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

(11) **EP 1 980 795 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
26.06.2013 Bulletin 2013/26

(21) Application number: **08013610.4**

(22) Date of filing: **28.08.2003**

(51) Int Cl.:
F24F 1/00 *(2011.01)* ***F24F 11/00*** *(2006.01)*
F24F 13/20 *(2006.01)*

(54) Air conditioner

Klimaanlage

Climatiseur

(84) Designated Contracting States:
ES FR IT

(30) Priority: **30.08.2002 JP 2002254109**

(43) Date of publication of application:
15.10.2008 Bulletin 2008/42

(62) Document number(s) of the earlier application(s) in accordance with Art. 76 EPC:
03791362.1 / 1 548 375

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Description

BACKGROUND OF THE INVENTION

Field of the Invention

[0001] The present invention relates to an air conditioner having a housing and an air blower, a heat exchanger, etc. which are mounted in the housing, in which indoor air is sucked from a suction port and heat-exchanged and then air-conditioned air is blown out from a blow-out port into the room.

Background Art

[0002] There is generally known an in-ceiling type air conditioner in which a lifting lug is provided to the side plate of a housing having an air blower, a heat exchanger, a drain pan, etc. mounted therein and a hanging bolt hung from a beam of the ceiling is fitted in the lifting lug to thereby support the housing while the housing is hung from the beam. At the lower side of the main body (housing) of the indoor unit of the in-ceiling type air conditioner as described above are provided a decorative panel which has an air suction port disposed at the center thereof for sucking indoor air and air blow-out ports disposed on the outer peripheral portion thereof for blowing out air heat-exchanged by the heat exchanger into the room and is provided on the ceiling face so as to close the opening portion formed in the ceiling, and a suction grille having a suction port at the center thereof. The suction grille is detachably secured to the decorative panel by hinge joint. Furthermore, flaps for changing the air blow-out direction are provided at the air blow-out ports of the decorative panel, and these flaps are designed so that the position thereof is stepwise changeable by a controller.

[0003] In the in-ceiling type air conditioner described above, the lifting lug is fixed to the housing by using plural bolts in order to completely prevent the lifting lug from dropping off the housing. In some type of air conditioners, the housing comprises a so-called top plate composed of a heat-insulating metal plate and bisected side plates composed of heat-insulating metal plates. When fabricating this type of housing, it is general to temporarily tacking the bisected side plates in an annular form and then screw-fixing the side plates to each other and also each side plate to the top plate.

[0004] The in-ceiling type air conditioner as described above uses a temporarily tacking manner of equipping temporary tacking pawls extending in the vertical direction to the side plates and temporarily fixing the side plates to each other through the temporarily tacking pawls while sliding the side plates in the vertical direction. However, the construction as described above has problems that it is difficult to carry out a fabrication work of the lifting lug because it is fixed to the housing by using plural bolts, also that when bolts are used, the bolts may come loose, etc. Furthermore, when the side plates are temporarily tacked to each other in the annular form by using temporary tacking pawls extending in the vertical direction while sliding the side plates in the vertical direction, the temporary tacking between the side plates can be easily performed. However, the inner diameter of the annular assembly of the side plates is determined at the temporary tacking stage, and thus when the peripheral edge portion of the bottom plate of the housing is engaged with the inner periphery of the annular assembly of the side plates, a large gap may occur between the inner peripheral portion of the annular assembly and the outer edge portion of the bottom plate or the engagement between them is difficult because they are excessively tightly engaged with each other.

[0005] Furthermore, in some type of air conditioners, a slide type lock device to be engagedly fitted to a fitting portion of a decorative panel is equipped to a suction grille so that the suction grille which is detachably joined to the decorative panel through a hinge is fixed to the suction grille. In this type of slide lock device, the suction grille is equipped with a cut-out portion for sliding a slide type lock piece constituting the slide type lock device in a direction perpendicular to the sash bars of the suction grille, and the slide type lock piece is slidably mounted in the cut -out portion. However, in this construction, when the slide type lock piece is detached from the suction grille, the cut-out portion described above remains at the sash bars of the suction grille. Therefore, in the case of a suction grille on which a slide type lock piece is required to be mounted, there is no problem because it is inconspicuous. However, in the case of a suction grille on which a slide type lock piece is required to be mounted, the cut-out portion is excessively conspicuous, and thus the slide type lock piece cannot be used in both the grilles.

[0006] Furthermore, from the viewpoint of the manufacture, it is preferable for the slide type lock device that the cost is low and the fabrication is easy.

[0007] As described above, the flap for changing the air blow-out direction is provided at the air blow-out port of the decorative panel. The flap is automatically positioned by driving a motor under the control of a microcomputer or the like, whereby not only the blow-out position can be fixed, but also a swing operation can be performed. This flap is fixed at any one of plural stages, for example, five stages from F1 to F5, or swung between F1 and F5 to thereby control the air blow-out direction. For example, F1 set the air blow-out direction to the horizontal blow-out direction with respect to the ceiling surface, and F5 sets the air blow-out direction to the vertical blow-out direction with respect to the ceiling surface. F2, F3 and F4 successively set the position of the flap between F1 and F5.

[0008] A microcomputer and an AC motor as a flap motor are provided in the indoor unit. The control of the flaps is carried out on the basis of data of a flap motor driving time. The data of the flap motor driving which are owned by the microcomputer are predetermined as default based on the stage of F1 in such a manner that the

stage of F2 is set after 3 seconds from F1, the stage of F3 is set after 6 seconds from F1, etc. In a case where the flaps are fixed at any stage from F1 to F5 (for example, F3) during operation of the air conditioner, the flaps start to move until the stage of F1, and after the position of F1 is detected, the flaps are moved on the basis of the flap motor driving time until the stage F3 which is stored in advance by the microcomputer.

[0009] In the air conditioner described above, the position of the flap at each stage is predetermined as a default. Accordingly, for example when the stage of F1 is selected during cooling operation, there may be occur such a smudging situation that cold air blown out from the blow-out port flows along the ceiling surface to cool the ceiling surface and induce condensation on the ceiling surface, and duct in the room adheres to the ceiling surface to smudge the ceiling surface. Furthermore, for example when the stage of F3 is selected, cold air blown out from the blow-out port directly impinges against a user's body, and thus the user may have uncomfortable feeling (draft feeling). Furthermore, when a swing operation is carried out on a flap, the flap may be swung to such an angle level that smudge occurs or a draft feeling is induced. That is, predetermined flap control is carried out at any setup place, and thus there is a problem that the flap control cannot be performed in conformity with user's requirements (a requirement of preventing smudge or a requirement of preventing draft feeling).

[0010] JP 2000 199639 A discloses an air conditioner having flaps at two blow-out ports wherein the swinging of the two flaps is controlled in such a way that the flaps are swung in synchronism with each other. This document does not disclose any relationship between flap positions and stages.

Summary of the invention

[0011] The present invention has been implemented in view of the foregoing problems and has the object to provide an air conditioner in which flap control satisfying user's requirements can be performed and smudge and draft feeling can be prevented.

[0012] This object is attained by an air conditioner according to claim 1 and an air conditioner according to claim 5.

Brief Description of the Drawings

[0013]

Fig. 1 is a cross-sectional view showing an indoor unit of an air conditioner according to a first embodiment of the present invention.

Fig. 2 is a perspective view showing a housing.

Fig. 3 is a diagram showing an outlook of the housing.

Fig. 4 is a cross-sectional view of Fig. 3 which is taken along IV-IV line.

Fig. 5 is an enlarged view taken along an arrow V of Fig. 3.

Fig. 6 is a diagram showing the procedure of a fabrication working of securing a lifting lug to the housing.

Fig. 7 is a cross-sectional view showing an indoor unit of an air conditioner according to a second embodiment of the present invention.

Fig. 8 is a perspective view showing a state where the suction grille of the indoor unit is opened.

Fig. 9 is a front view showing the surrounding portion of a slide type lock device.

Fig. 10 is a side cross-sectional view showing the surrounding portion of the slide type lock device.

Fig. 11 is an end elevation of the slide type lock piece.

Fig. 12 is a bottom view showing an indoor unit of an air conditioner according to a third embodiment of the present invention.

Fig. 13 is a block diagram showing a control device for controlling flaps of the third embodiment.

Fig. 14 is a schematic diagram showing a remote controller according to the third embodiment.

Fig. 15 is a schematic diagram showing the operation of the flaps of the third embodiment.

Fig. 16 is a block diagram showing a control device for controlling flaps in a first modification of the third embodiment.

Fig. 17 is a diagram showing a table stored in a rewritable non-volatile memory of the first embodiment.

Fig. 18 is a schematic diagram showing a remote controller according to the first embodiment.

Fig. 19 is a block diagram showing a control device for controlling flaps according to a second modification of the third embodiment.

Fig. 20 is a diagram showing a table stored in a rewritable non-volatile memory of the second modification.

Best Modes for Carrying out the Invention

[0014] Embodiments according to the present invention will be described with reference to the accompanying drawings.

[0015] The following embodiments will be described by applying the present invention to a case where a four-direction ceiling cassette type air conditioner, however, the present invention is not limited to these embodiments.

[0016] First, a first embodiment of the present invention will be described with reference to Figs. 1 to 5.

[0017] As shown in Fig. 1, an indoor unit of an air conditioner according to this embodiment has a box-shaped main body (housing) 1 formed of sheet metal of an air conditioner, and is hung from the ceiling by hanging bolts. The main body 1 of the air conditioner is opened downwardly, and when it is embedded in the ceiling, this opening side is confronted to a room to be air conditioned. A fan motor 5 is fixed in the air conditioner main body 1,

and a vane wheel is secured to the shaft of the fan motor 5. The fan motor 5 and the vane wheel 7 constitute an air blower 9. A polygonally-bent heat exchanger 11 is disposed so as to surround the air blower 9, and a drain pan 13 of foamed styrol is disposed so as to cover the lower surface 11A of the heat exchanger 11. Various kinds of parts such as a bellmouth 14 of the air blower 9, an electrical component box (not shown), etc. are fixed to the drain pan 13 by screws. Reference numeral 12 represents a heat insulating member of foamed styrol. As not shown in the figures, the air conditioner of this embodiment has a refrigerating cycle comprising a compressor, an outdoor heat exchanger, etc. equipped to an outdoor unit, and a heat exchanger 11, etc. equipped to an indoor unit. During cooling operation (or dry operation), the heat exchanger 11 of the indoor unit functions as an evaporator, and during heating operation, the heat exchanger 11 of the indoor unit functions as a condenser.

[0018] A decorative panel 21 is secured to the lower surface of the main body 1 of the air conditioner. A suction port 22 and a blow-out port 23 are formed in the decorative panel 21, and a filter 25 is mounted inside the suction port 22.

[0019] Fig. 2 is a perspective view showing a fabrication state of the housing 1. The housing 1 comprises a top plate 31 formed of sheet metal and bisected side plates 32 and 33 formed of sheet metal. The side plates 32 and 33 are annularly joined to each other by joint portions A and B at two places. One side plate 32 has a joint piece 32A constituting the joint portion A and a joint piece 32B constituting the joint portion B, and the other side plate 33 has a joint piece 33A constituting the joint portion A and a joint piece 33B constituting the joint portion B.

[0020] Fig. 3 is a diagram showing the outlook of the housing 1, Fig. 4 is a cross-sectional view of IV-IV of Fig. 3, and Fig. 5 is an enlarged view taken along an arrow V of Fig. 3.

[0021] As shown in Figs. 3 to 5, a temporary tacking pawl 35 extending in the peripheral direction is provided at some midpoint of the joint portion A in the vertical direction. The temporary tacking pawl 35 is formed integrally with the joint piece 32A of the one side plate 32. The temporary tacking pawl 35 is designed so as to extend substantially in U-shape toward the inside of the housing 1 and hooked to a reception hole formed in the joint piece 33A of the other side plate as shown in Fig. 4. Accordingly, referring to Fig. 4, the one side plate 32 is moved in the direction of an arrow X, the temporarily tacking pawl 35 is hooked to the reception hole 37, and then the one side plate 32 is moved to be pulled back in the direction of an arrow Y, thereby completing the temporary tacking.

[0022] The temporary tacking pawl 35 is designed to have a tapered shape, and the reception hole 37 receiving the temporary tacking pawl 35 is designed to have a tapered trapezoidal shape so that the engagement between the temporary tacking pawl 35 an the reception hole 37 gets tighter as the engagement progresses.

[0023] The foregoing description relates to the joint portion A, and the joint portion B has the same construction as the joint portion A although it is omitted from the illustration.

[0024] In the above construction, a curtain piece 31A having a predetermined height is integrally formed around (over the overall periphery or at a part of) the sheet-metal top plate 31 as shown in Fig. 2. The side plates 32, 33 are disposed so that the upper edges of the side plates 32 and 33 abut against the outer surface of the curtain piece 31A, and these side plates 32 and 33 are annularly temporarily tacked with each other by the joint portions A and B at the two places. In this case, the temporary tacking is carried out by using the temporary tacking pawls 35 extending in the peripheral direction, and thus as the engagement between each temporary tacking pawl 35 and the reception hole 37 gets tighter, the upper edges of the side plates 32, 33 abut against the outer surface of the curtain piece 31A more strongly. Accordingly, when the temporary tacking is completed, no gap occurs between the side plate 32, 33 and the top plate 31.

