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(54) **AIR CONDITIONING APPARATUS**

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APPAREIL DE CONDITIONNEMENT D'AIR

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Description

Technical Field

[0001] The present invention relates to an air conditioner including in an indoor unit thereof a panel which is opened and closed according to cooling and heating operation.

Background Art

[0002] A blow-out port is formed in the front surface of a cabinet in an indoor unit of an air conditioner, and warm air or cool air is blown out from the blow-out port. A panel for changing the direction of the air blown out from the blow-out port according to cooling and heating operation is provided.

[0003] For example, it is described in Patent Document 1 that a first panel for opening and closing a blow-out port, and a second panel arranged side by side with the first panel are provided. By controlling the direction of the two panels, the blow-out air passage connected to the blow-out port is restricted to a predetermined range.

[0004] Further, the first panel is moved forward at the time of cooling operation.

[0005] Patent Document 2 discloses an air conditioner comprising the features of the preamble of claim 1.

Patent Document 1: Japanese Patent Laid-Open No. 2005-315536
Patent Document 2: JP 08 247491 A

Disclosure of the Invention

Problems to be Solved by the Invention

[0006] The panel for changing the wind direction is attached to the cabinet via a shaft, so as to be freely attached and detached for maintenance such as cleaning. Meanwhile, cool air is made to flow along the ceiling at the time of cooling operation, so that the whole room can be cooled without the user being directly exposed to the cool air. This requires that the length of the panel in the front and rear direction is increased to increase the length of the air supply passage.

[0007] When the length of the panel is increased in this way, the user can easily reach the panel. As a result, an external force is easily applied to the panel. For example, in the case where the user carelessly grasps the opened panel, or where an object hits the panel during cleaning, and the like, when the panel is configured to be attached via the shaft, the panel may easily come off from the cabinet.

[0008] Further, in the above described air conditioner, the panel is moved only at the time of cooling operation. The panel is not moved at the time of heating operation and hence does not contribute to the air blowing. However, when the panel is moved, the gap between the panel and the cabinet is closed by using another member, such as a flap. In this way, another member is needed, and further a moving mechanism of the member is also needed. Further, when it is configured such that a single panel can be used for cooling and heating operation, it is also possible to increase the air blowing capacity.

[0009] In view of the above, it is an object of the present invention to provide an air conditioner that has a structure in which even when the length of the panel is increased, the panel opened at the time of cooling and heating operation does not easily come off from the cabinet, and that can efficiently utilize the long panel at the time of cooling and heating operation by moving the panel by a simple mechanism.

Means for solving the Problems

[0010] According to the present invention there is provided an air conditioner as defined in claim 1. Preferred embodiments are defined in the dependent claims.

[0011] When the panel is moved and when the upper shaft is held, the panel is upwardly opened. When the lower shaft is held, the panel is downwardly opened. In this way, the opening direction of the panel is determined according to which of the shafts is held by the regulating section.

[0012] The upper shaft is provided in an upper portion of the panel, and the lower shaft is provided in a lower portion of the panel. When the panel is upwardly opened, the regulating section releases the lower shaft, and locks and rotatably holds the upper shaft. When the panel is downwardly opened, the regulating section releases the upper shaft, and locks and rotatably holds the lower shaft. Further, when the panel is closed, the regulating section locks the upper and lower shafts.

[0013] When the panel is opened, one of the shafts is surely held. That is, the shaft is not rotatably received but can be firmly supported in such a manner of being sandwiched and fitted. This makes it possible to prevent the coming-off of the shaft, so as to thereby prevent the panel from coming off from the cabinet. Further, when the panel is closed, the regulating section locks the upper and lower shafts. This makes it possible to prevent the panel from unexpectedly coming off at the stand-by position thereof.

[0014] Here, the regulating section of the opening and closing mechanism includes a pair of upper and lower holding sections which hold the upper and lower shafts of the panel, and a driving section which operates the holding sections. When the panel is upwardly opened, the regulating section releases the lower shaft, and also locks and rotatably holds the upper shaft. When the panel is downwardly opened, the regulating section releases the upper shaft, and also locks and rotatably holds the lower shaft.

[0015] In this case, the driving section may be independently provided so as to correspond to the upper and lower holding sections, respectively. As the holding sec-

tion, it is foreseen a pair of rotatable hooks.

[0016] Further, when the panel is opened and when the opening direction of the panel is changed, the regulating section once closes the panel so as to lock the upper and lower shafts, and then releases the lock of one of the shafts. That is, when the panel is upwardly opened, the panel is once closed and is then downwardly opened. In this way, when the opening direction is changed, the opening direction is changed after both the shafts are surely locked.

[0017] The regulating section as described above includes a pair of upper and lower hooks which respectively hold the upper and lower shafts, a linkage section which mechanically connects the hooks with each other to operate the hooks, and a changing section which regulates the operation of each of the hooks to change the opening direction. Note that the linkage section is operated by the driving section.

[0018] The hook hold the shaft by sandwiching it. The upper and lower hooks are simultaneously moved by the linkage section. However, the changing section regulates the movement of one of the hooks, and thereby only the other hook is made operable.

[0019] That is, when one of the hooks is moved, the changing section regulates the movement of the other hook, so as to thereby determine the movement of each of the hooks according to the opening direction. When the upper hook is regulated and when the lower hook is made movable, the panel can be upwardly opened. When the lower hook is regulated and when the upper hook is made movable, the panel can be downwardly opened.

[0020] Further, the upper and lower shafts are provided on each of the left and right sides of the panel. The regulating section is arranged on both the left and right sides, and the left and right regulating sections are operated in association with each other. When the regulating sections are operated in association with each other, the locking and releasing of the shaft are performed with no time lag on the left and right sides of the panel, so that the panel is prevented from being twisted and opened.

[0021] Further, the opening and closing mechanism includes a moving section which brings the panel close to and away from the cabinet. The moving section moves the panel in the direction away from the cabinet when the panel is opened. Also, the moving section moves the panel in the direction close to the cabinet when the panel is closed.

[0022] Specifically, the moving section includes a rod which is moved into and out of the cabinet. The panel is rotatably supported by the rod, and the opening and closing mechanism reciprocates the rod at the time when the panel is opened and closed. A mechanism which only reciprocates the rod may be adopted as the opening and closing mechanism, and the panel is opened upwardly or downwardly according to the forward movement of the rod.

[0023] Further, the panel is rotated about the upper shaft so as to be upwardly opened, and is rotated about the lower shaft so as to be downwardly opened. The opening angle at the time when the panel is upwardly opened is set larger than the opening angle at the time when the panel is downwardly opened. That is, the panel is upwardly opened at the time of heating operation, while the panel is downwardly opened at the time of cooling operation. Thereby, the opening angle of the panel is set large at the time of heating operation. Hence, the flow of warm air blown out from the blow-out port can be smoothed, so that sufficient wind velocity toward the floor surface can be obtained. At the time of cooling operation, the opening angle of the panel is set small, and hence the distal end of the panel is directed toward the ceiling. Thereby, the cool air is blown out toward the ceiling, so that the reaching distance of the cool air is increased.

[0024] In order to make the opening angle different depending on the opening direction in this way, the rod is attached closer to the upper shaft of the panel. By eccentrically arranging the position at which the rod is attached to the panel, the lengths from the upper and lower shafts to the attaching position are made different from each other. Thus, when the moving amount of the rod is fixed, the opening angle is made different depending on the opening direction.

[0025] The opening and closing mechanism includes the moving section which brings the panel close to and away from the cabinet by reciprocating the rod. The opening and closing mechanism opens the panel in one of the upper and lower directions by moving the rod forward by the moving section while regulating the opening direction of the panel. When the upper side of the panel is regulated, the panel is upwardly opened, while when the lower side of the panel is regulated, the panel is downwardly opened. Even in the case where the panel is opened in one of the directions, the rod is similarly moved. However, the panel is rotatably supported by the rod, and hence can be opened in any of the directions.

