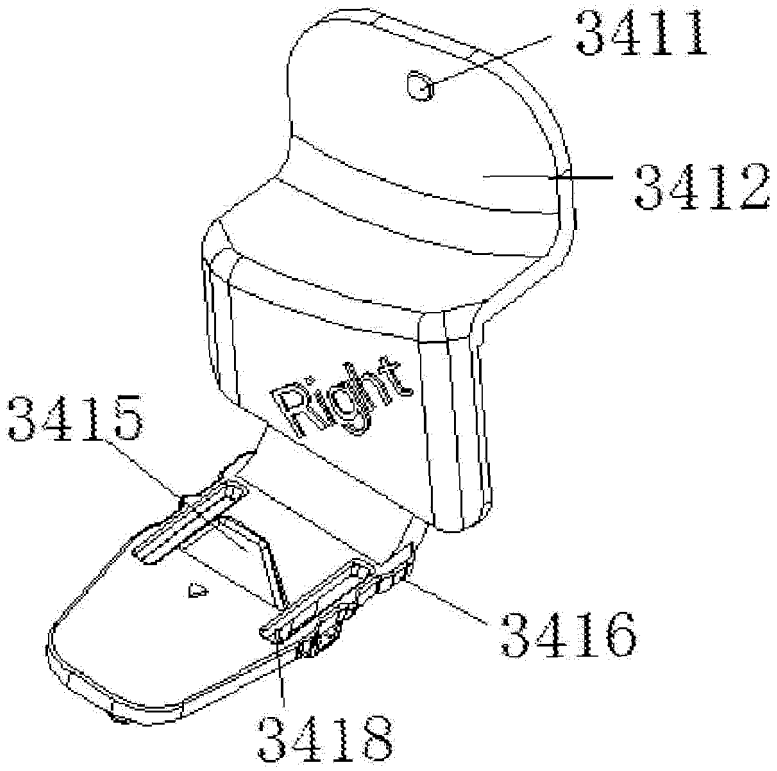

Fig. 6

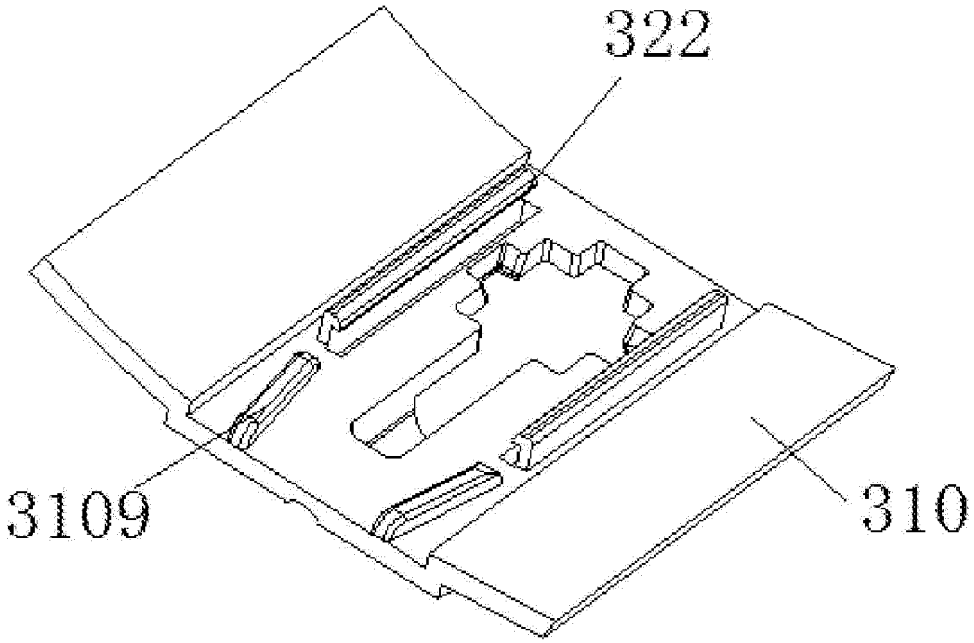

Fig. 7

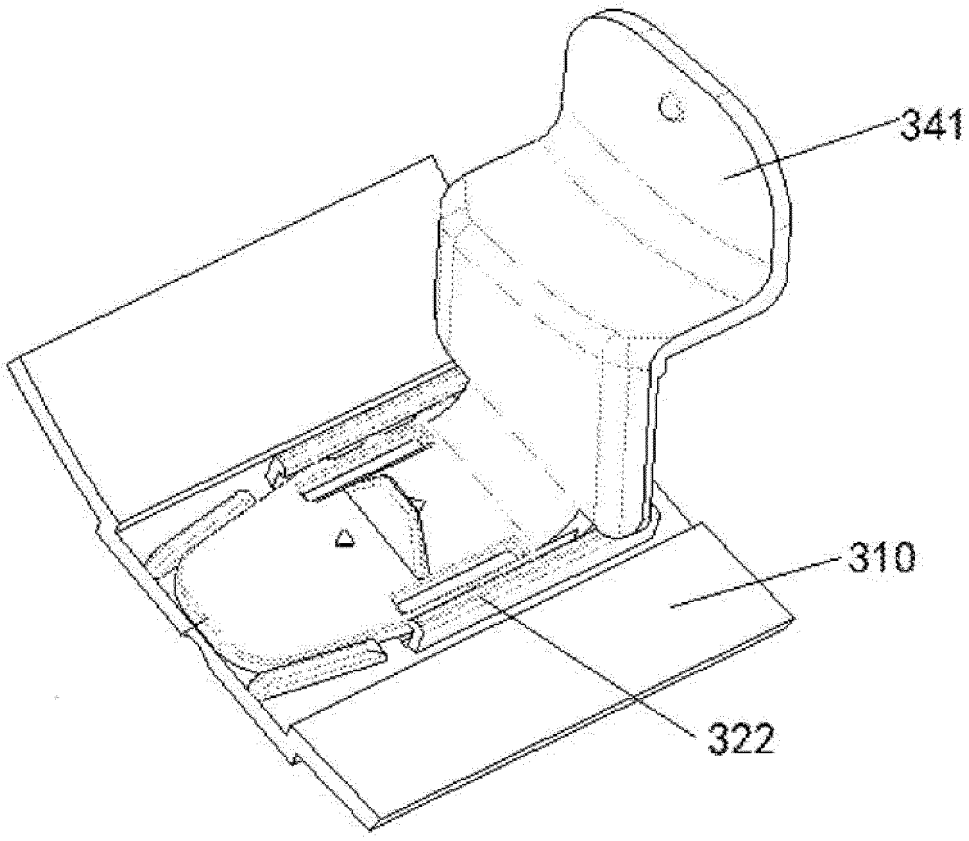

Fig. 8

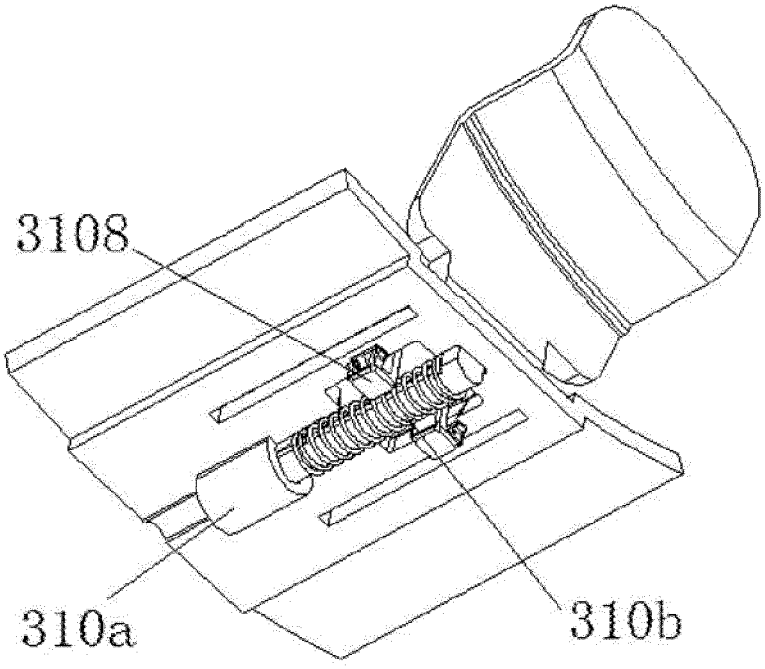

Fig. 9

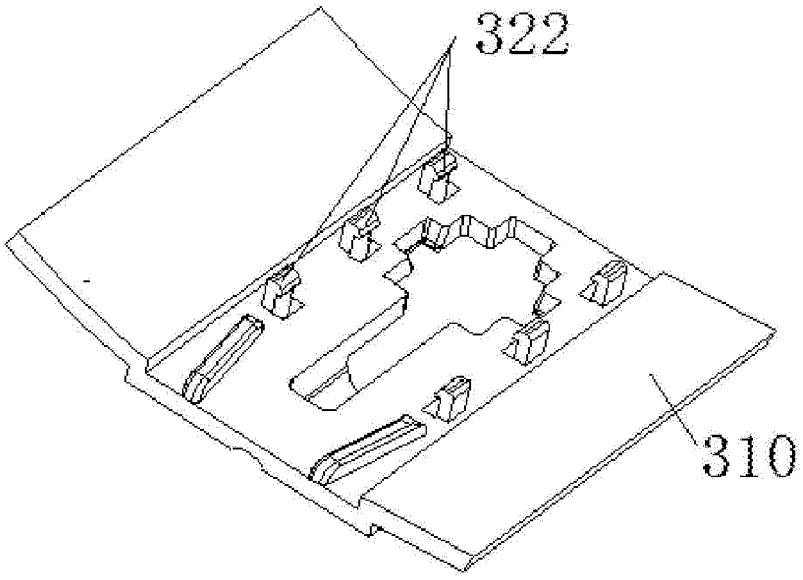

Fig. 10

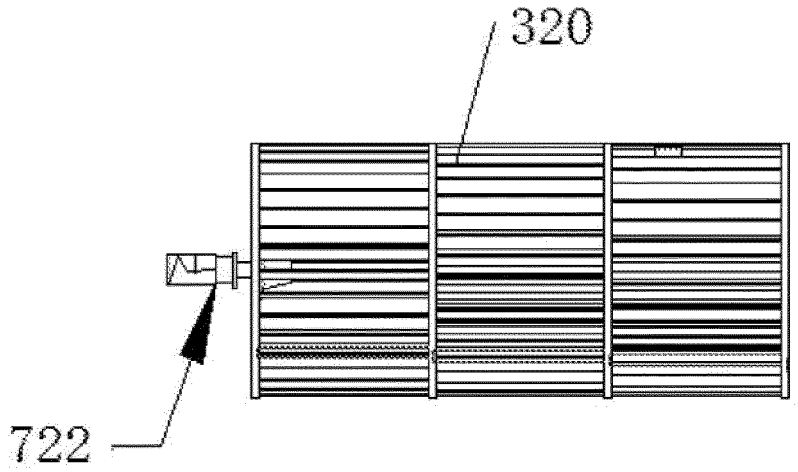

Fig. 11

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2017/109764

A. CLASSIFICATION OF SUBJECT MATTER

F24F 13/00(2006.01)i

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

F24F F04D

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)

CNABS, CNTXT, CNKI, VEN: 空调, 叶轮, 风扇, 风机, 风轮, 电机, 拨片, 推动板, 推动片, 拨动板, 拨动片, 拨板, 推片, 推板, 推动, 拨动, 轴向, 移动, 运动, 拆卸, 拆装, 卸下, 安装, air condition+, fan, blower, wind wheel, motor, push, slice, piece, plate, board, axial, axially, move, movement, mobile, motion, disassembly, dismount, reassembly, detach, demount, mount, assembly, install

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	CN 1548821 A (GREE ELECTRIC APPLIANCES, INC. OF ZHUHAI) 24 November 2004 (2004-11-24) description, page 3, line 6 to page 5, last line, and figures 1 and 7	1, 6, 7, 11