[0025] After the temporary tacking is completed, the side plates 32 and 33 and each side plate 32, 33 and the curtain piece 31A are actually fixed to each other by screw tapping.

[0026] In this embodiment, no gap occurs between the side plate 32, 33 and the top plate 31 when the temporary tacking is completed. Therefore, when the side plates 32 and 33, and the side plate 32, 33 and the curtain piece 31A are actually fixed to each other by screw tapping after the temporary tacking is completed, they can be actually firmly fixed to each other with high precision.

[0027] Next, the lifting lug will be described.

[0028] As shown in Fig. 2, a lifting lug 41 is fixed at each of four corners of the housing 1. The hanging bolts 2 are inserted in the lifting lugs 41, and the housing 1 is hung from the ceiling by the hanging bolts 2. As shown in Fig. 6, the lifting lug 41 comprises a first portion 42 extending inside of the housing 1, a second portion 43 which is engaged with the lower end edge of the side plate 32, 33 of the housing 1 when the first portion 42 is inserted in the direction of an arrow P through an opening (not shown) formed in the housing 1 and turned in the direction of an arrow R until the confronting face 42A of the first portion 42 abuts against the inner surface of the side plate 32, 33 of the housing 1, and a third portion 45 which has a groove 44 (Fig. 4) for passing the hanging bolt 22 therethrough and projects to the outside of the housing 1 substantially in parallel to the top plate 31 when the first portion 42 is inserted in the direction of the arrow P through the opening (not shown) formed in the housing 1 and turned in the direction of the arrow R until the confronting face 42A of the first portion 42 abuts against the inner surface of the side plate 32, 33 of the housing 1.

[0029] The opening (not shown) formed in the housing 1 is designed to be large enough to accept at least the height H of the second portion 43, and also large enough

to turn the lifting lug 41 in the direction of the arrow R.

[0030] When the lifting lug 41 is inserted in the direction of the arrow P and then turned in the direction of the arrow R to the position at which the confronting face 42A of the first portion 42 abuts against the inner surface of the side plate 32, 33 of the housing 1, the lifting lug 41 would be swung due to the size of the opening (not shown), and thus it is difficult to fix the lifting lug 41 and the side plate 32, 33 by one screw 47.

[0031] In this embodiment, preventing means 50 for preventing the swinging motion of the first portion 42 as shown in Fig. 4 is provided between the inner surface of the side plate 32, 33 and the confronting face 42A of the first portion 42. This preventing means 50 is constructed by a recess portion 51 which is formed on the inner surface of the side plate 32, 33 and recessed toward the inside of the housing 1, and a projecting portion 52 which is formed on the confronting face 42A of the first portion 42 and engaged with the recessed portion 51. The engagement between the recess portion 51 and the projecting portion 52 prevents the swinging portion of the lifting lug 41, so that the fixing work based on one screw 47 can be extremely facilitated.

[0032] When the lifting lug 41 is secured to the housing 1, the third portion 45 abuts against the upper edge of the opening (not shown) formed in the housing 1, and the second portion 43 is fitted to the lower end edge of the side plate 32, 33 of the housing 1. According to this construction, the lifting lug 41 is designed so as to receive the weight of the housing 1 by itself. Accordingly, the screw 47 mainly functions to joint the lifting lug 41 to the side plate 32, 33, and the weight of the housing 1 is not received by the screw 47. If the screw 47 slackens, the lifting lug 41 is not detached from the housing 1.

[0033] Next, a second embodiment of the present invention will be described with reference to Figs. 7 to 11.

[0034] Fig. 7 is a cross-sectional view showing an air conditioner 150 of this embodiment. As shown in Fig. 7, the air conditioner 150 of this embodiment has a main body 202 formed of sheet metal and a suction port 203 which are disposed at the center thereof, blow-out ports 204 at the four sides of the outer peripheral portion thereof, a decorative panel 207 provided on the ceiling surface 206 so as to close the ceiling opening 205, and a suction grille 209 having a suction port 208 at the center thereof. The air conditioner is further equipped with an air blower 110, and the air blower 110 has a turbo fan 111 and a fan motor 113 secured to the top plate 112.

[0035] Here, a nozzle port 114 guides air from the suction port 208 to the turbo fan 111. A drain pan 115 has an inner boss portion 115a and an outer boss portion 115b, and formed of formed styrol in a squarish annular form. A plate fin type heat exchanger 116 is annularly disposed at the discharge side of the turbo fan 111 so as to surround the fan 111. A heat-insulating member 117 is wound around the main body 202, and an air guide portion 121 guides air heat-exchanged by the heat exchanger 116 to a heat exchanger 116. Furthermore, hanging bolts 122 hang the main body 202 from the ceiling beams by hanging tools 123. Furthermore, a filter 124 for cleaning air is secured at the downstream side of the suction grille.

[0036] Fig. 8 is a perspective view showing a state where the suction grille 209 is opened.

[0037] As shown in Fig. 8, the suction grille 209 is secured to one side of the decorative panel 207 through a hinge 125 so as to be freely opened and closed. The filter 124 is detachably mounted on the suction grille 209 while the filter 124 is pressed by a filter pressing member 127.

[0038] In the air conditioner 150, the suction grille 209 is opened/closed every time the filter 124 is subjected to maintenance or the like.

[0039] In this embodiment, the suction grille 209 is turned through the hinge 125, andwhenthe suction grille 209 is closed, a slide type lock piece 101 constituting each of a pair of slide type lock devices 100 provided to the suction grille 209 is engagedly fitted in a fitting portion (hole) 135 of the decorative panel 207, whereby the suction grille 209 is fixed to the decorative panel 207.

[0040] Fig. 9 is a front view showing the surrounding portion of the slide type lock device. Fig. 10 is a side cross-sectional view showing the surrounding portion of the slide type lock device. Fig. 11 is a cross-sectional view showing a slide type lock piece.

[0041] The slide type lock piece 101 constituting the slide type lock device 100 is designed to be slidable in the direction of an arrow A along the gap between the cleats 209a of the suction grille 209 as shown in Fig. 9.

[0042] Here, the securing state of the slide type lock device 100 to the suction grille 9 will be described.

[0043] A boss portion 102 is integrally formed on the back side of the suction grille 209. The slide type lock piece 101 is slidably fixed to the boss portion 102 through a washer 103 by a screw 105.

[0044] The slide type lock piece 101 is formed of resin so as to have a substantially rectangular shape. An elongated screw hole 101a is formed substantially at the center portion of the slide type lock piece 101.

[0045] A finger grip portion 106 which is used by an operator when the slide type lock piece 101 is slid in the direction of the arrow A is erectly provided on the lower surface of the slide type lock piece 101 so as to project from a finger grip hole 209c of the suction grille downwardly.

[0046] Furthermore, a sagging piece 101c having a free end 101b at one end thereof is formed at each of both the sides of the slide piece lock piece 101.

[0047] Furthermore, a lib 107 which abuts against the cleat 209a of the suction grille 209 when the slide type lock piece 101 is slid is formed at each of the non-formation portions of both the sides of the slide type lock piece 101 at which the sagging piece 101c is not formed.

[0048] Fitting projections 101d which can be fitted in fitting notches 209b formed in the cleats 209a of the suction grille 209 are provided to the free ends 101b of the sagging pieces 101c.

[0049] Each sagging piece 101c sags when the operator grips the finger grip portion 106 and slides the slide type lock piece 101 in the direction of the arrow A from the state of Fig. 9. Accordingly, the fitting projections 101d fitted in the fitting notches 20b at the periphery side of the suction grille 20 climb over the side walls of the fitting notches 209b, and abut against the cleats 209a of the suction grille 209. When the slide type lock piece 110 is further slid in the direction of the arrow A, the fitting projections 101d are fitted in the notches 209b at the center side of the suction grille 209 by the elastic force of the sagging piece 101c again. At this time, click sound occurs, and the operator achieves a so-called operating click feeling.

[0050] It is preferable that the slide type lock pieces 101 are fixed to prevent the suction grille 209 from being erroneously opened when the air conditioner is carried. Therefore, the slide type lock pieces 101 are provided with fixing screw holes (not shown) and the slide type lock pieces 101 are firmly fixed to the suction grille 209 by fixing screws (not shown) while the slide type lock pieces 101 are projected. Accordingly, there can be beforehand prevented such a trouble that the slide type lock pieces 101 creep out from the fitting portions (holes) 135 of the decorative panel 7 when the air conditioner is carried.

[0051] According to this embodiment, the slide type lock pieces 101 may be merely fixed to the boss portions 102 by using the washers 103 and the screws 105. Therefore, it is unnecessary to use a so-called special part, and the number of parts can be reduced to the required minimum number, so that the manufacturing cost and the manufacturing labor can be reduced.

[0052] Furthermore, the sagging pieces 101c for bringing the operator with the operating click feeling are provided to the sides of the slide lock pieces 101c, so that the thickness of the slide type lock device 100 can be reduced and thus it can be designed to be thin.

[0053] Still furthermore, no cut-out portion is provided to the cleat 209a of the suction grille 209, and thus even when the slide type lock device 100 is detached from the suction grille 209, no cut-out portion occurs in the cheat 209 of the suction grille 209. Therefore, even when it is unnecessary to mount the slide type lock device 100, the same type of suction grille 9 can be used.

[0054] Next, a third embodiment according to the present invention will be described with reference to Figs. 1, 12 to 18. The construction of the air conditioner is substantially the same as the first embodiment shown in Fig. 1, and the detailed description thereof is omitted from the following description.

[0055] Fig. 12 is a plan view showing an indoor unit 1 (see Fig. 1) of an air conditioner according to this embodiment.

[0056] In Fig. 12, a decorative panel 21 is provided with a suction port 303 and four blow-out ports 304A, 304B, 304C, 304D disposed so as to surround the suction port 303. The blow-out ports 304A, 304B, 304C, 304D are provided with flaps 305A, 305B, 305C, 305D respectively. Furthermore, a flap motor 306A for driving the two flaps 305A, 305B and a flap motor 306B for driving the two flaps 305C, 305D are provided. These f lap motors 306A, 306B are connected to a control device 307, and these motors are independently controlled by the control device 307. That is, the flaps 305A and 305B are operated in synchronism with each other, and the flaps 305C and 35D are operated in synchronism with each other. The flap motors 306A and 306B are stepping motors. The blow-out ports 304A to 304D will be collectively referred to as the blow-out port 304, and the flaps 305A to 305D will be collectively referred to as the flap 305.

[0057] Fig. 13 is a block diagram showing the control device 307 for driving the flap motors 306A 306B. Each flap motor 306A. 306B is connected to the microcomputer 322 (hereinafter referred to as "microcomputer") through the driving circuit 321A, 321B. A rewritable non-volatile memory 323 (for example, EEPROM) and a remote controller 324 (hereinafter referred to as "remote controller") are connected to the microcomputer 322. The driving circuits 321A, 321B, the microcomputer 322 and EEPROM 323 are mounted on a board, and accommodated in an electrical component box (not shown).

[0058] The microcomputer 322 carries out the overall control of the air conditioner on the basis of a control program stored in a recording medium (for example, ROM EEPROM or the like) (not shown) in advance. Particularly, the microcomputer 322 controls each flap 305 (Fig. 12), that is, the flap motors 306A and 306B on the basis of the control program. For example, it carries out the control of holding (fixing) the flap 305 and the swing control of the flap 305. Specifically, in response to an instruction from the remote controller 324, the microcomputer 322 refers to EEPROM 323 and controls the flap motors 306A and 306B.

[0059] When carrying out the control of holding (fixing) the flap 305, the microcomputer 322 carries out the control of changing the position of the flap 305 among plural stages, for example, five stages (F1 to F5).

[0060] For example, the remote controller 324 is provided with an operation mode switch 340, a blow-out port selecting switch 341, an air flowing direction setting switch 342, a swing change-over switch 343, an operating/stopping switch 345, setting switches 346 and 347, an operating switch 348, a data input switch 349, etc., and also provided with a display portion 350. On the display portion 350 are displayed characters, symbols, data, etc. of an operation mode (cooling, dry or heating mode), an air blow-out port (A, B or C, D), an air flowing direction (F1, F2, F3, F4 or F5), swing, etc.

[0061] The operation mode change-over switch 340 is a switch for switching the operation mode to any one of a cooling operation mode, a dry operation mode and a heating operation mode.

[0062] The blow-out port selecting switch 341 is a switch for selecting the blow-out ports 304A and 304B or the blow-out ports 304C and 304D. Every time the blow-

out selecting switch 341 is pushed, a display of the blow-out ports A and B and a display of the blow-out ports C and D are successively changed to each other on the display portion 350, and the blow-out ports 304A and 304B or the blow-out ports 304C and 304D are selected as targets for the change of the air flowing direction. The blow-out ports A, B, C, D displayed on the display portion 350 correspond to the blow-out ports 304A, 304B, 304C, 304D (Fig. 12).