[0026] A left and right pair of the rods are arranged outside the blow-out port in the left and right direction of the cabinet. The rod is formed to have a circular cross section. The rod is arranged at a position where the air blowing is not hindered. However, depending on the direction of the air blown out in the left and right direction, the air may hit the rod. By forming the rod to have the circular cross section, it is possible to prevent dew condensation on the rod even when the cool air hits the rod.

Advantage(s) of the Invention

[0027] According to the present invention, when the panel which can be opened upwardly and downwardly about the upper and lower shafts thereof is opened, one of the shafts is surely held, so as to thereby make it possible to prevent the panel from unexpectedly coming off from the cabinet even in the case where an external force is applied to the panel. Further, when the panel is closed, both of the shafts are held, so that the panel can be pre-

vented from easily coming off from the cabinet.

[0028] In particular, the regulating section which regulates the opening direction of the panel is configured as a mechanism that includes a pair of upper and lower holding sections which hold the upper and lower shafts of the panel, and a driving section which independently operates each of the holding sections. Therefore, it is possible to provide a simple mechanism also as the panel opening and closing mechanism.

[0029] Further, a rod which is simply reciprocated to open and close the panel is used, so that the structure can be simplified as compared with, for example, the structure in which the panel is opened by using a gear. Further, in the case where the panel is directly opened and closed by the gear, gear noise is generated by a load being applied to the gear, so as to become a problem. When the rod is used, such noise problem is not caused.

[0030] Further, the opening angle of the panel can be changed according to the opening direction of the panel by the simple mechanism. For this reason, it is not necessary to change the opening and closing of the panel by controlling a motor, and it is only necessary to simply control the movement of the rod. As a result, the control is also simplified.

Brief Description of the Drawings

[0031]

Figure 1 is a perspective view of an indoor unit of an air conditioner according to the present invention;
Figure 2 is a schematic sectional view of the indoor unit when a wind guide panel is closed;
Figure 3 is a perspective view of the indoor unit when the wind guide panel is upwardly opened;
Figure 4 is a schematic sectional view of the indoor unit when the wind guide panel is upwardly opened;
Figure 5 is a perspective view of the indoor unit when the wind guide panel is downwardly opened;
Figure 6 is a schematic sectional view of the indoor unit when the wind guide panel is downwardly opened;
Figure 7 is a control block diagram of the air conditioner;
Figure 8 is a schematic sectional view of the indoor unit, showing an opening and closing mechanism of the wind guide panel;
Figure 9 is a figure for explaining movement of a changing section in a regulating section, in which Figure 9(a) shows an initial state, in which Figure 9(b) shows an upwardly opened state, and in which Figure 9(c) shows a downwardly opened state;
Figure 10 is a figure for explaining the movement of the regulating section, in which Figure 10(a) shows an initial state, in which Figure 10(b) shows an upwardly opened state, and in which Figure 10(c) shows a downwardly opened state;
Figure 11 is a schematic sectional view of the indoor unit, showing a moving section when the wind guide panel is closed;
Figure 12 is a schematic sectional view of the indoor unit, showing the moving section when the wind guide panel is upwardly opened;
Figure 13 is a schematic sectional view of the indoor unit, showing the moving section when the wind guide panel is downwardly opened;
Figure 14 is an exploded perspective view of the regulating section;
Figure 15 is an exploded perspective view of the moving section; and
Figure 16 is a figure for explaining movement of a regulating section in another embodiment, in which Figure 16(a) shows an initial state of the panel, in which Figure 16(b) shows an upwardly opened state of the panel, and in which Figure 16(c) shows a downwardly opened state of the panel.

Description of Symbols

[0032]

3	Cabinet
5	Blow-out port
20	Wind guide panel
22	Lower shaft
23	Upper shaft
31	Support
32	Rod
41	Control apparatus
50	Moving section
51	Regulating section
52	Upper hook
53	Lower hook
54	Changing section
55	Linkage section
56	Driving section
57	Moving mechanism section
58	Driving section
64	Upper link
65	Lower link
66	Linkage plate
70	Regulating motor
72	Regulating groove
81	Moving plate
86	Opening and closing motor
90	Position detecting sensor

Best Mode for Carrying Out the Invention

[0033] Figures 1 and 2 show an indoor unit of an air conditioner according to a present embodiment. The indoor unit includes a heat exchanger 1 and an indoor fan 2 which are housed in a cabinet 3. The cabinet 3 is formed in a box shape which has a depth greater than its height and which has a curved surface extending from the front surface to the bottom surface. A suction port 4 is formed

in the upper surface of the cabinet 3, and a blow-out port 5 is formed in the curved surface.

[0034] An air passageway 6 extending from the suction port 4 to the blow-out port 5 is formed in the inside of the cabinet 3, and the heat exchanger 1 and the indoor fan 2 are arranged in the air passageway 6. A filter 7 is arranged between the suction port 4 and the heat exchanger 1, so as to remove dust from the indoor air sucked from the suction port 4. A cleaning apparatus 8 which cleans the filter 7 is provided.

[0035] The filter 7 is moved by the cleaning apparatus 8 in the cabinet 3 so as to pass through a dust removing section 9. Thereby, the dust adhering to the filter 7 is removed in the dust removing section 9. A guide passage 10 curved in a U-shape in side view is formed on the front side in the cabinet 3, and a moving section, which is made of a motor and a gear, reciprocates the filter 7 along the guide passage 10. In the dust removing section 9, the dust is scraped by a rotating brush 11 from the filter 7 passing through the dust removing section 9. By a suction fan, air is made to flow in the direction substantially in parallel with the filter 7 (in the left and right direction), so that the scraped dust is sucked and discharged.

[0036] A wind guide panel 20 which opens and closes the blow-out port 5 is provided on the curved surface of the cabinet 3. As shown in Figures 3 to 6, the wind guide panel 20 is configured to be able to be upwardly and downwardly opened, and an opening and closing mechanism by which the wind guide panel 20 is moved to be opened and closed is provided.

[0037] The wind guide panel 20 is formed by one curved panel and covers the front surface of the cabinet 3. The width of the wind guide panel 20 is set to be the same as the width of the cabinet 3 and is set larger than the width of the blow-out port 5. Further, in the front surface of the cabinet 3, a front panel 21 is formed from the middle stage portion of the front surface to the bottom surface so as to be one stage lower than the front surface. Thereby, a recessed section is formed over the whole width direction so that the wind guide panel 20 can be fit into the recessed section. An opening is formed in the front panel 21 which forms the recessed section, and the opening serves as the blow-out port 5. Therefore, the wind guide panel 20 is located in front of the blow-out port 5, so as to cover the blow-out port 5 and the front panel 21 around the blow-out port 5. At this time, the wind guide panel 20 is held in a closed attitude as shown in Figure 2.

[0038] When the wind guide panel 20 is held in the closed attitude, gaps are formed between the cabinet 3 and the front and rear ends of the wind guide panel 20. As shown in Figures 4 and 6, when the wind guide panel 20 is opened and closed, the end section of the wind guide panel 20 is made to enter the gap. Thus, the wind guide panel 20 can be smoothly rotated without being brought into contact with the cabinet 3. Further, it is possible to prevent the leaking of the blown-out air by forming the front and rear end sections of the wind guide panel 20 in such a manner that the wind guide panel 20 is brought into contact with the cabinet 3 at the time when the wind guide panel 20 is fully upwardly or downwardly opened. In particular, in the case of cool air, it is possible to prevent dew condensation on the bottom surface side of the cabinet 3.