Y	CN 2618085 Y (GREE ELECTRIC APPLIANCES, INC. OF ZHUHAI) 26 May 2004 (2004-05-26) description, page 3, line 6 to page 5, last line, and figures 1 and 7	1, 6, 7, 11
Y	CN 201330752 Y (LIU, YONG ET AL.) 21 October 2009 (2009-10-21) description, page 3, antepenultimate paragraph and penultimate paragraph, and figure 1	1, 6, 7, 11
A	CN 203516173 U (TCL AIR CONDITIONER (ZHONGSHAN) CO., LTD.) 02 April 2014 (2014-04-02) entire document	1-14
A	CN 103115398 A (XUE, KANG) 22 May 2013 (2013-05-22) entire document	1-14
A	JP H10103295 A (KUBOTA CORP.) 21 April 1998 (1998-04-21) entire document	1-14

☑ 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
17 January 2018	**09 February 2018**
Name and mailing address of the ISA/CN **State Intellectual Property Office of the P. R. China** **No. 6, Xitucheng Road, Jimenqiao Haidian District, Beijing 100088** **China**	Authorized officer
Facsimile No. **(86-10)62019451**	Telephone No.

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

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2017/109764

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP H05322200 A (MITSUBISHI ELECTRIC CORP.) 07 December 1993 (1993-12-07) entire document	1-14
A	JP 3846583 B2 (MITSUBISHI ELECTRIC CORP.) 15 November 2006 (2006-11-15) entire document	1-14

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

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2017/109764

Patent document cited in search report	Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
CN 1548821 A	24 November 2004	CN 1259527 C	14 June 2006
CN 2618085 Y	26 May 2004	None	
CN 201330752 Y	21 October 2009	None	
CN 203516173 U	02 April 2014	None	
CN 103115398 A	22 May 2013	CN 103115398 B	16 December 2015
JP H10103295 A	21 April 1998	None	
JP H05322200 A	07 December 1993	None	
JP 3846583 B2	15 November 2006	JP 2004144318 A	20 May 2004

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

REFERENCES CITED IN THE DESCRIPTION

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- CN 2823621 Y **[0006]**