[0063] The air flowing direction setting switch 342 is a setting switch for fixing the position of the flaps 305A, 305B, 305C, 305D (see Fig. 12) to any one of plural stages, for example, five stages of F1 to F5. Every time the air flowing direction setting switch 342 is pushed, the air flowing display F1 F2, F3, F4, F5 on the display portion 350 is successively changed in this order to select the corresponding stage F1 to F5, and the position of the flaps 305 (Fig. 12) is set in conformity with the stage thus selected.

[0064] The swing change-over switch 343 is a switch for switching the flaps 305 to the swing operation. The swing change-over switch 343 also selects any one swing operation range from plural swing operation ranges. For example, when the swing change-over switch 343 is pushed, the swing operation is set. Thereafter, every time the switching change-over switch 343 is further pushed, the swing operation range is successively switched.

[0065] The operation/stop switch 345 is a switch for changing operation and stop to each other.

[0066] The setting switches 346, 347, the operation switch 348 and the data input switch 349 are used when the content of EEPROM 323 (Fig. 13) is rewritten. For example, a mode for rewriting the content of EEPROM 323 is set by simultaneously pressing the setting switches 346 and 347, and the content of EEPROM 323 is rewritten by the operation switch 348 and the data input switch 349.

[0067] Fig. 15 shows the flap position of the flaps 305. N0 to N7 represent the flap positions.

[0068] N1 to N6 represents the flap positions allocated to the respective stages F1 to F5 of the flaps 305. N0 and N7 represent the flap swing limit positions. The flap limit positions of the flaps 305 means the limit positions of a movable area where the flaps 305 is not moved beyond the positions at which the blow-out ports 304 are closed by the flaps 305.

[0069] N0 or N7 represents the initial position of the flap 305 as a standard. That is, it represents the flap position to which the flap 305 is moved when the operation is stopped. N0 and N7 are not allocated to the stages F1 to F5 of the flaps 305. Accordingly, the flaps 305 can be prevented from closing the blow-out ports 304 or abutting against the decorative panel 21 or the like at each of the stages F1 to F5.

[0070] In the first embodiment, N0 represents the initial position of the flaps 305 as a standard, and at the time when the operation is stopped, the flaps 305 are set to the initial position N0, and the blow-out ports 304 (blow-out ports 304A to 304D) are closed.

[0071] N1 represents a flap position when air is blown out substantially horizontally with respect to the ceiling surf ace. As the flap position is changed like N2, N3, ..., the blow-out direction is changed to the downward direction. N6 represents a flap position when air is blown out substantially vertically with respect to the ceiling surface.

[0072] The flaps 305 can be changed at five stages of F1 to F5 which are selectable by the remote controller 324, and any one of the flap positions N1 to N5 excluding the flap positions N0 and N7 corresponds to each of the stages F1 to F5.

[0073] For example, the flap positions N1, N3, N4, N5, N6 are allocated to the stages F1, F2, F3, F4 and F5 respectively. That is, in EEPROM 23 (Fig. 13) is stored a table 25 representing the association relationship between the stage F1 F2, F3, F4, f5 and the flap positions N1, N3, N4, N5, N6 (hereinafter referred to as "association relation table". In the first embodiment, the stepping motors are used as the flap motors 6A and 6B, and thus each of the flap positions N0 to N7 stored in EEPROM 23 represent the number of steps of the stepping motor.

[0074] At this time, the flap position N2 represents a preliminary flap position provided in the flap position range (from N1 to N3) between the stage F1 corresponding to the flap position N1 and the stage F2 corresponding to the flap position N3 at which air is blown out to the lower side than that in the stage F1.

[0075] The microcomputer 322 of Fig. 13 refers to this corresponding relation table 325, and controls to set the flaps 305 (flap motor 306A, 306B) to the flap position N1 to N6 corresponding to the stage F1 to F5 selected by the air flowing direction setting switch 342 (Fig. 14).

[0076] In the above construction, for example when the flaps 305 are controlled to the stage F1 corresponding to the flap position N1, air is blown out substantially horizontally with respect to the ceiling surface in the room, so that smudging may occur on the ceiling surface of the room particularly during cooling operation or dry operation.

[0077] Furthermore, when the flaps 305 are controlled to the stage F3 corresponding to the flap position N4, cold air directly impinges against the human body during cooling operation or dry operation, so that a user has draft feeling which makes the user uncomfortable.

[0078] In this embodiment, the corresponding relationship between the stage (F1 to F5) and the flap position (N1 to N6) can be changed by the switches 346 to 349 (Fig. 14) provided to the remote controller 324.

[0079] Specifically, the switches 346 to 349 are switches for changing the corresponding relationship between the stage (F1 to F5) and the flap position (N1 to N6), and the corresponding relationship table 325 (Fig. 13) of EEPROM 323 is rewritten by operating the switches 346 to 349. When the corresponding relationship table 325 is rewritten, the table can be rewritten by operating the switches 346 to 349 while referring to the content of the

corresponding relationship table 325 displayed on a table data display window of the display portion 350 (Fig. 14).

[0080] That is, in such a case where smudging occurs, if the flap position N1 corresponding to the stage F1 is changed to the preliminary flap position N2 (that is, the flap position N1 corresponding to the stage F1 in the corresponding relationship table 325 is rewritten to the preliminary flap position N2), occurrence of smudging on the ceiling surface can be avoided.

[0081] Furthermore, in such a case where a draft feeling is brought to a user, the flap position N3 corresponding to the stage F2 is changed to the preliminary flap position N2, and furthermore the flap position N4 corresponding to the stage F3 is changed to the flap position N3 (that is, the flap position N3 corresponding to the stage F2 in the corresponding relationship table 25 is rewritten to the preliminary flap position N2, and furthermore the flap position N4 corresponding to the stage F3 is rewritten to the flap position N3), the draft feeling can be avoided.

[0082] Next, when the flap 305 (Fig. 12) is swung, the flap 305 is normally swung in only predetermined one operation range, and draft feeling or smudging on the ceiling surface may occur particularly during cooling operation or dry operation.

[0083] In this embodiment, the plural flap operation ranges (Fig. 13) are stored in EEPROM 323 so t hat any one of the plural flap operation ranges is selectable by the remote controller 324, whereby the flap operation range is changed.

[0084] For example, plural (for example, two) flap operation ranges 26 in which the swing motion is carried out between two stages of the stages F1 to F5 are stored in EEPROM 323. For example, the flap operation range 326A in which the flap 305 is swung between F1 and F3, and the flap operation range 326B in which the flap 305 is swung between F1 and F5 are stored in EEPROM 323. The flap operation range 326A or 326B is selected by the swing change-over switch 343 provided to the remote controller 324, and the microcomputer 322 refers to the selected flap operation range 326A or 326B to control the swing operation of the flap 305. Each of the stages F1 to F5 corresponds to any one of the flap positions N1 to N6 by the above-described corresponding relationship table 325.

[0085] Accordingly, in a case where the flap operation range 326B in which the flap 305 makes a swing motion between the stages F1 and F5 is selected, if a user is brought with draft feeling, the flap operation range 326A in which the flap 305 makes a swing operation between the stages F1 and F3 is selected, whereby the draft feeling can be suppressed.

[0086] Furthermore, in a case where the flap 305 is swung till the stage F1 corresponding to the flap position N1, if smudge occurs on the ceiling surface, the flap position corresponding to the stage F1 is changed to the preliminary flap position N2 in the corresponding relationship table 325, whereby occurrence of smudging can be avoided.

[0087] Furthermore, if draft feeling occurs even when the flap operation range 326A in which the flap 305 swings till the stage F3 corresponding to the flap position N4 is selected, the flap position corresponding to the stage F2 is changed to the preliminary flap position N2 in the corresponding relationship table 325, and further the flap position corresponding to the stage F3 is changed to N3, whereby the draft feeling can be suppressed.

[0088] For example, a preliminary flap position N3' may be provided between the stage F2 corresponding to the flap position N3 and the stage F3 corresponding to the flap position N4, and the flap position N3' may be associated with the stage F2 or the flap position N3' may be associated with the stage F3. That is, if the preliminary flap position is provided, the flap can be controlled in conformity with a user's desire.

[0089] As described above, according to this embodiment, by rewriting the flap positions N1 to N6 corresponding to the respective stages F1 to F5 in the corresponding relationship table 325 stored in EEPROM 323, the flap 5 can be controlled with preventing smudge or draft feeling.

[0090] Furthermore, according to this embodiment, the corresponding relationship table 325 can be rewritten by the switches 346 to 349 of the remote controller 324, and thus the rewriting operation can be easily performed.

[0091] In this embodiment, only one preliminary flap position is set. However, the present invention is not limited to this embodiment, and plural preliminary flap positions may be set.

[0092] Furthermore, in this embodiment, when the flap is swung, the two flap operation ranges can be selected. However, the flap operation range is not limited to the above two flap operation ranges, and for example, the flaps may be swung between the stages F2 and F4. That is, the flap operation range and the number of flap operation ranges may be arbitrarily set. Accordingly, more minute flap swinging motions can be performed.

[0093] Next, a first modification of the third embodiment described above will be described with reference to Figs. 16 to 18.

[0094] Fig. 16 is a block diagram showing a control device of the first modification of the third embodiment. In this modification, the same parts as the embodiment shown in Fig. 1 and Figs. 12 to 15 are represented by the same reference numerals, and the description thereof is omitted.

[0095] In Fig. 16, in EEPROM 323 is stored a corresponding relationship table 327 (Fig. 17) in which the corresponding relationship between the stages F1 to F5 and the flap positions N1 to N6 is associated with each of plural (for example, two) blow-out modes. The microcomputer 322 refers to the corresponding relationship table 327 and controls the flap 305 to the flap position corresponding to each stage F1 to F5 selected in the blow-out mode selected by the remote controller 360.

[0096] The smudgeless mode and the draft preventing mode in Fig. 17 are blow-out ports which are switchable by the remote controller 360 (Figs. 16, 18).

[0097] Each blow-out mode is set to be different between cooling operation and heating operation. For example, under cooling operation, downward air blowing frequently induces draft feeling, and thus downward blowing of cold air is regulated even in any case of the smudgeless mode and the draft preventing mode. Specifically, the selection of the stages F4, F5 indicating the downward air blowing is prohibited. That is, in the corresponding relationship table 327 of EEPROM 323, no position data are associated with F4, F5 in the smudgeless mode and the draft preventing mode under cooling operation. In the air blow-out direction setting switch 42 of the remote controller 360, the selection of F4, F5 is skipped, and only F1 to F3 are selectable.

[0098] Under heating operation, a user hardly has a draft feeling, and thus the downward air blowing is permitted in any case of the smudgeless mode and the draft preventing mode. Specifically, the selection of the stages F4, F5 is permitted. That is, some position data are associated with F4 and F5, and F1 to F5 are selectable in the air blow-out direction setting switch 42 of the remote controller 360.

[0099] In Fig. 18, the remote controller 360 is provided with a blow-out mode change-over switch 344, and the blow-out mode change-over switch 344 is a switch for switching the smudgeless mode and the draft preventing mode as plural blow-out modes to each other. When the smudgeless mode is selected by the blow-outmode change-over switch 344, a character "smudgeless" is displayed on the display portion 350, and when the draft preventing mode is selected, a character "draft prevention" is displayed on the display portion 350.

[0100] The smudgeless mode is a mode in which air blowing along the wall surface is prohibited. That is, air blowing out from the blow-out port never flows along the ceiling surface of the room even when any stage is set. For example, under cooing operation, the stage F1 is associated with the flap position N2 at which air blown out from the blow-out port flows in a slightly more sharply downward direction as compared with the f lap position N1 at which the air f lows along the ceiling surface of the room, and the stages F2 and F3 are associated with the flap positions N3 and N4, respectively. Under heating operation, F1 F2, F3, F4 and F5 are associated with N2, N3, N4, N5 and N6, respectively. Accordingly, when the smudgeless mode is set under cooling operation, occurrence of smudging is prevented.

[0101] The draft preventing mode is a mode in which air is blown out in a more sharply upward direction as compared with the smudgeless mode particularly under cooling operation. For example, under cooling operation, the stages F1 F2, F3 are associated with the flap positions N1, N2 and N3 at which the air blowing direction is a more sharply upward direction. Accordingly, when draft feeling occurs in the smudgeless mode, the draft feeling can be suppressed by setting to the draft preventing mode.

[0102] Under heating operation, the draft feeling is hardly brought to a user, and thus the same corresponding relationship as the smudgeless mode is established in the draft preventing mode. As in the case of the cooling operation, the corresponding relationship may be varied between the draft preventing mode and the smudgeless mode.

[0103] Next, the swinging motion of the flap 305 will be described.

[0104] First, the swing motion of the flap 305 under cooling (or dry) operation will be described.

[0105] When the flat operation range 326A in which the flap 305 is swung between the stages F1 and F3 by the swing change-over switch 343 of the remote controller 360 is selected and the smudgeless mode is selected by the blow-out mode change-over switch 344, the microcomputer 322 refers to the smudgeless mode of the corresponding relationship table 327 and carries out the swing control of the flaps between the flap position N2 corresponding to the stage F1 and the flap position N4 corresponding to the stage F3.