[0039] In this way, the outer surface of the wind guide panel 20 forms a smooth curved surface extending from the front surface to the bottom surface of the cabinet 3. That is, the wind guide panel 20 is formed as a member which configures a part of the front surface of the cabinet 3. In other words, a part of the panel of the cabinet 3 is used as the wind guide panel 20. Thereby, the wind guide panel 20 is formed into a long panel having a total length greater than that of the louver adopted in a conventional air conditioner.

[0040] The wind guide panel 20 is rotated about upper and lower shafts in the different directions, so as to thereby be opened in one of the upward and downward directions. As shown in Figures 5 and 6, at the time of cooling operation, the wind guide panel 20 is downwardly opened about the lower shaft 22. When held in the downwardly opened attitude, the wind guide panel 20 is connected to the lower wall of the blow-out port 5, so that a long nozzle is formed by the wind guide panel 20 and the upper wall of the blow-out port 5. The wind guide panel 20 guides the cool air in the obliquely upward direction so that the cool air is blown out toward the ceiling. As shown in Figures 3 and 4, at the time of heating operation, the wind guide panel 20 is upwardly opened about the upper shaft 23. When held in the upwardly opened attitude, the wind guide panel 20 covers the front of the blow-out port 5 and suppresses the flow of warm air blown out toward the front so as to guide the warm air toward the floor surface. Note that also at the initial stage of the cooling operation, the wind guide panel 20 is held in the upwardly opened attitude to allow the cool air to be blown out toward the floor surface, so that the rapid cooling is performed. As shown in Figure 2, at the non-operation time, the wind guide panel 20 is held in the closed attitude and covers the blow-out port 5 so as to be integrated with the cabinet 3.

[0041] Note that a wind direction plate 24 and an auxiliary louver (not shown) are provided in the blow-out port 5. The wind direction plate 24 changes its angle in the left and right direction so as to change the wind direction in the left and right direction. The auxiliary louver changes the vertical angle thereof according to the attitude of the wind guide panel 20 and thereby changes the vertical wind direction while rectifying the blown-out air.

[0042] In the wind guide panel 20 enlarged as described above, the sway and deflection can be easily caused. Thus, a peripheral wall for reinforcement is formed at both side edges on the inner surface of the wind guide panel 20 in the front and rear direction (short side direction). The peripheral wall is formed over the whole length in the left and right direction (long side direction). The peripheral wall is formed to have a hollow

structure and can be thick. With such peripheral wall, the strength of the wind guide panel 20 can be increased, and the deflection of the wind guide panel 20 can be prevented. Further, the same peripheral wall for reinforcement is also formed at both side edges in the left and right direction. Therefore, the sway of the wind guide panel 20 can be prevented.

[0043] When the four-side edges of the wind guide panel 20 are reinforced by being thickened, the strength against deformation of the wind guide panel 20 can be increased, so that the size of the wind guide panel 20 can be increased. Further, the wind guide panel 20 is configured to be hardly deformed, and hence the curving degree of the wind guide panel 20 in the front and rear direction can be increased. Thereby, it is possible to easily perform the control of the air blowing direction at the time when the wind guide panel 20 is opened. That is, at the time of cooling operation, cool air can be guided toward the ceiling, so as to increase the reaching distance of the cool air. At the time of heating operation, warm air is guided toward the wall so as to reach the floor surface.

[0044] Further, an inclined surface is formed on the tip side of the peripheral wall. The inner side surface of the peripheral wall is formed as the inclined surface. The outer side surface of the peripheral wall is formed into a vertical surface. When the wind guide panel 20 is held in the downwardly opened attitude, the blown-out cool air hits the peripheral wall positioned in the left and right direction, which may cause dew condensation on the peripheral wall. Thus, when the inner side surface of the peripheral wall is formed into the inclined surface, the cool air is made to flow along the inclined surface. The cool air is made to flow without staying at the peripheral wall, which makes it possible to prevent the dew condensation from being caused on the peripheral wall.

[0045] A heat insulating material 30 is provided on the inner surface of the wind guide panel 20 surrounded by the peripheral wall. The heat insulating material 30 is provided over the whole surface except for both the end sides in the left and right direction. The width of the heat insulating material 30 in the left and right direction is set larger than the width of the blow-out port 5. The surface of the heat insulating material 30 is formed into one surface. Therefore, there is no projection on the side of the inner surface of the wind guide panel 20, which inner surface faces the blow-out port 5, and hence the air flow cannot be hindered.

[0046] A support 31 is provided on both the left and right sides of the inner surface of the wind guide panel 20. The wind guide panel 20 is detachably attached to the support 31. The support 31 is attached to the cabinet 3 via a rod 32. That is, the wind guide panel 20 is detachably attached to the cabinet 3 via the rod 32.

[0047] As shown in Figure 5, a claw 33 which can be freely slid in the left and right direction is provided on both the left and right sides of the wind guide panel 20. The claw 33 faces the peripheral wall formed in the front and rear direction, and is urged by an urging member, such as a spring, toward the peripheral wall. The wind guide panel 20 is attached to the support 31 in such a manner that the support 31 is sandwiched between the claw 33 and the peripheral wall. The wind guide panel 20 can be removed from the support 31 by sliding the claw 33 in the direction away from the peripheral wall.

[0048] Note that the claw 33 may be provided at least on one side in the front and rear direction. In this case, on the other side, a pin is provided in one of the wind guide panel 20 and the support 31, and a hole is formed in the other in which the pin is not provided. The wind guide panel 20 is engaged with the support 31 by fitting the pin into the hole. When the claw 33 is provided on the one side, it is preferred to provide the pin on the rear side in consideration of workability. In this case, the user is able to attach and detach the wind guide panel 20, while looking at the claw 33 in the state where the wind guide panel 20 is held in the downwardly opened attitude. Therefore, the user is able to easily and surely attach and detach the wind guide panel 20 and is also able to perform the attaching and detaching operation while supporting the wind guide panel 20 with a single hand. Thus, it is possible to prevent the falling off of the wind guide panel 20.

[0049] The upper shaft 23 of the wind guide panel 20 is provided on the front side of the support 31, while the lower shaft 22 is provided on the rear side of the support 31. The upper and lower shafts 22 and 23 are arranged along the left and right direction, and both ends of the upper and lower shafts 23 and 22 are supported so as to be separated from the support 31. The upper and lower shafts 22 and 23 are located on the outside of the blow-out port 5 in the front-and-rear and left-and-right directions, and are located in front of the blow-out port 5. Therefore, the upper and lower shafts 22 and 23 do not impede the flow of the air blown out from the blow-out port 5.

[0050] Note that the support 31 may be integrated with the wind guide panel 20. The rod 32 is directly attached to the wind guide panel 20. In this case, when the rod 32 is detachably attached to the wind guide panel 20, the wind guide panel 20 can be detachably attached to the cabinet 3.

[0051] In the air conditioner, the outdoor unit (not shown) corresponding to the indoor unit is installed in an outdoor location. A compressor, a heat exchanger, a four way valve, an outdoor fan, and the like, are incorporated in the outdoor unit, and a refrigerating cycle 40 is formed by these components and the heat exchanger 1 on the indoor side. Further, as shown in Figure 7, a control apparatus 41 which controls the refrigerating cycle 40 is provided in the indoor unit. The control apparatus 41 made of a microcomputer controls the refrigerating cycle 40 to perform cooling and heating operation, on the basis of a user's instruction and detection signals of various sensors 42, such as temperature sensors which detect the room temperature and the outdoor air temperature. At this time, the control apparatus 41 opens and closes

the wind guide panel 20 by controlling an opening and closing mechanism according to the cooling or heating operation. Further, the control apparatus 41 cleans the filter 7 by controlling the cleaning apparatus 8 periodically or according to the instruction from the user.

[0052] The opening and closing mechanism is configured, as shown in Figure 7, by a moving section 50 which brings the wind guide panel 20 close to and away from the cabinet 3, and a regulating section 51 which regulates the opening direction of the wind guide panel 20 at the time when the wind guide panel 20 is moved.

[0053] When the wind guide panel 20 is opened, the moving section 50 moves the wind guide panel 20 in the direction in which the wind guide panel 20 is separated from the cabinet 3. At this time, the regulating section 51 changes the opening direction of the wind guide panel 20 by allowing one of the upward and downward opening operations of the wind guide panel 20 and by regulating the other opening operation. When the downward opening operation is regulated, the wind guide panel 20 is upwardly opened. On the contrary, when the upward opening operation is regulated, the wind guide panel 20 is downwardly opened. When the wind guide panel 20 is closed, the wind guide panel 20 is moved by the moving section 50 in the direction of approaching the cabinet 3.

[0054] That is, the regulating section 51 regulates the opening direction by locking one of the upper shaft 23 and the lower shaft 22 to prevent the movement thereof. When the wind guide panel 20 is downwardly opened, the lower shaft 22 is locked to be rotatably supported, and the upper shaft 23 is released. When the wind guide panel 20 is upwardly opened, the upper shaft 23 is locked to be rotatably supported, and the lower shaft 22 is released.

[0055] Further, the regulating section 51 has a function to hold the wind guide panel 20 in the closed attitude. The wind guide panel 20 in the closed attitude is held close to the front panel 21 of the cabinet 3. At this time, the regulating section 51 locks the upper shaft 23 and the lower shaft 22. Even when an external force is applied to separate the wind guide panel 20, the wind guide panel 20 is not moved because both the shafts 22 and 23 are locked.

[0056] In this way, a driving source only for moving the wind guide panel 20 may be provided as the driving source for opening and closing the wind guide panel 20. Further, the driving source only needs to enable simple operation, such as reciprocating operation of the wind guide panel 20. Therefore, the moving section 50 can be formed into a simple mechanism which reciprocates the wind guide panel 20. Thereby, the opening and closing mechanism can be simplified and miniaturized.

[0057] As shown in Figures 9 and 10, the regulating section 51 includes a pair of upper and lower hooks 52 and 53 which respectively hold the upper and lower shafts 23 and 22, a changing section 54 which changes the opening direction by regulating the operation of each of the hooks 52 and 53, a linkage section 55 which enables the hooks 52 and 53 to be operated in association with each other, and a driving section 56 which drives the linkage section 55. As show in Figures 11 to 13, the moving section 50 includes the rod 32 which holds the wind guide panel 20, a moving mechanism section 57 which moves the rod 32 into and out of the cabinet 3, and a driving section 58 which drives the moving mechanism section 57.

[0058] A left and right pair of the regulating sections 51 are provided in the cabinet 3, and are arranged outside the blow-out port 5 in the left and right direction. As shown in Figure 14, the regulating section 51 is configured as a unit on a base plate 60. The base plate 60 is fixed to the inside of the cabinet 3.

[0059] The upper hook 52 and the lower hook 53 are respectively rotatably supported by fixed shafts 61 fixed to the base plate 60. Inlet/outlet ports 21a which respectively allow the hooks 52 and 53 to be projected and retracted are formed in the upper and lower portions of the front panel 21, respectively. The upper hook 52 is projected from the inlet/outlet port 21a, so as to hook the upper shaft 23 from the lower side. The upper shaft 23 is held by being sandwiched between a receiving base 62 formed in the front panel 21 and the upper hook 52. Similarly, the lower hook 53 is also projected from the inlet/outlet port, so as to hook the lower shaft 22 from the upper side, so that the lower shaft 22 is held by being sandwiched between a receiving base 63 and the lower hook 53.

[0060] The linkage section 55 mechanically connect the hooks 52 and 53 with each other by using a link mechanism, so as to enable each of the hooks 52 and 53 to be operated. Specifically, the linkage section 55 is configured by a pair of upper and lower links 64 and 65, and a linkage plate 66. The upper and lower links 64 and 65 connect the upper and lower hooks 52 and 53 to the linkage plate 66, respectively. That is, a shaft 64a is formed at one end of the upper link 64, so as to be fitted into a shaft hole of the upper hook 52. The upper hook 52 is rotatably supported at the one end of the upper link 64. The lower hook 53 is also similarly supported by the lower link 65.

[0061] The other end of the upper link 64 is rotatably attached to the linkage plate 66. The linkage plate 66 is formed into a fan-shaped gear, and gear teeth are formed on the circular arc surface of the linkage plate 66. The linkage plate 66 is rotatably supported by a fixed shaft 67 which is projectingly provided on the base plate 60. A pair of long grooves 68 are formed in the linkage plate 66, and other end shafts 64b and 65b of the upper and lower links 64 and 65 are fitted into the long grooves 68, respectively. Each of the long grooves 68 is extended in the radial direction from the fixed shaft 67 serving as the center. The other end shafts 64b and 65b of the links 64 and 65 are respectively made movable in the radial direction, so that a play is provided by each of the long grooves 68.

[0062] By the rotation of the linkage plate 66, the links

64 and 65 are respectively moved in association with each other between the fixed shafts 61 of the hooks 52 and 53 and the fixed shaft 67 of the linkage plate 66. Thereby, the hooks 52 and 53 can be rotated about the fixed shafts 61, respectively.

[0063] The driving section 56 is configured by a plurality of gears 69 and a regulating motor 70. The regulating motor 70 is provided on a mounting base 71 attached to the base plate 60. The motor shaft of the regulating motor 70 is fitted into the gear 69, so that the driving force of the regulating motor 70 is transmitted to the linkage plate 66 via the plurality of gears 69. When the regulating motor 70 is driven, the linkage plate 66 is rotated about the fixed shaft 67. Therefore, the two hooks 52 and 53 can be moved by one motor.

[0064] As shown in Figure 10, the changing section 54 guides the movement of each of the other end shafts 64b and 65b of the links 64 and 65. A regulating groove 72 is formed in the mounting base 71, and both the other end shafts 64b and 65b are fitted in the regulating groove 72. The movement of each of the hooks 52 and 53 is defined in such a manner that the links 64 and 65 are moved differently from each other by the regulating groove 72. That is, when one of the hooks 52 and 53 is moved, the other of the hooks 52 and 53 is regulated so as not to be moved. The changing section 54 defines the movement of the hooks 52 and 53 according to the opening direction.

[0065] The regulating groove 72 is formed approximately in a U-shape. The regulating groove 72 is configured by three grooves of an upper locking groove 72a, a neutral groove 72b, and a lower locking groove 72c, and the three grooves are continuously connected. The upper locking groove 72a is formed along a circular arc centering on the one end shaft 64a of the upper link 64. The lower locking groove 72c is formed along a circular arc centering on the one end shaft 65a of the lower link 65. The neutral groove 72b is formed along a circular arc centering on the fixed shaft 67 of the linkage plate 66.

[0066] As shown in Figures 9(a) and 10(a), when both the other end shafts 64b and 65b are located in the neutral groove 72b, the hooks 52 and 53 respectively hold the upper and lower shafts 22 and 23, so that both the shafts 22 and 23 are locked. The state at this time is assumed as an initial state. As shown in Figures 9(b) and 10(b), when the other end shafts 64b of the upper link 64 is located in the upper locking groove 72a, the upper shaft 23 is rotatably held by being sandwiched by the upper hook 52 so as to be locked. The lower hook 53 is separated from the lower shaft 22. As shown in Figures 9(c) and 10(c), when the other end shafts 65b of the lower link 65 is located in the lower locking groove 72c, the lower shaft 22 is rotatably held by being sandwiched by the lower hooks 53 so as to be locked. The upper hook 52 is separated from the upper shaft 23.