[0106] When the flap operation range 326B in which the flap 305 is swung between the stages F1 and F5 by the swing change-over switch 43 of the remote controller 360 is selected and the smudgeless mode is selected by the blow-out mode change-over switch 344, the microcomputer 322 refers to the smudgeless mode and carries out the swing control of the flap between the flap position N2 (the flap position under cooling operation) corresponding to the stage F1 and the flap position N6 (the flap position under heating operation) corresponding to the stage F5.

[0107] Next, the swing operation of the flap 30 5 under heating operation will be described. Under the heating operation, the same swing control is carried out irrespective of the case where the blow-out mode which is set to the smudgeless mode or the draft preventing mode.

[0108] When the flap operation range 326a in which the flap 305 is swung between the stages F1 and F3 by the swing change-over switch 43 of the remote controller 360 is selected, the microcomputer 322 refers to the smudgeless mode of the corresponding relationship table 327 or the draft preventing mode, and carries out the swing control of the flap 305 between the flap position N2 corresponding to the stage F1 and the flap position N4 corresponding to the stage F3.

[0109] When the flap operation range 326B in which the flap 305 is swung between the stages F1 and F5 by the swing change-over switch 343 of the remote controller 360 is selected, the microcomputer 322 refers to the smudgeless mode of the corresponding relationship table 327 or the draft preventing mode, and carries out the swing control of the flap 305 between the flap position N2 corresponding to the stage F1 and the flap position N6 corresponding to the stage F5.

[0110] According to the first modification, the corresponding relationship table 327 having the smudgeless mode and the draft preventing mode as the plural blow-out modes in which the respective stages F1 to F5

and the flap positions N1 to N6 are associated with one another is stored in EEPROM 323, and the blow-out mode change-over switch 344 for selecting any one of the plural blow-out modes is provided. Therefore, the flap position N1 corresponding to the stage F1 can be changed to the preliminary flap position N2 to prevent smudging by operating the blow-out mode change-over switch 344 without rewriting the corresponding relationship table 327 of EEPROM 323. Furthermore, in order to prevent draft, the flap position N3 corresponding to the stage F2 is changed to the preliminary flap position N2, and the flap position N4 corresponding to the stage F3 is changed to the flap position N3. Therefore, the flap position corresponding to each stage of the flap 305 can be changed simply.

[0111] Furthermore, according to the first modification, when the flap 305 is swung, the microcomputer 322 refers to the corresponding relationship table 327 to carry out the swing control in the swing operation range selected by the swing change-over switch 344 in conformity with the blow-out mode selected by the blow-out mode change-over switch 344 of the remote controller 360. Therefore, the smudge or the draft feeling can be prevented by switching the blow-out mode and the flap operation range without rewriting the corresponding relationship table 27 of EEPROM 323.

[0112] Next, a second modification of the third embodiment will be described with reference to Figs. 19 and 20.

[0113] Fig. 19 is a block diagram showing a control device of the second modification of the air conditioner according to the third embodiment. In this modification, the same parts as the third embodiment and the first modification are represented by the same reference numerals, and the description thereof is omitted.

[0114] In Fig. 19, the flap positions N0 to N7 in the corresponding relationship table 323 (or 327) of EEPROM 323 represent variables indicating the flap positions. In EEPROM 323 is stored a data table in which the step numbers (numerical values) of the flap motors 306A, 306B as the stepping motors are stored in association with the flap position variables N0 to N7 is stored. For example, in Fig. 19, numerical values are stored like 0 is stored in S11, and 200 is stored in S21, etc.

[0115] The step number Smn (m=1, 2, .., 8, n=1, 2, 3, 4) of the flap motors 306A, 306B as the stepping motor which corresponds to the flap position variable N0 to N7 in the data table 328 can be rewritten by operating the switches 346 to 349 of the remote controller 380. For example, a numerical value data "200 " in the step number S21 can be rewritten to a numerical value "210", for example. Accordingly, the flap positions N0 to N7 can be finely adjusted.

[0116] Various flap positions which correspond to plural types of air conditioners (indoor unit) are stored in the data table 328 (Fig. 20). For example, the flap position data which are adapted to plural types of air conditioners such as a four-direction cassette type, a two-direction cassette type, a ceiling-hung type, a wall-hung type, etc. are stored in the data table 328 (Fig. 20). The microcomputer 322 is set to refer to the flap position data of the corresponding type (four-direction cassette type, two-direction cassette type, ceiling-hung type, wall-hung type or the like) in advance .

[0117] As described above, according to the second modification, the flap positions corresponding to the plural types of air conditioners are stored in the data table 328 (Fig. 20), and thus EEPROM 323 in which the same tables 325 (327) and 328 are stored can be used in various types of air conditioners.

[0118] Furthermore, according to the second embodiment, the flap positions corresponding to the respective stages (that is, the numerical value data Smn corresponding to N0 to N7) are stored in EEPROM 323 as a rewritable non-volatile memory, and the switches 346 to 349 (Fig. 14 or Fig. 18) are provided as the means of rewriting the flap positions. Therefore, the data of the flap positions stored in EEPROM 23 can be rewritten by operating the switches 46 to 49, and the position of the flap 5 can be finely adjusted.

[0119] The present invention has been described on the basis of the embodiments and modifications described above, however, the present invention is not limited to these embodiments.

[0120] For example, in the above-described embodiments, the case where the four-direction ceiling cassette type is used as the air conditioner. However, the present invention is not limited to this type, and the present invention may be applied to an air conditioner which has a flap(s) and controls the flap(s), for example, a two-direction ceiling cassette type, a ceiling-hung type, a wall-hung type or the like.

[0121] Furthermore, in the above-described embodiments, the four flaps in the four-direction ceiling cassette type air conditioner are driven by the two flap motors. However, the present invention is not limited to these embodiments. For example, the present invention may be applied to a case where the four flaps are driven by one flap motor, or the four flaps are independently driven by four flap motors.

Industrial Applicability

[0122] According to the air conditioner of the present invention, the fabrication work of the hanging lugs can be facilitated and further the temporary tacking work of the side plates can be also facilitated. Furthermore, the number of parts of the slide type lock device can be minimized, and the fabrication can be easily performed, so that the manufacturing cost and the manufacturing labor can be reduced. Still furthermore, the flap control can be carried out in conformity with a user' s requirement, and the flap control can be performed with preventing smudge or draft feeling.

Claims

1. An air conditioner comprising a heat exchanger (11), an air blower (9) and a flap (305) for changing the air blow-out direction, the flap position of the flap (305) being controlled to be changed at plural stages, **characterized by** further comprising: a microcomputer (322), a rewritable non-volatile memory (323), a table (325) in which plural blow-out modes for associating the respective stages (F1 to F5) with the flap positions (N1 to N5) are stored, and switches (346 - 349) for changing the content of the table (325), wherein the flap position corresponding to each stage is adjustable.

2. The air conditioner according to claim 1, wherein the plural stages contain a first stage and a second stage corresponding to a flap position at which air is blown out in a more sharply downward direction as compared with the first stage, a preliminary flap position is provided in a flap position range between the first stage and the second stage, and at least one of the flap positions corresponding to the first stage or second stage is changeable to the preliminary flap position.

3. The air conditioner according to claim 2, wherein the first stage corresponds to a flap position at which air is blown out in a substantially horizontal direction with respect to the ceiling surface of a room.

4. The air conditioner according to claim 2, wherein the plural blow-out modes contain a blow-out mode in which at least the first stage is associated with the preliminary flap position, and a switch for making any one of the plural blow-out modes selectable is provided.

5. An air conditioner having a heat exchanger (11), an air blower (9) and a flap (305) for changing an air blow-out direction, a swing operation of the flap being controlled, **characterized by** further comprising: a microcomputer (322), a rewritable non-volatile memory (323), a table (325) in which plural blow-out modes for associating the respective stages (F1 to F5) with the flap positions (N1 to N5) are stored, and switches (346 - 349) for changing the content of the table (325), wherein the operation range of the flap (305) is changeable.

6. The air conditioner according to claim 5, wherein plural flap operation ranges are provided, and any one of the plural flap operation ranges is selectable.

7. The air conditioner according to claim 5, wherein the flap is designed so that the flap position thereof is changeable at plural stages, and each of the plural flap operation ranges is set so that a swing operation is carried out between two stages.

8. The air conditioner according to claim 7, wherein the plural stages contain a first stage and a second stage corresponding to a flap position at which air is blown out in a more sharply downward direction as compared with the first stage, a preliminary flap position is provided in the flap position range between the first stage and the second stage, and at least one of the flap positions corresponding to the first stage or second stage is changeable to the preliminary flap position.

Patentansprüche

1. Klimaanlage umfassend einen Wärmetauscher (11), ein Gebläse (9) und eine Klappe (305) um die Luftausblasrichtung zu ändern, wobei die Klappenstellung der Klappe (305) gesteuert wird um in mehreren Stufen einstellbar zu sein, **dadurch gekennzeichnet, dass** die Klimaanlage weiterhin aufweist:

   einen Mikrocomputer (322), einen wiederbeschreibbaren nichtflüchtigen Speicher (323), eine Tabelle (325) in welcher eine Anzahl von Ausblasmodi gespeichert sind um die zugehörigen Stufen (F1 bis F5) mit den Klappenstellungen (N1 bis N5) zu assoziieren, und Schalter (346 - 349) um den Inhalt der Tabelle (325) zu verändern, wobei die Klappenposition, welche zu einer jeden Stufe gehört, einstellbar ist.

2. Klimaanlage gemäß Anspruch 1, wobei die Anzahl an Stufen eine erste Stufe und eine zweite Stufe beinhaltet, die einer Klappenstellung entspricht, in welcher Luft in einer weit mehr nach unten gerichteten Richtung ausgeblasen wird im Vergleich zur ersten Stufe, eine vorübergehende Klappenstellung in einem Klappenstellungsbereich zwischen der ersten Stufe und der zweiten Stufe vorgesehen ist, und zumindest eine der Klappenstellungen, welche der ersten Stufe oder der zweiten Stufe entspricht, zur vorübergehenden Klappenstellung hin veränderlich ist.

3. Klimaanlage gemäß Anspruch 2, wobei die erste Stufe einer Klappenstellung entspricht, in welcher Luft in einer im Wesentlichen horizontalen Richtung in Bezug auf die Deckenoberfläche des Raums ausgeblasen wird.

4. Klimaanlage gemäß Anspruch 2, in welcher die Anzahl an Ausblasmodi einen Ausblasmodus beinhaltet, in welchem zumindest die erste Stufe mit der vorübergehenden Klappenstellung assoziiert ist, und ein Schalter vorgesehen ist, um jeden aus der Anzahl an Ausblasmodi auswählbar zu machen.

5. Klimaanlage mit einem Wärmetauscher (11), einem Gebläse (9) und einer Klappe (305) um eine Luftausblasrichtung zu ändern, wobei ein Schwenkvorgang der Klappe gesteuert wird, **dadurch gekennzeichnet, dass** die Klimaanlage weiterhin aufweist:

   einen Mikrocomputer (322), einen wiederbeschreibbaren nichtflüchtigen Speicher (322), eine Tabelle (325), in welcher eine Anzahl an Ausblasmodi gespeichert sind um die zugehörigen Stufen (F1 bis F5) mit den Klappenstellungen (N1 bis N5) zu assoziieren, und Schalter (346 - 349) um den Inhalt der Tabelle (325) zu verändern, wobei der Betriebsbereich der Klappe (305) veränderlich ist.

6. Klimaanlage gemäß Anspruch 5, wobei eine Anzahl an Klappenbetriebsbereichen vorgesehen ist, und jeder aus der Anzahl an Klappenbetriebsbereichen wählbar ist.

7. Klimaanlage gemäß Anspruch 5, wobei die Klappe derart gestaltet ist, dass ihre Klappenstellung in mehreren Stufen verstellbar ist, und wobei jeder aus der Anzahl an Klappenbetriebsbereichen derart gewählt ist, dass ein Schwenkvorgang zwischen den beiden Stufen hervorgerufen wird.

8. Klimaanlage gemäß Anspruch 7, wobei die Anzahl an Stufen eine erste und eine zweite Stufe beinhaltet, die einer Klappenstellung entspricht, in welcher Luft in einer weit mehr nach unten gerichteten Richtung ausgeblasen wird im Vergleich zur ersten Stufe, eine vorübergehende Klappenstellung im Klappenstellungsbereich zwischen der ersten Stufe und der zweiten Stufe vorgesehen ist, und zumindest eine der Klappenstellungen, welche der ersten oder der zweiten Stufe entspricht, zur vorübergehenden Klappenstellung hin veränderlich ist.

Revendications

1. Conditionneur d'air comprenant un échangeur thermique (11), un ventilateur (9) et un volet (305) destiné à modifier la direction de soufflage de l'air, la position de volet du volet (305) étant commandée de manière à évoluer sur plusieurs paliers, **caractérisé en ce qu'**il comprend, en outre : un micro-ordinateur (322), une mémoire non volatile pouvant être réécrite (323), une table (325) dans laquelle plusieurs modes de soufflage destinés à associer les paliers respectifs (F1 à F5) aux positions de volet (N1 à N5) sont mémorisés, et des commutateurs (346 à 349) destinés à modifier le contenu de la table (325), dans lequel la position de volet correspondant à chaque palier peut être réglée.