[0067] In the initial state, when the linkage plate 66 is rotated clockwise, the other end shaft 64b of the upper link 64 is moved along the upper locking groove 72a. The other end shaft 64b of the upper link 64 is moved in the circumferential direction with the one end shaft 64a as the center. The upper link 64 is not radially moved, and hence the one end shaft 64a is also not moved. Thereby, the upper hook 53 is not rotated. On the other hand, the other end shaft 65b of the lower link 65 is moved along the neutral groove 72b. The one end shaft 65a is moved by being pulled. The lower hook 52 is rotated clockwise. Thereby, as shown in Figures 9(b) and 10(b), the lock of the lower shaft 22 is released. In the initial state, when the linkage plate 66 is rotated counter clockwise, the lock of the upper shaft 23 is similarly released as shown in Figures 9(c) and 10(c).

[0068] Note that the control apparatus 41 drives the left and right regulating motors 70 so that the above described operations are synchronized with each other in the left and right regulating sections 51. A stepping motor is used as the regulating motor 70, so as to be normally and reversely rotated according to the opening direction. Thereby, the wind guide panel 20 is smoothly opened without being twisted at the right and left sides.

[0069] A pair of the moving sections 50 are provided on the left and right sides in the cabinet 3, so as to be arranged outside the regulating sections 51 in the left and right direction, respectively. As shown in Figures 11 to 13, the front end of the rod 32 is made to project to the outside from a vertically long hole 21b (see Figure 3) formed in the front panel 21. A support shaft 80 for attaching the rod 32 is provided on the support 31. The front end of the rod 32 is rotatably supported by the support shaft 80. The support shaft 80 is positioned so as to be shifted to the front side from the center in the front and rear direction. The rod 32 is formed to have a circular cross section. When the air hits the rod 32, the air is allowed to easily flow. Thus, even when cool air is blown to the rod 32, dew condensation hardly occurs. Further, the rod 32 is formed to have a hollow structure. Thereby, the weight of the rod 32 can be reduced while the strength of the rod 32 is maintained. As a result, it is possible to reduce the load of the motor to move the rod 32.

[0070] When the wind guide panel 20 is opened, the moving mechanism section 57 moves the front end of the rod 32 to the front side. When the wind guide panel 20 is closed, the moving mechanism section 57 moves the front end of the rod 32 to the rear side. The moving mechanism section 57 is formed as a moving plate 81 which is reciprocated while holding the rod 32. As shown in Figure 15, the moving plate 81 is formed into a fan-shape, and is rotatably supported by a fixed shaft 83 which is fixed to a base plate 82. The base plate 82 is fixed to the cabinet 3.

[0071] The moving section 50 is also configured as a unit similarly to the regulating section 51. Here, the regulating section 51 and the moving section 50 are arranged side by side in each of the spaces respectively provided on both the left and right sides of the cabinet 3. When both the regulating section 51 and the moving section 50 are configured as one unit, they can be handled

as an opening and closing mechanism unit, so as to be easily attached. Further, the moving section 50 can be configured by a small number of components, so that the size and thickness of the unit can be reduced. Thereby, the opening and closing mechanism can be housed in a limited space, so that the width of the blow-out port 5 can be increased. When the width of the blow-out port 5 is increased, the blowing range of air in the width direction can be increased, and thereby it is possible to supply the air to all corners of a room.

[0072] The rear end of the rod 32 is rotatably attached to the vicinity of the front end of the moving plate 81 via a rotary shaft 84. A circular arc groove 85 is formed in the moving plate 81. The circular arc groove 85 is formed on a circular arc centering on the fixed shaft 83. A rack is formed in the circular arc groove 85. The driving section 58 is configured by an opening and closing motor 86, and a gear 87 attached to the motor shaft of the opening and closing motor 86. The gear 87 is inserted into the circular arc groove 85, so as to mesh with the rack.

[0073] When the opening and closing motor 86 is driven, the moving plate 81 is rotated about the fixed shaft 83 according to the rotation of the gear 87, so that the rod 32 is moved into and out of the front panel 21. When the wind guide panel 20 is held in the closed attitude as shown in Figure 11, the moving plate 81 is located in the rear side. Only the front end of the rod 32 is made to project from the front panel 21. This state is the initial state.

[0074] When the lock of the lower shaft 22 is released, and when the opening and closing motor 86 is driven, the moving plate 81 is rotated counterclockwise as shown in Figure 12. The rod 32 is pushed out, so that the front end of the rod 32 is moved to the front side. The wind guide panel 20 is rotated about the upper shaft 23, so as to be upwardly opened. Note that the opening and closing motor 86 is controlled so that the moving plate 81 is rotated by a fixed angle of, for example, 50 degrees.

[0075] When the lock of the upper shaft 23 is released, and when the opening and closing motor 86 is driven, the moving plate 81 is rotated counterclockwise as shown in Figure 13. The rod 32 is pushed out, so that the front end of the rod 32 is moved to the front side. The wind guide panel 20 is rotated about the lower shaft 22, so as to be downwardly opened. At this time, the wind guide panel 20 is opened so as to be downwardly moved, and hence the front end of the rod 32 is also moved to the front side while being gradually downwardly moved. Also in this case, the moving plate 81 is rotated by the fixed angle.

[0076] When the wind guide panel 20 is opened, and when the opening and closing motor 86 is driven to cause the moving plate 81 to rotate clockwise, the wind guide panel 20 is closed. By the rotation of the moving plate 81, the rear end of the rod 32 is moved to the rear side. The rod 32 is drawn into the cabinet 3. Thereby, the wind guide panel 20 is rotated about the upper shaft 23 or the lower shaft 22. The wind guide panel 20 is made to approach the cabinet 3, so as to be held in the closed attitude.

[0077] Note that the control apparatus 41 drives the opening and closing motors 86 on the left and right sides so that the above described operations in the left and right side moving sections 50 are synchronized with each other. A stepping motor is used as the opening and closing motor 86 and is normally and reversely rotated according to the opening and closing operations.

[0078] When the wind guide panel 20 is opened during the cooling or heating operation, one of the upper and lower shafts 22 and 23 of the wind guide panel 20 is locked. For example, when the wind guide panel 20 is held in the upwardly opened attitude, and when the wind guide panel 20 is pulled to cause an external force to be applied to the wind guide panel 20, one of the shafts (here, the upper shaft 23) is pushed. When the upper shaft 23 is pushed, the upper hook 52 is made to rotate counterclockwise. The upper link 64 is pushed in the shaft direction. The shaft direction is the direction which connects the one end and the other end of the upper link 64. The other end of the upper link 64 pushes the mounting base 71 through the regulating groove 72. At this time, the direction of the upper locking groove 72a, at which the other end of the upper link 64 is located, is substantially orthogonal to the shaft direction of the upper link 64. Since the mounting base 71 is fixed, the upper link 64 is not moved in the shaft direction. Further, the acting direction of the force from the upper link 64 is substantially orthogonal to the direction of the upper locking groove 72a. No force acts on the other end of the upper link 64 in the direction in parallel with the direction of the upper locking groove 72a. As a result, the upper link 64 is not moved along the upper locking groove 72a, so that the rotation of the upper hook 52 is prevented.

[0079] Thereby, the upper shaft 23 is firmly held by the upper hook 52. For this reason, even when an external force is applied to the opened wind guide panel 20, the upper shaft 23 is not separated from the upper hook 52.

[0080] Similarly, in the state where the wind guide panel 20 is held in the downwardly opened attitude, even when an external force is applied to the wind guide panel 20, the lower hook 53 is prevented from being rotated, so that the lower shaft 22 is not separated from the lower hook 53.

[0081] That is, in the state in which the wind guide panel 20 is opened, even when an external force is applied, it is possible to prevent the lock from being released in such a manner that the direction of one of the links 64 and 65 is made orthogonal to the direction of the regulating groove 72. Thereby, it is possible to prevent the occurrence of the state in which the shaft of the wind guide panel 20 is separated from the cabinet 3 and thereby the opened wind guide panel 20 is hung down by being supported by the rod 32.

[0082] Further, when the wind guide panel 20 is held in the closed attitude, the upper shaft 23 and the lower shaft 22 are locked and held by the hooks 52 and 53,

respectively. Therefore, the wind guide panel 20 is not easily separated from the cabinet 3. Further, the wind guide panel 20 in the closed attitude is held as a part of the front panel of the cabinet 3. Thus, the wind guide panel 20 is not hooked by an external object and hence is not unexpectedly separated from the cabinet 3.

[0083] Further, in the opening and closing mechanism, the upper and lower hooks 52 and 53 are mechanically connected to each other so as to be driven by the one motor 70. This prevents the operation timings of the hooks 52 and 53 from being shifted from each other, so that the shafts 22 and 23 can be surely locked and opened. Therefore, the situation in which the lock of the respective shafts 22 and 23 is simultaneously released may not occur, and hence the reliability of opening and closing operation can be improved.

[0084] Meanwhile, when the wind guide panel 20 is maximally opened, the moving amount of the rod 32 is fixed regardless of the opening direction. However, the front end of the rod 32 is positioned to be eccentric with respect to the wind guide panel 20. Thus, as shown in Figures 4 and 6, the opening angle at the time when the wind guide panel 20 is upwardly opened is different from the opening angle at the time when the wind guide panel 20 is downwardly opened. The upwardly opening angle is set larger than the downwardly opening angle. That is, the opening angle is increased as the distance from the center to the fulcrum is reduced at the time when the wind guide panel 20 is opened. The center is the upper shaft 23 or the lower shaft 22, and the fulcrum is the position of the front end of the rod 32. Since the rod 32 is attached closer to the upper shaft 23, the upwardly opening angle is set large, and the downwardly opening angle is set small.

[0085] The wind guide panel 20 is downwardly opened at the time of cooling operation. However, when the downwardly opening angle is large, the wind guide panel 20 is set below the horizontal line. This causes the cool air to flow in the horizontal direction, and does not cause the air to flow toward the ceiling. The reaching distance of the cool air is reduced, and the cool air directly hits a person. Therefore, in the case where the wind guide panel 20 is downwardly opened, it is preferred to reduce the opening angle. The wind guide panel 20 is upwardly opened at the time of heating operation. However, when the opening angle is small, the outlet of the warm air is narrowed. The warm air, which is returned after hitting the wind guide panel 20, has no place to escape, and hence collides with the blown-out warm air, so as to thereby disturb the flow of the warm air. As a result, the velocity of the air blown out toward the floor surface is reduced, so as to prevent the warm air from reaching the floor surface.

[0086] In this way, efficient air delivery cannot be performed at the time of cooling and heating operation, so that the cooling and heating performance cannot be maximally exhibited. However, as described above, when the upwardly opening angle is set large, and when the downwardly opening angle is set small, the cool air can be blown out toward the ceiling at the time of cooling operation, and the outlet of the warm air is increased at the time of heating operation so that a smooth flow of the warm air can be formed. Therefore, the maximum capacity of the air conditioner can be fully exhibited.

[0087] In the air conditioner, the cooling or heating operation is performed on the basis of an instruction generated when the user operates the remote controller, or is performed when the set time of the timer is reached. The control apparatus 41 controls the refrigerating cycle 40 and the opening and closing of the wind guide panel 20. At this time, the control apparatus 41 operates the moving section 50 and the regulating section 51 in association with each other.

[0088] When performing the cooling or heating operation, the control apparatus 41 turns on and off the driving of the regulating motor 70 and the opening and closing motor 86 according to a predetermined timing. That is, the respective motors 70 and 86 are sequence-controlled.

[0089] Further, the control apparatus 41 performs an initializing operation before the start of operation. That is, the control apparatus 41 determines the position of the wind guide panel 20 at the time when the operation is stopped. When the wind guide panel 20 is not set in the initial state, the control apparatus 41 operates, as the initializing operation, the moving section 50 and the regulating section 51 so that the wind guide panel 20 is set in the initial state. When the operation is started, and when the wind guide panel 20 is set in the initial state, the control apparatus 41 starts the operation without performing the initializing operation. Note that the state in which the wind guide panel 20 is held in the closed attitude is the initial state, and that the opening angle of the wind guide panel 20 is associated with the states of the respective members of the moving section 50 and the regulating section 51.

[0090] As shown in Figure 11, a position detecting sensor 90 for detecting the position of the wind guide panel 20 is provided in the moving section 50. Note that the position detecting sensors 90 are provided in the left and right moving sections 50, respectively. A limit switch is used as the position detecting sensor 90. The position detecting sensor 90 is attached to the base plate 82 of the moving section 90 in the cabinet 3. The position detecting sensor 90 is arranged so as to be positioned close to the moving plate 81 which is set in the initial state. When the moving plate 81 is set in the initial state, the rod 32 attached to the moving plate 81 is brought into contact with the position detecting sensor 90. Therefore, the position detecting sensor 90 detects that the wind guide panel 20 is set in the initial state, that is, in the closed attitude. Note that the position detecting sensor 90 may also be configured to directly detect the position of the wind guide panel 20. The position detecting sensor is not limited to the contact type sensor, such as the limit switch, and non-contact type sensors, such as an optical

sensor and a camera, may also be used as the position detecting sensor.

[0091] On the basis of a detection signal of the position detecting sensor 90, the control apparatus 41 determines whether or not the wind guide panel 20 is set in the initial state. When the operation is stopped, the wind guide panel 20 is normally held in the closed attitude, and hence the moving section 50 and the regulating section 51 are set in the initial state. However, when the wind guide panel 20 is not set in the initial state due to a certain reason, the control apparatus 41 determines, on the basis of the detection signal from the position detecting sensor 90, that the wind guide panel 20 is not set in the initial state. Then, the control apparatus 41 performs the initializing operation so as to forcibly set the wind guide panel 20 in the initial state.

[0092] Conventionally, it is configured such that the time period during which the wind guide panel 20 is changed from the fully opened state to the closed state (initial state) is stored as the initialization time period, and that when the cooling or heating operation is started, the initializing operation of closing the wind guide panel 20 is necessarily performed during the initialization time period, and then the normal operation, such as the cooling or heating operation, is performed. However, in such conventional initializing operation, even when the wind guide panel 20 is set in the initial state at the time of starting such operation as cooling or heating operation, the initializing operation is necessarily performed during the initialization time period, and hence it takes a time until the operation is shifted to the normal operation of cooling or heating operation.

[0093] As in the present embodiment, when the position detecting sensor 90 is provided, it is possible to detect, at the time of starting the operation, whether or not the wind guide panel 20 is set in the initial state. Thus, when the wind guide panel 20 is set in the initial state at the time of starting the operation, it is possible to perform the cooling or heating operation without performing the initializing operation.

[0094] Further, when the wind guide panel 20 is not set in the initial state at the time of starting the operation, the initializing operation is performed. At the time point when the position detecting sensor 90 detects that the wind guide panel 20 is set in the initial state, the initializing operation is ended, so that the operation can be shifted to the cooling or heating operation. Further, even when the wind guide panel 20 is not set in the fully opened state, but in a slightly opened state or in a substantially half opened state, the initializing operation is performed. However, the initializing operation is ended at the time point when the position detecting sensor 90 detects that the wind guide panel 20 is set in the initial state. Thus, the initializing operation can be shifted to the cooling or heating operation without being performed during the initialization time period. As described above, the time required for the initializing operation can be reduced by using the detection result from the position detecting sensor 90, so that the initializing operation can be rapidly shifted to the normal operation.