2. Conditionneur d'air selon la revendication 1, dans lequel les différents paliers comprennent un premier palier et un deuxième palier correspondant à une position de volet dans laquelle l'air est soufflé plus directement vers le bas par comparaison au premier palier, une position de volet préliminaire est prévue dans une plage de positions de volet entre le premier palier et le deuxième palier, et au moins l'une des positions de volet correspondant au premier palier ou au deuxième palier peut être remplacée par la position de volet préliminaire.

3. Conditionneur d'air selon la revendication 2, dans lequel le premier palier correspond à une position de volet dans laquelle l'air est soufflé dans une direction sensiblement horizontale par rapport à la surface de plafond d'une pièce.

4. Conditionneur d'air selon la revendication 2, dans lequel les différents modes de soufflage comprennent un mode de soufflage dans lequel au moins le premier palier est associé à la position de volet préliminaire, et un commutateur destiné à permettre la sélection de l'un quelconque des différents modes de soufflage est prévu.

5. Conditionneur d'air comportant un échangeur thermique (11), un ventilateur (9) et un volet (305) destiné à modifier la direction de soufflage d'air, un fonctionnement oscillant du volet étant commandé, **caractérisé en ce qu'**il comprend, en outre: un micro-ordinateur (322), une mémoire non volatile pouvant être réécrite (323), une table (325) dans laquelle plusieurs modes de soufflage destinés à associer les paliers respectifs (F1 à F5) aux positions de volet (N1 à N5) sont mémorisés, et des commutateurs (346 à 349) destinés à modifier le contenu de la table (325), dans lequel la plage de fonctionnement du volet (305) peut être modifiée.

6. Conditionneur d'air selon la revendication 5, dans lequel plusieurs plages de fonctionnement de volet sont prévues, et l'une quelconque des différentes plages de fonctionnement de volet peut être sélectionnée.

7. Conditionneur d'air selon la revendication 5, dans lequel le volet est conçu de telle sorte que sa position de volet peut être modifiée sur plusieurs paliers, et chacune des différentes plages de fonctionnement de volet est définie de telle sorte qu'un fonctionnement oscillant est assuré entre deux paliers.

8. Conditionneur d'air selon la revendication 7, dans lequel les différents paliers comprennent un premier palier et un deuxième palier correspondant à une position de volet dans laquelle l'air est soufflé plus directement vers le bas par comparaison au premier

palier, une position de volet préliminaire est prévue dans la plage de position de volet entre le premier palier et le deuxième palier, et au moins l'une des positions de volet correspondant au premier palier ou au second palier peut être remplacée par la position de volet préliminaire.

FIG. 1

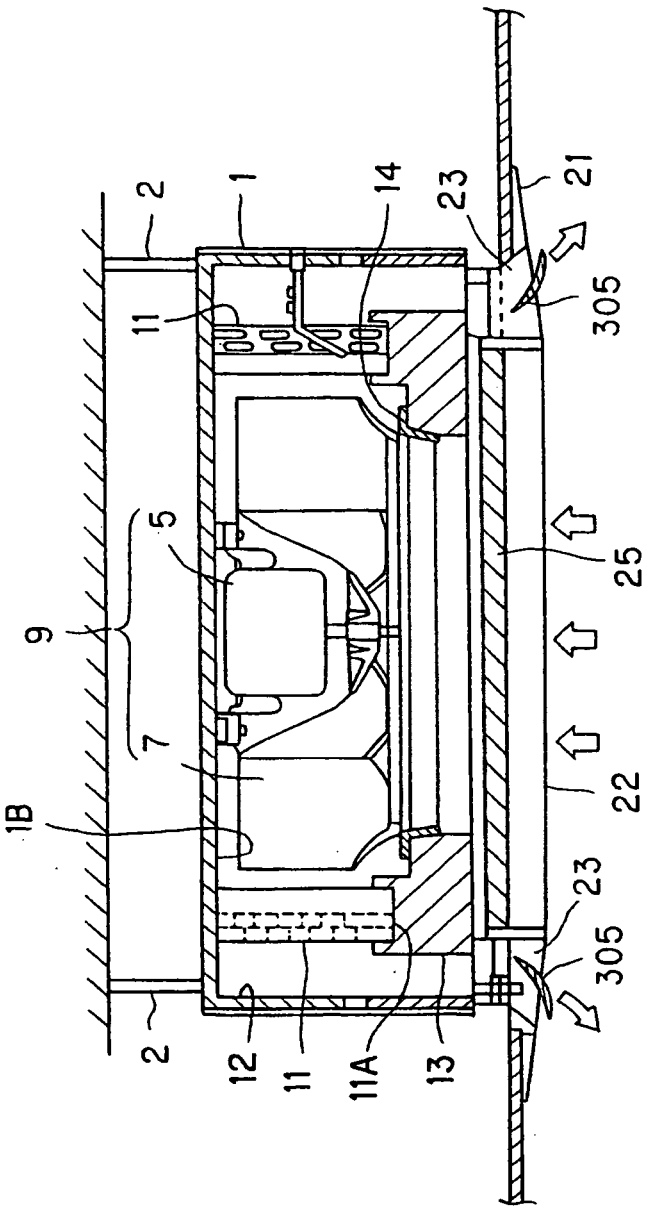


FIG. 2

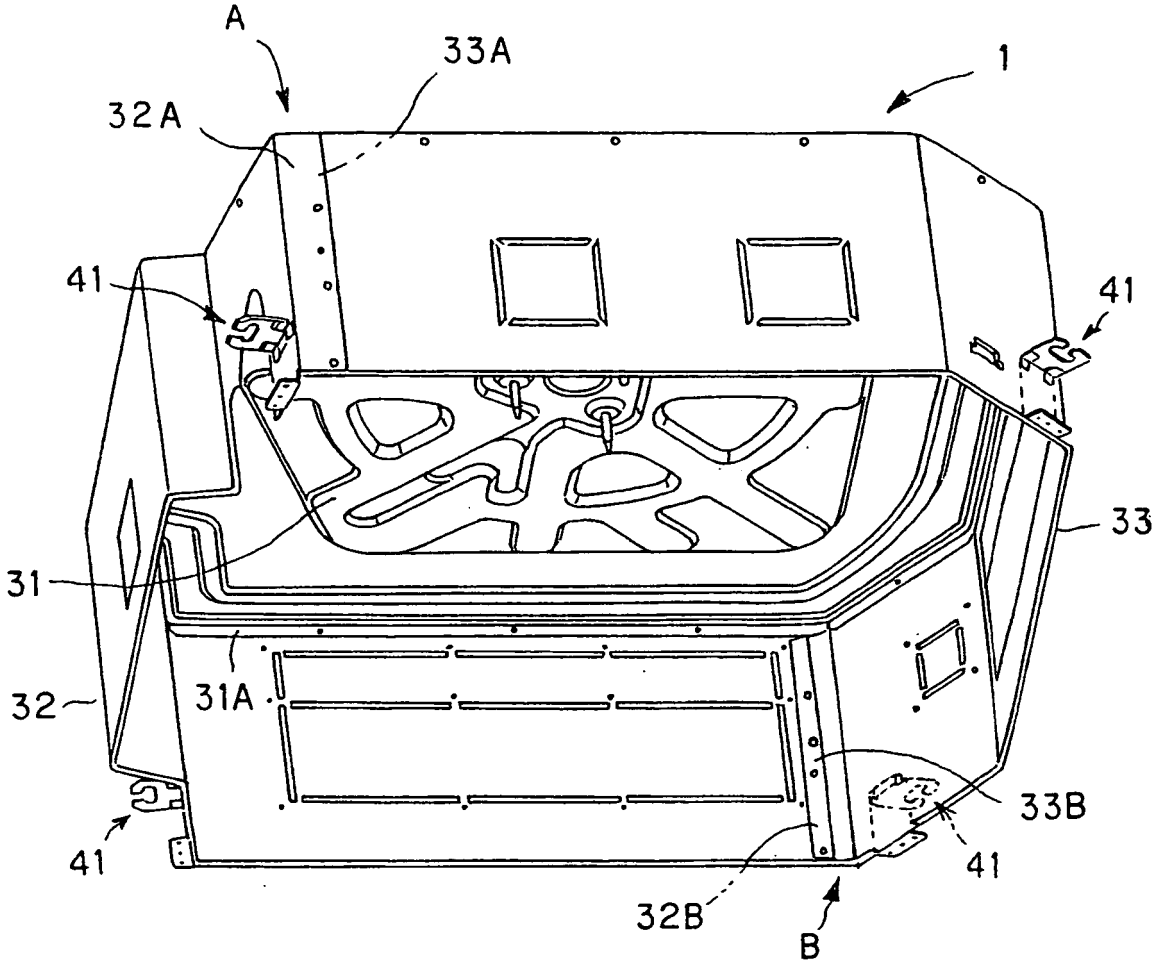


FIG. 3

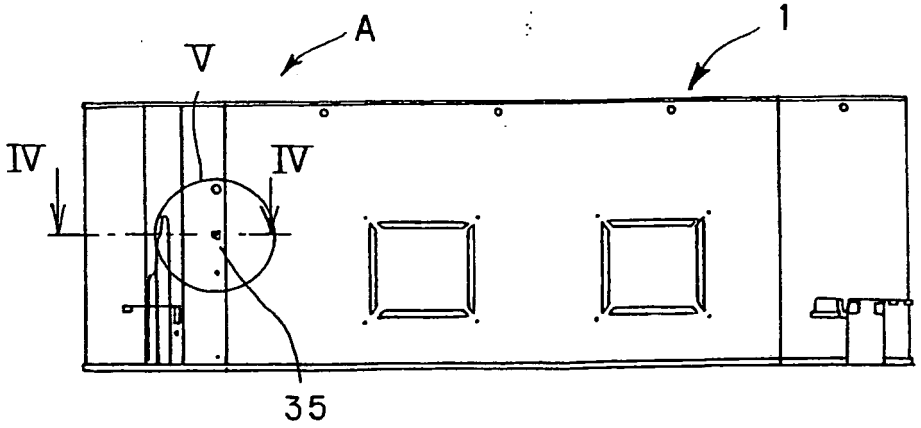


FIG. 4

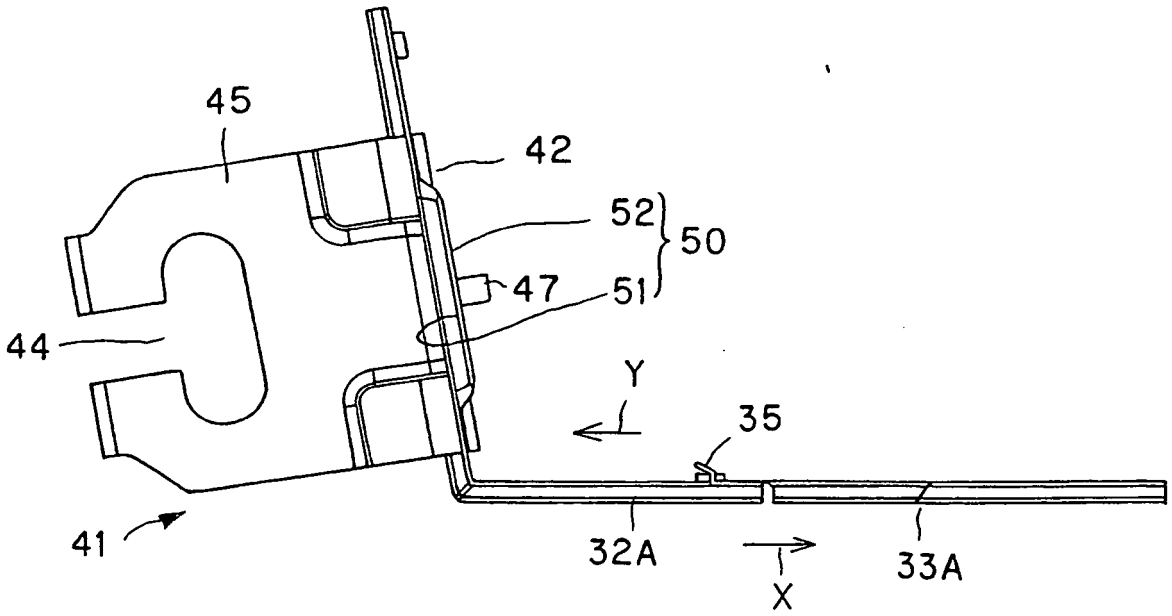


FIG. 5

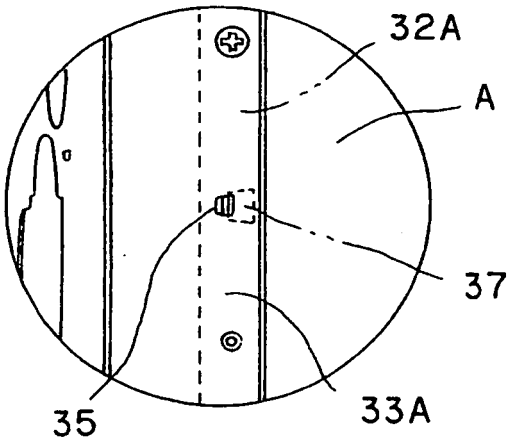


FIG. 6

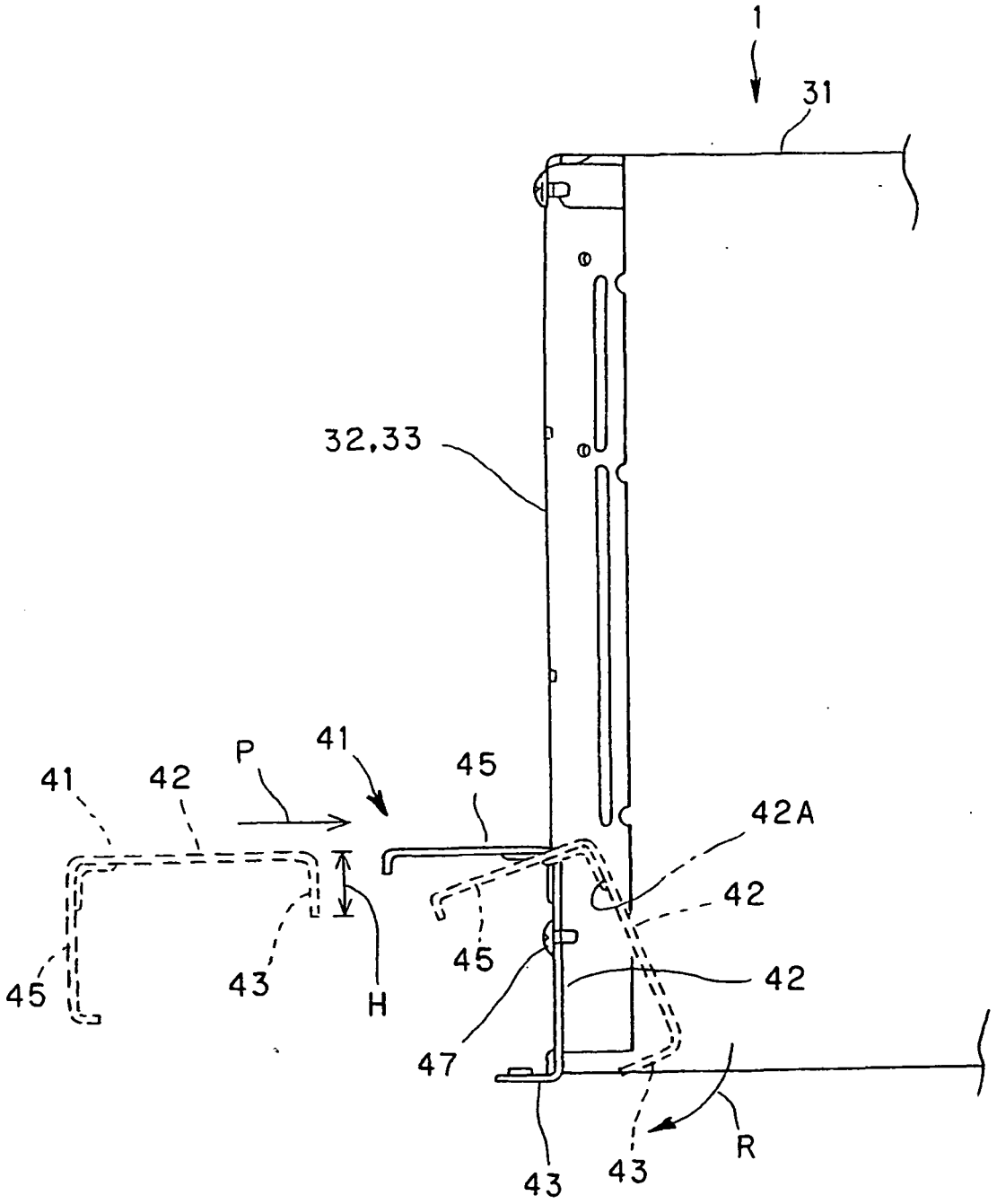


FIG. 7

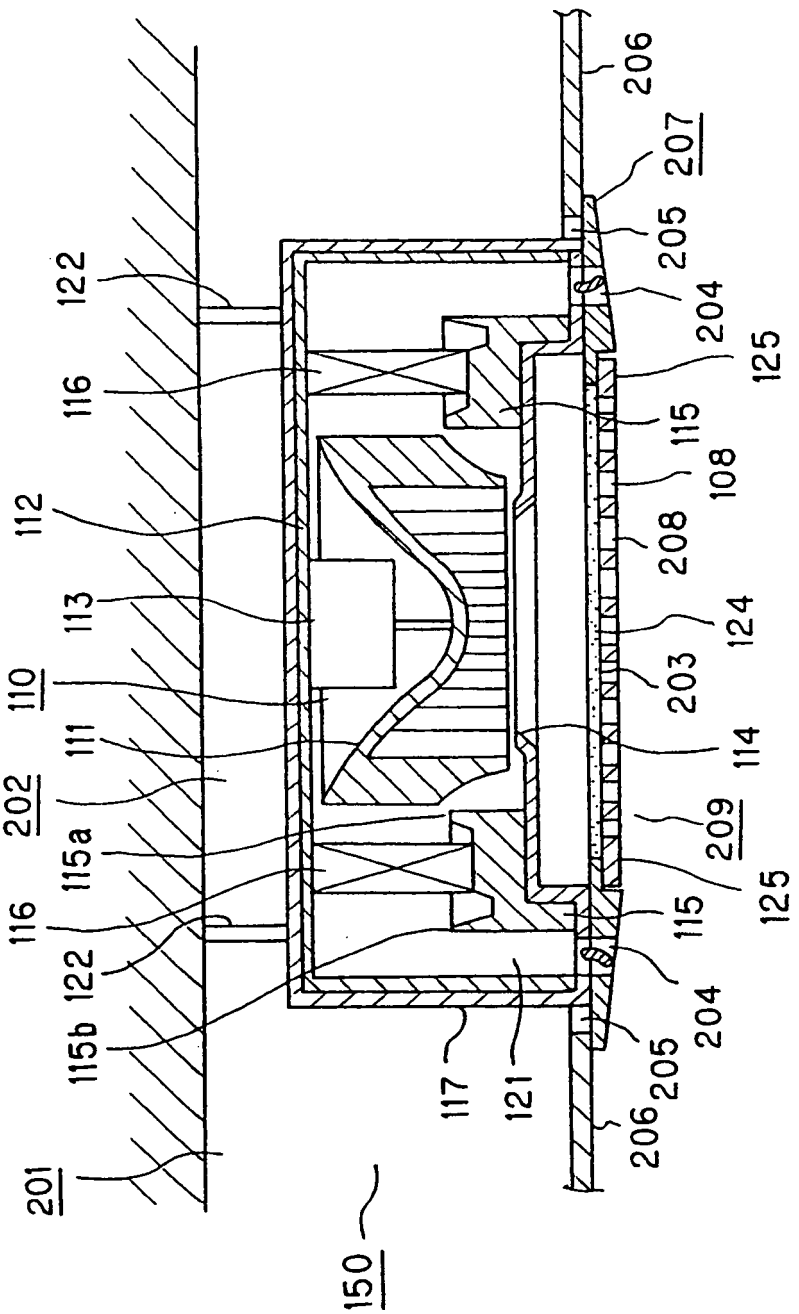

206
207
205
204
125
115
108
208
124
203
114
209
125
115
204
205
206
122
116
112
113
110
111
202
115a
116
122
115b
201
117
121
150