[0095] When it is not detected by the position detecting sensor 90 that the wind guide panel 20 is set in the initial state, the opening operation of the wind guide panel 20 is not performed and only the closing operation of the wind guide panel 20 is performed. Even when after the initializing operation is performed for a predetermined time period, the wind guide panel 20 is not set in the initial state, the wind guide panel 20 is once set in the fully opened state (by performing the opening operation for the time period required for shifting the closed state to the fully opened state), and the auxiliary louver is set in the closed state. Thereafter, the wind guide panel 20 is set in the closed state. Even when this operation is performed and when it is not detected by the position detecting sensor 90 that the wind guide panel 20 is set in the initial state, an error display as an operation failure is performed.

[0096] Note that in such cases where a receptacle of an air conditioner is first connected to an AC power source, and where the power supply to the air conditioner is once interrupted due to power failure, or the like, it is necessary to set the auxiliary louver (not shown) in the closed state. Thus, the wind guide panel 20 is first opened to the extent in which at least the auxiliary louver can be rotated (for example, the wind guide panel 20 is fully opened). Then, after the auxiliary louver is closed, the wind guide panel 20 is set in the initial state.

[0097] In the initial state, the moving plate 81 is positioned on the rear side in the moving section 50 as shown in Figure 11. In the regulating section 51, the other end shafts 64b and 65b of the upper and lower links 64 and 65 are located in the neutral groove 72b as shown in Figures 8 and 10(a).

[0098] When the heating operation is started, the control apparatus 41 first drives the regulating motor 70 of the regulating section 51. By the driving, the linkage plate 66 is rotated clockwise. The upper link 64 is rotated about the one end. The other end shaft 65b of the lower link 65 is moved along the neutral groove 72b, and thereby the lower link 65 is pulled up. The lower hook 53 is rotated clockwise, so that the lock of the lower shaft 22 is released.

[0099] The control apparatus 41 drives the opening and closing motor 86 of the moving section 50 with a slight delay from the timing of starting the regulating motor 70. The timing of starting the opening and closing motor 86 is set after the lower hook 53 is separated from the lower shaft 22. That is, the control apparatus 41 stops the regulating motor 70, when a predetermined first timing is reached. The first timing is a timing determined according to the time period until the other end shaft 64b of the upper link 64 reaches the end of the upper locking groove 72a as shown in Figure 10(b). After stopping the regulating motor 70, the control apparatus 41 drives the opening and closing motor 86.

[0100] When the opening and closing motor 86 is driv-

en, the moving plate 81 is rotated counterclockwise. The rod 32 is pushed out to the front side, so that the wind guide panel 20 is moved in the direction away from the cabinet 3. The wind guide panel 20 is opened about the upper shaft 23. When the wind guide panel 20 is opened at a set opening angle, the control apparatus 41 stops the opening and closing motor 86. Note that the opening angle is calculated from the number of steps of the opening and closing motor 86.

[0101] The control apparatus 41 drives the opening and closing motor 86 for a fixed time period, and stops the opening and closing motor 86 when a second timing is reached. At this time, the opening angle reaches the maximum opening angle as shown in Figure 12. The wind guide panel 20 is held in the upwardly opened attitude, so that the warm air is blown out toward the floor surface.

[0102] Also, in the case of the cooling operation, the control apparatus 41 controls the regulating motor 70 and the opening and closing motor 86 at the same timing. However, the regulating motor 70 is rotated in the direction opposite to the direction at the time of the heating operation. The opening and closing motor 86 is rotated in the same direction as the direction at the time of the heating operation.

[0103] When the opening and closing motor 86 is driven for the fixed time period, and when the second timing is reached, the opening and closing motor 86 is stopped. At this time, the opening angle reaches the maximum opening angle as shown in Figure 13. The wind guide panel 20 is held in the downwardly opened attitude, so that the cool air is blown out toward the ceiling.

[0104] At the time of starting the cooling operation, the rapid cooling is performed. At this time, the wind guide panel 20 is first upwardly opened so as to be held in the upwardly opened attitude. Thereafter, the wind guide panel 20 is closed so as to be held in the closed attitude, and the upper and lower shafts 22 and 23 are once locked. Then, the wind guide panel 20 is downwardly opened so as to be held in the downwardly opened attitude. Thereby, when the opening direction of the opened wind guide panel 20 is changed, at least one of the shafts 22 and 23 is always locked and held. This prevents the state in which both the shafts 22 and 23 are simultaneously released. Thus, it is possible to prevent the coming off of the wind guide panel 20 during opening and closing of the wind guide panel 20.

[0105] When the cooling or heating operation is ended, the control apparatus 41 first drives the opening and closing motor 86. The rod 32 is pulled back, so that the wind guide panel 20 is made to approach the cabinet 3. The control apparatus 41 stops the opening and closing motor 86 when a predetermined third timing is reached. At this time, as shown in Figure 11, the wind guide panel 20 is held in the closed attitude, and the moving plate 81 is positioned on the rear side. That is, the third timing is a timing which is determined according to the time when the moving plate 81 is returned to the initial state. Note that the position detecting sensor 90 detects that the moving plate 81 is returned to the initial state. The third timing may also be set according to the detection timing.

[0106] Then, the control apparatus 41 drives the regulating motor 70. For example, when the heating operation is performed, the state shown in Figure 10(b) is changed to the state shown in Figure 10(a). The lower hook 53 is rotated, so that the lower shaft 22 is locked. The control apparatus 41 stops the regulating motor 70 when a predetermined fourth timing is reached. The fourth timing is a timing which is determined according to the time period during which the other end shaft 65b of the lower link 65 is moved from the connecting position between the upper locking groove 72a and the neutral groove 72b, to reach the connecting position between the neutral groove 72b and the lower locking groove 72c.

[0107] The above described embodiment exemplifies a structure of the regulating section 51 in which the upper and lower hooks 52 and 53 are mechanically connected to each other so as to be driven by the one regulating motor 70. In another embodiment obtained by modifying the configuration of the regulating section 51, two regulating motors 700a and 700b are provided so as to independently drive the respective hooks 52 and 53. The other configuration is the same as that of the above described embodiment.

[0108] As shown in Figure 16, the regulating section 51 includes a pair of the upper and lower hooks 52 and 53 which respectively hold the upper and lower shafts 22 and 23, and the regulating motors 700a and 700b as independent driving sections which are respectively connected to the rotary shafts 61a of the hooks 52 and 53.

[0109] The movement of the upper and lower hooks 52 and 53 is the same as that of the first embodiment. That is, the upper hook 52 is projected from the inlet/outlet port 21a (see Figure 5), so as to hook the upper shaft 23 from the lower side. The upper shaft 23 is held by being sandwiched between the receiving base 62 formed in the front panel 21 (see Figure 5) and the upper hook 52. Similarly, the lower hook 53 is also projected from the inlet/outlet port, so as to hook the lower shaft 22 from the upper side. Thereby, the lower shaft 22 is held by being sandwiched between the lower hook 53 and the receiving base 63 (see Figure 11 and Figure 13).

[0110] Note that the control apparatus 41 drives the upper hook regulating motor 700a and the lower hook regulating motor 700b which are provided on the left and right sides, in such a manner that the above described operations in the left and right regulating sections 51 are synchronized with each other. A stepping motor is used as each of the regulating motors 700a and 700b, so as to be normally and reversely rotated according to the opening direction. Thereby, the wind guide panel 20 is smoothly opened without being twisted at the right and left sides.

[0111] Note that the moving section 50 includes the same mechanism as that shown in Figures 11 to 13, and hence the explanation thereof is omitted.