FIG. 8

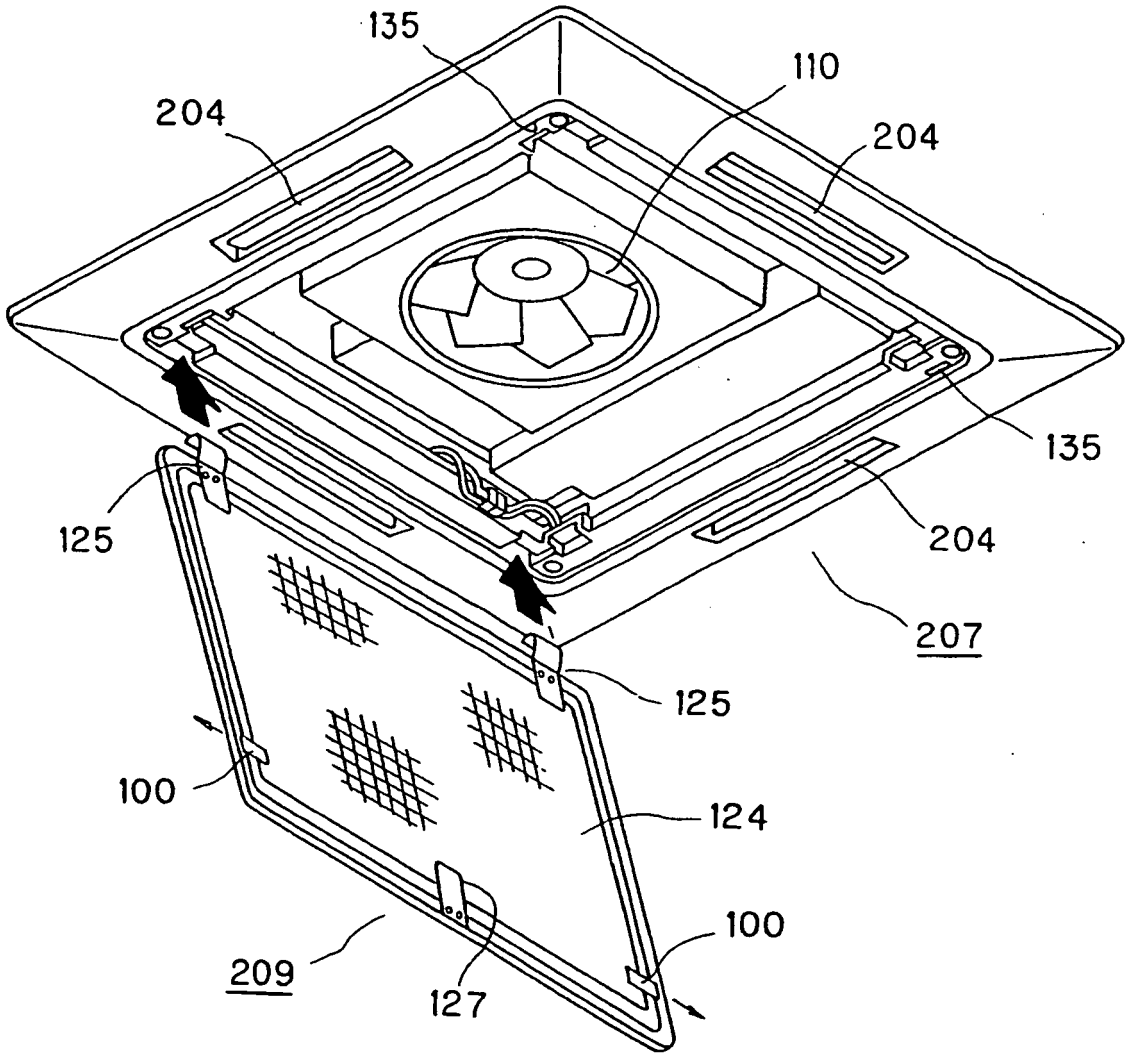


FIG. 9

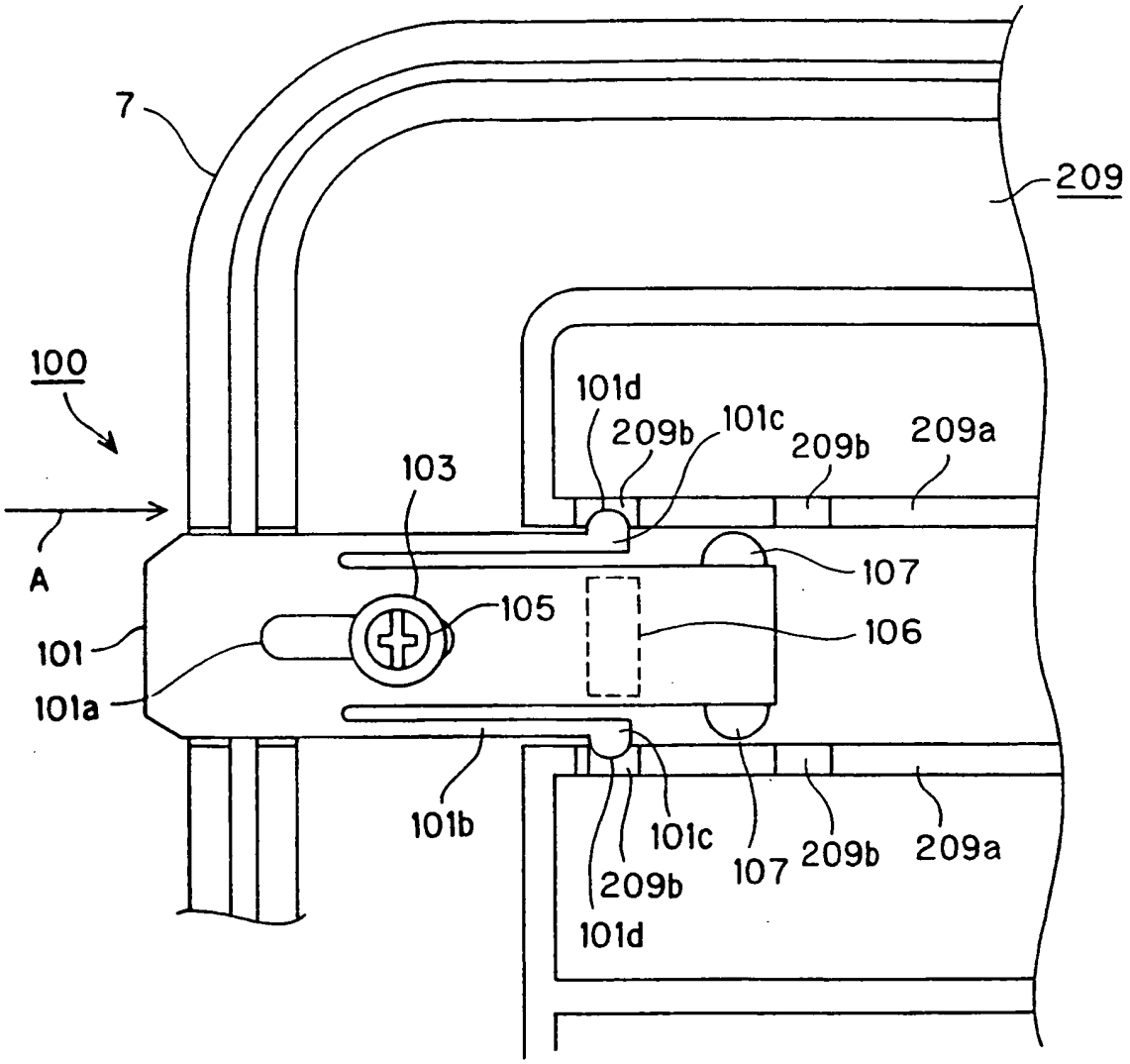

7
209
100
A
101d
209b
101c
209b
209a
103
107
105
106
101
101a
101b
101c
107
209b
209a
209b
101d

FIG.10

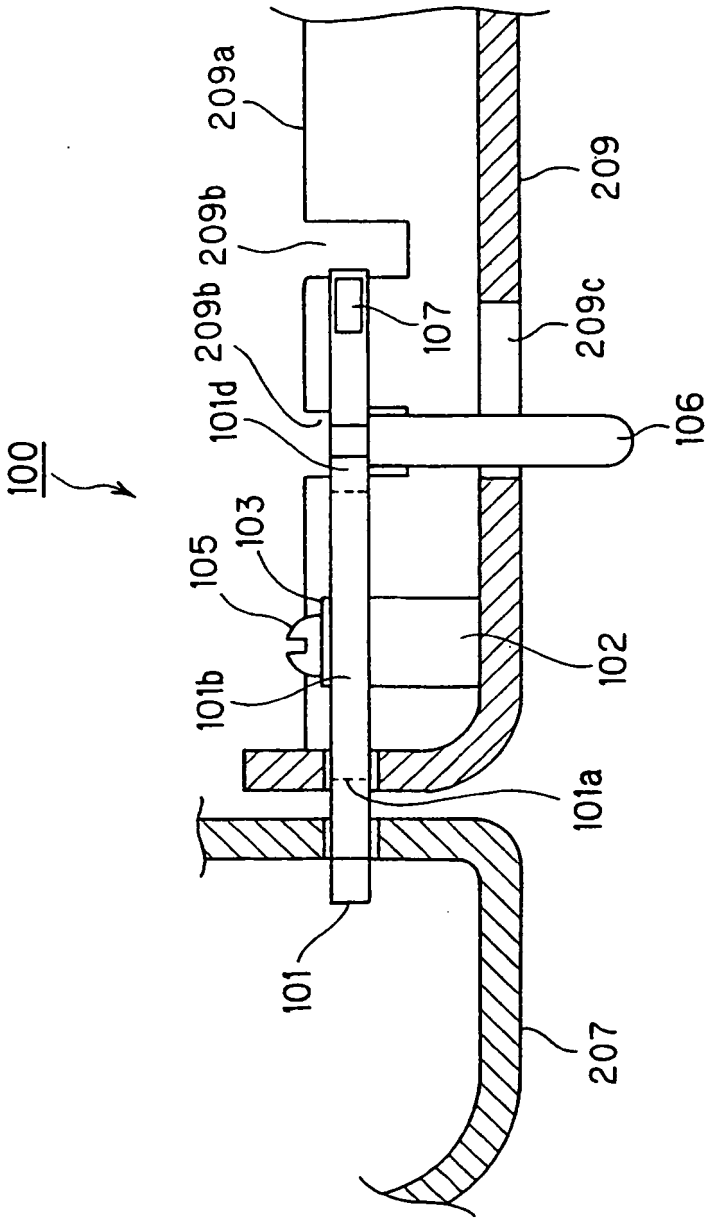

100
209a
209
209b
209b
107
209c
101d
106
103
105
102
101b
101a
101
207

FIG.11

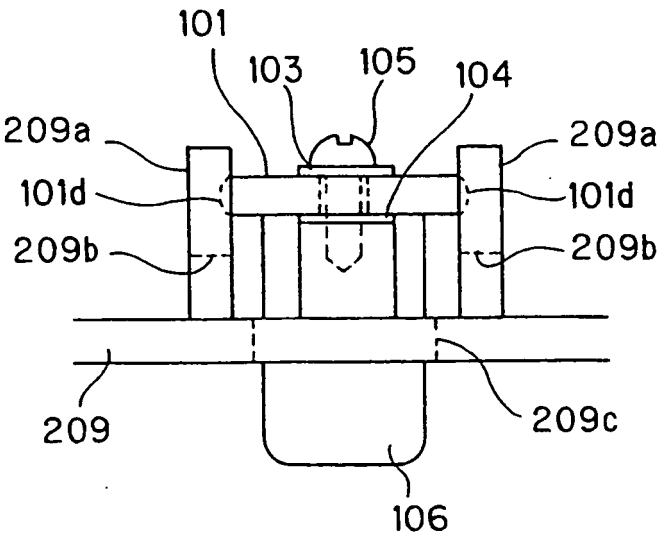


FIG.12

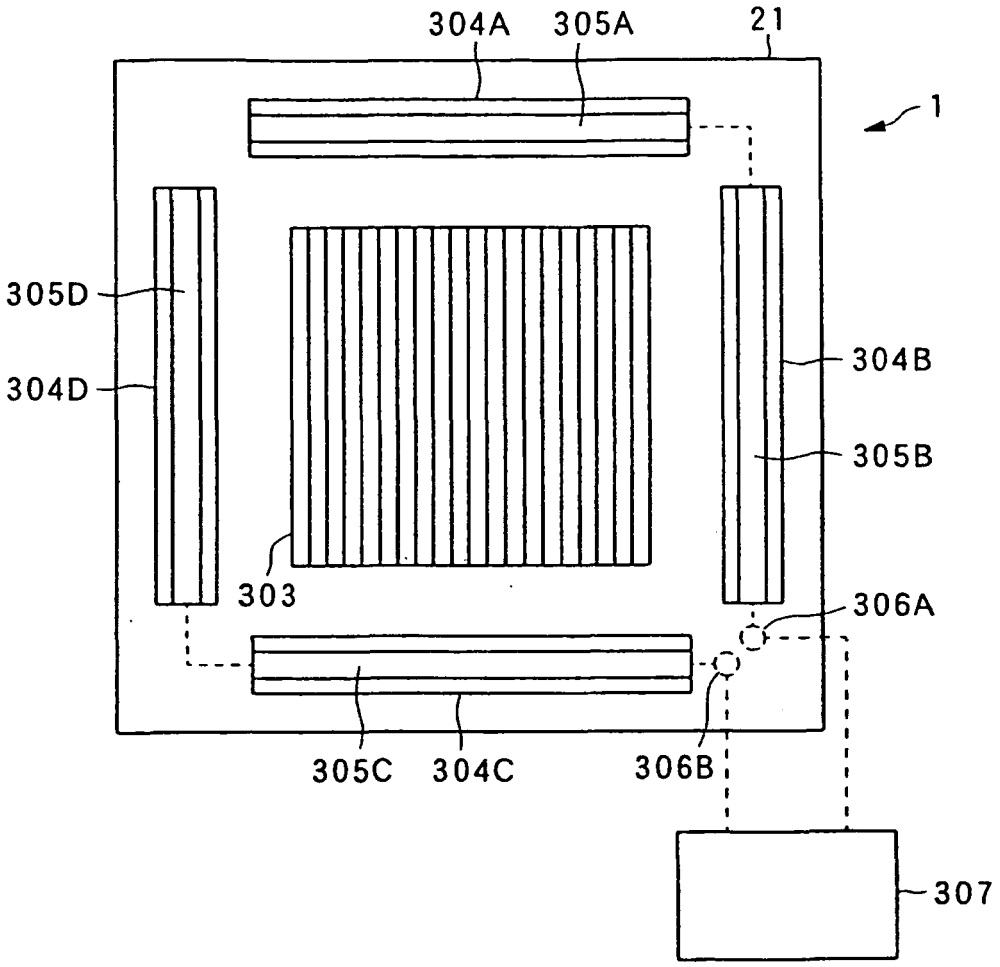


FIG.13

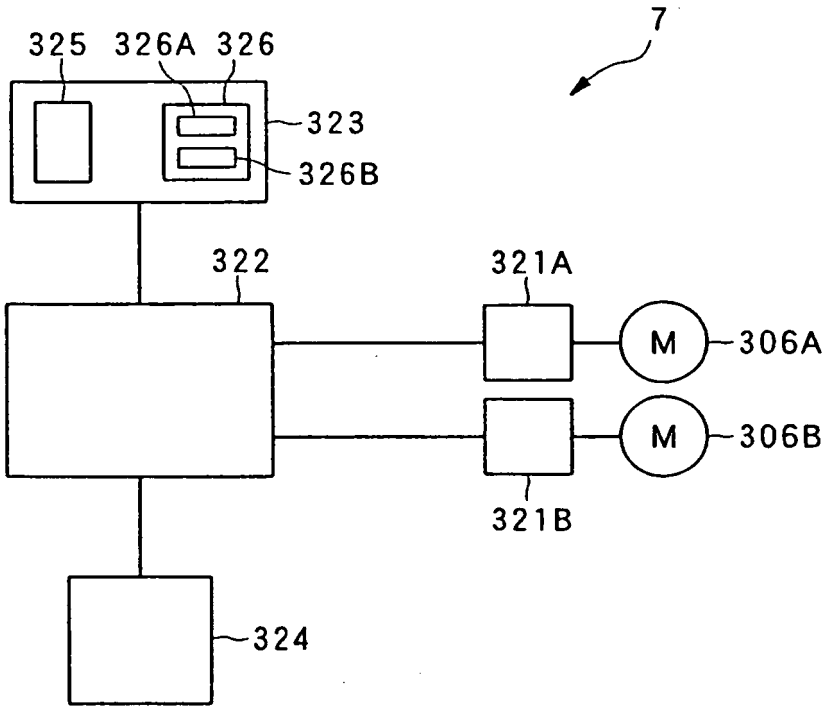


FIG.14

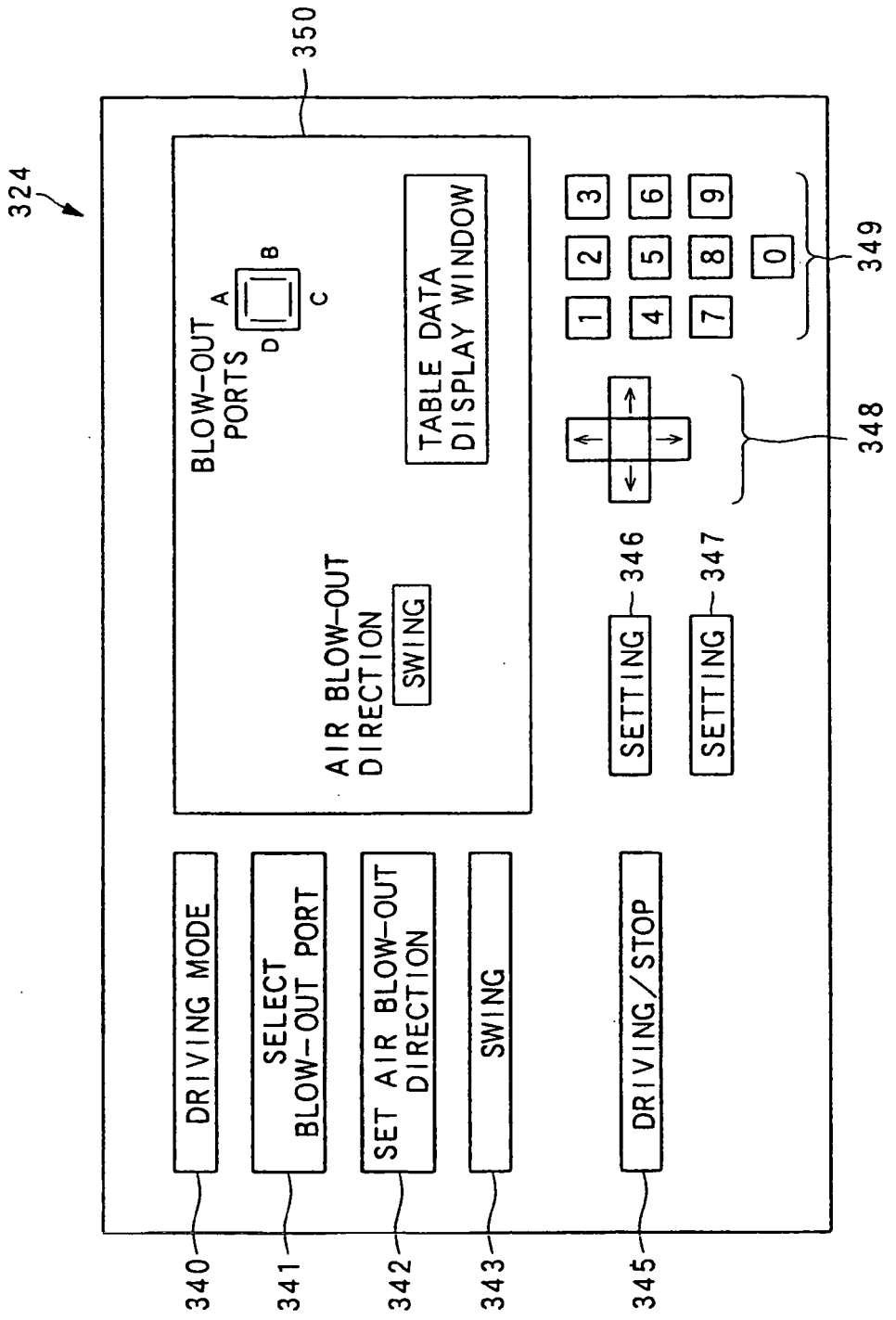

324
350
BLOW-OUT PORTS
A
B
C
D
TABLE DATA DISPLAY WINDOW
AIR BLOW-OUT DIRECTION
SWING
1
2
3
4
5
6
7
8
9
0
349
348
SETTING
346
SETTING
347
DRIVING MODE
SELECT BLOW-OUT PORT
SET AIR BLOW-OUT DIRECTION
SWING
DRIVING/STOP
340
341
342
343
345

FIG.15

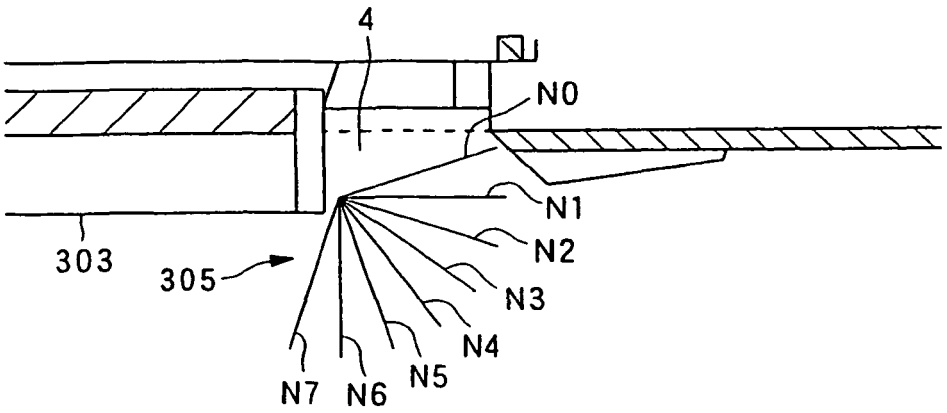

4
N0
N1
N2
N3
N4
N5
N6
N7
303
305

FIG.16

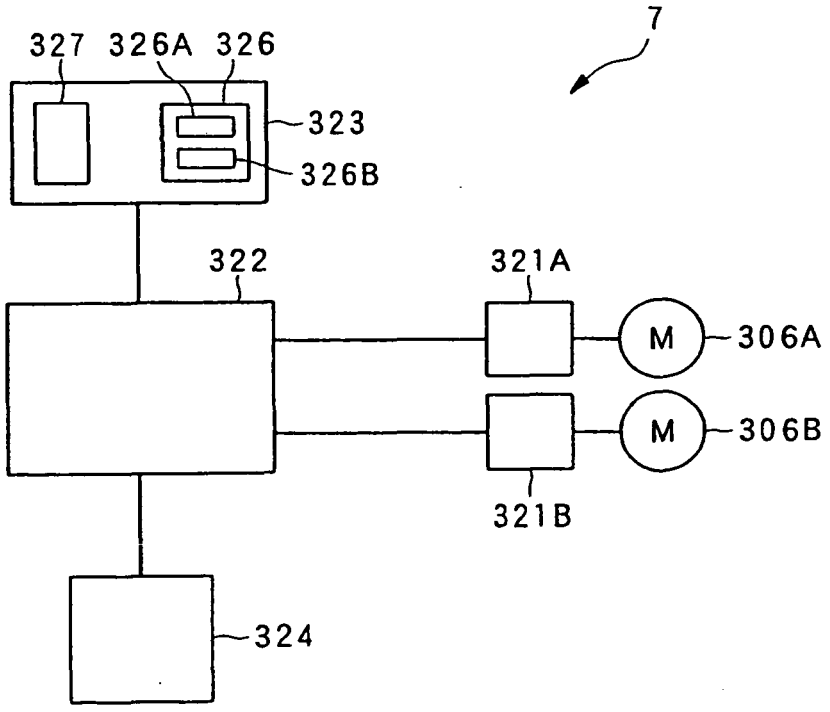

7
327
326A
326
323
326B
322
321A
M
306A
M
306B
321B
324

FIG.17

327

MODE	SMUDGELESS		DRAFT PREVENTION	
	COOLING	HEATING	COOLING	HEATING
F1	N2	N2	N1	N2
F2	N3	N3	N2	N3
F3	N4	N4	N3	N4
F4		N5		N5
F5		N6		N6

FIG.18

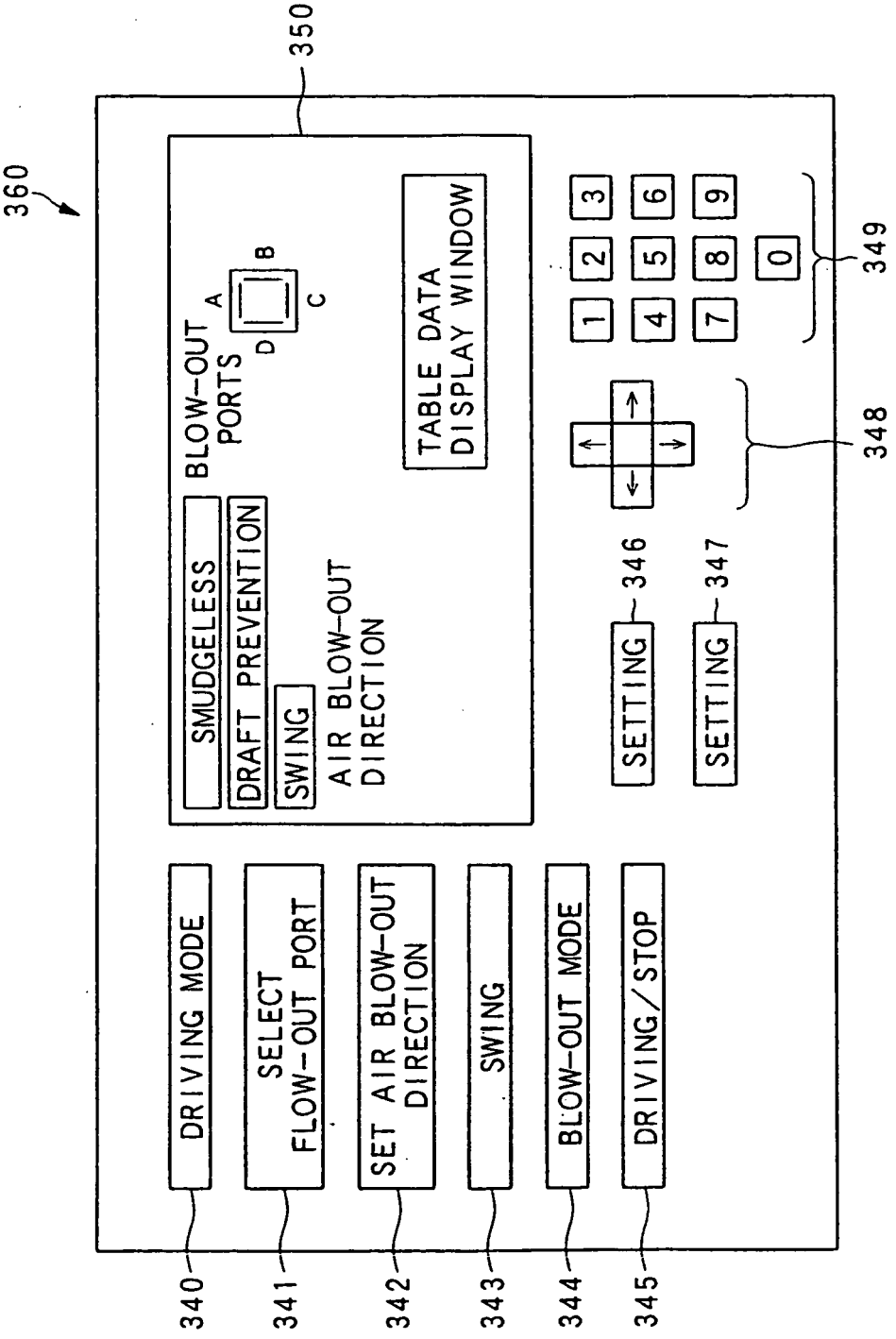

360
350
BLOW-OUT PORTS
A
B
C
D
SMUDGELESS
DRAFT PREVENTION
SWING
AIR BLOW-OUT DIRECTION
TABLE DATA DISPLAY WINDOW
1
2
3
4
5
6
7
8
9
0
349
348
SETTING
346
SETTING
347
DRIVING MODE
SELECT FLOW-OUT PORT
SET AIR BLOW-OUT DIRECTION
SWING
BLOW-OUT MODE
DRIVING/STOP
340
341
342
343
344
345

FIG. 19

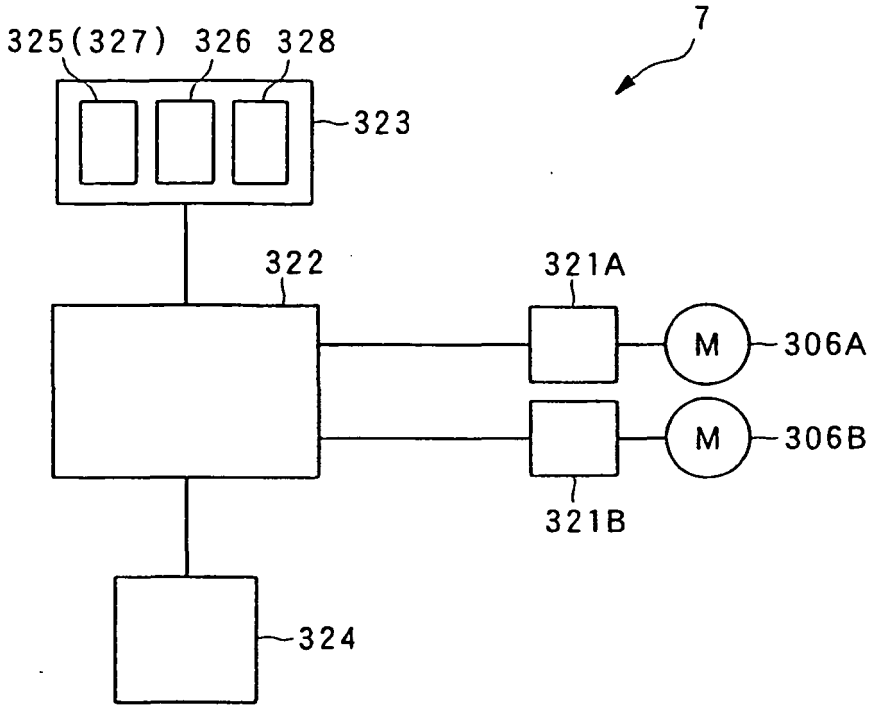


FIG. 20

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	FOUR-DIRECTION	TWO-DIRECTION	CEILING-HUNG	WALL-HUNG	...
N0	S11	S12	S13	S14	
N1	S21	S22	S23	S24	
N2	S31	S32	S33	S34	
N3	S41	S42	S43	S44	
N4	S51	S52	S53	S54	
N5	S61	S62	S63	S64	
N6	S71	S72	S73	S74	
N7	S81	S82	S83	S84	

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- JP 2000199639 A **[0010]**