[0112] In the above described configuration, in the

case where the wind guide panel 20 is opened, even when an external force is applied to the wind guide panel 20, one of the hooks 52 and 53 is operated to hold the lower shaft 22 or the upper shaft 23. Thereby, it is possible to prevent the occurrence of the state in which the shaft of the wind guide panel 20 is separated from the cabinet 3 and thereby the opened wind guide panel 20 is hung down by being supported by the rod 32.

[0113] Further, when the wind guide panel 20 is held in the closed attitude, the upper shaft 23 and the lower shaft 22 are locked and held by the hooks 52 and 53, respectively. Therefore, the wind guide panel 20 is not easily moved from the cabinet 3. Further, the wind guide panel 20 in the closed attitude is held as a part of the front panel of the cabinet 3. Thus, the wind guide panel 20 is not hooked by an external object and hence is not unexpectedly separated from the cabinet 3.

[0114] Further, when the wind guide panel 20 is opened, and when the opening direction of the wind guide panel 20 is changed, the regulating section 51 once closes the wind guide panel 20. That is, the regulating motors 700a and 700b are driven by a command from the control apparatus 41. The regulating section 51 operates the upper and lower hooks 52 and 53 so that the upper shaft 23 and the lower shaft 22 are locked by the upper and lower hooks 52 and 53. Then, the regulating section 51 releases the lock of one of the shafts. For example, at the time of starting the cooling operation, the rapid cooling is performed. At this time, the wind guide panel 20 is first upwardly opened so as to be held in the upwardly opened attitude. Thereafter, the wind guide panel 20 is closed so as to be held in the closed attitude, and the upper and lower shafts 22 and 23 are once locked. Then, the wind guide panel 20 is downwardly opened so as to be held in the downwardly opened attitude. Thereby, when the opening direction of the opened wind guide panel 20 is changed, at least one of the shafts 22 and 23 is always locked and held. This prevents a state in which both the shafts 22 and 23 are simultaneously released. Thus, it is possible to prevent the coming off of the wind guide panel 20 during opening and closing of the wind guide panel 20.

[0115] Note that the present invention is not limited to the above described embodiments, but numerous modifications and changes can be obviously made therein without departing from the scope of the present invention as defined by the appended claims. The upper hook and the lower hook are provided in the wind guide panel, and the upper shaft and the lower shaft are provided in the cabinet. The upper and lower shafts are made movable, and each of the upper and lower hooks is configured as a bearing having an insertion hole for the shaft. The wind guide panel is rotatably held by the shaft being inserted into the insertion hole of the hook. When the wind guide panel is held in the closed attitude, the upper and lower shafts are fitted into the upper and lower hooks, respectively. When the wind guide panel is upwardly opened, the upper shaft is held as it is, and the lower shaft is moved so as to be separated from the lower hook. When the wind guide panel is downwardly opened, the shafts are set in the opposite state.

[0116] Further, a chuck for grasping the upper shaft or the lower shaft may also be used instead of the hook. Each of the shafts is locked and held by being grasped by the chuck. When each of the shafts is separated from the chuck, the lock of each of the shafts is released. When the portion of the chuck, which portion grasps the shaft, is formed into a circular shape, each of the shafts can be rotatably held.

[0117] A rack and pinion may also be used as the moving section. The rod is rotatably attached to the rack, and the pinion is driven by the opening and closing motor. Alternatively, a cylinder may also be used, and a cylinder rod is expanded and contracted so as to move the wind guide panel.

Claims

1. An air conditioner comprising: a blow-out port (5) formed in the front surface of a cabinet (3), a panel (20) covering the front surface; an upper shaft (23) provided in an upper portion of the panel (20) and a lower shaft (22) provided in a lower portion of the panel; the panel being configured to be able to be upwardly and downwardly opened about the upper and lower shafts (22, 23); and an opening and closing mechanism, by which the panel is moved to be opened and closed according to an operating state, **characterized in that** the opening and closing mechanism includes a regulating section (51) that regulates the opening direction of the panel (20), and that the regulating section (51), by holding one of the upper and lower shafts (22, 23), allows one of the upward and downward opening operation, and that the regulating section (51) includes a pair of upper and lower holding sections which holds the upper and lower shafts (22, 23) and a driving section (56) which operates the holding sections, and **in that** the holding sections includes an upper hook (52) holding the upper shaft of the panel (20) and a lower hook (53) holding the lower shaft (22) of the panel (20), and **in that**, when the panel (20) is upwardly opened, the lower hook (53) releases the lower shaft (22), and the upper hook (52) locks and rotatably holds the upper shaft (23), and, when the panel (20) is downwardly opened, the upper hook (52) releases the upper shaft (23) and the lower hook (53) locks and rotatably holds the lower shaft (22).

2. The air conditioner according to claim 1, wherein the driving section (56) is independently provided so as to correspond to each of the upper hook (52) and the lower hook (53).

3. The air conditioner according to claim 1, wherein

when the panel (20) is closed, the regulating section (51) locks the upper shaft (22) by the upper hook (52) and locks the lower shaft (23) by the lower hook (53).

4. The air conditioner according to claim 1, wherein when the panel (20) is opened and when the opening direction of the panel (20) is changed, the regulating section (51) once closes the panel (20) to lock the upper shaft and the lower shaft, and then releases the lock of one of the upper and lower shafts (22, 23).

5. The air conditioner according to claim 1, wherein the regulating section comprises a linkage section (55) which mechanically connects upper and lower hooks (52, 53) with each other to operate the hooks, and a changing section (54) which regulates the operation of each of the hooks to change the opening direction.

6. The air conditioner according to claim 5, wherein when one of the hooks is moved, the changing section (54) regulates the movement of the other hook, so as to thereby determine the movement of each of the hooks according to the opening direction.

7. The air conditioner according to claim 5, wherein the linkage section (55) includes a rotatable linkage plate and a pair of upper and lower links (64, 65) which connect the linkage plate (66) with each of the hooks (52, 53), and in that each of the links is moved in association with each other between fixed shafts (61) of the hooks (52, 53) and a fixed shaft (67) of the linkage plate (66) by the rotation of the linkage plate so that the respective hooks are moved.

8. The air conditioner according to claim 7, wherein the other end of the upper link (64) and lower link (65) are rotatably attached to the linkage plate (66), wherein the upper hook (52) is rotatably supported at the one end of the upper link (64), wherein the lower hook (53) is rotatably supported at the one end of the lower link (65), wherein the changing section guides the movement of the other end of each of the links, wherein when the linkage plate (66) is rotated clockwise, the one end of the upper link (64) is not moved and the movement of the upper hook is regulated, the one end of the lower link (65) is moved and the lower hook (53) is moved and the lock of the lower shaft (22) is released, and wherein when the linkage plate (66) is rotated counterclockwise, the one end of the lower link (65) is not moved and the movement of the lower hook (53) is regulated while the one end of the upper link (64) is moved and the upper hook (52) is moved and the lock of the upper shaft (23) is released.

9. The air conditioner according to claim 1, wherein the upper and lower shafts (22, 23) are respectively provided on each of the left and right sides of the panel (20), and in that the regulating section (51) is arranged on both the left and right sides so that the left and right regulating sections are operated in association with each other.

10. The air conditioner according to claim 1, wherein the opening and closing mechanism includes a moving section (50) which moves the panel (20) close to and away from the cabinet (3) by reciprocating a rod (32), in that the moving section is configured, when the panel is opened, to move the panel (20) in the direction away from the cabinet (3), and is configured, when the panel (20) is closed, to move the panel (20) in the direction close to the cabinet (3), and in that the opening and closing mechanism opens the panel (20) in one of the upward and downward directions by moving the rod forward by the moving section (50) while regulating the opening direction of the panel (20).

11. The air conditioner according to claim 10, wherein the rod (32) is provided so as to be moved into and out of the cabinet (3), in that the rod (32) rotatably supports the panel (20) between the upper and lower shafts (22, 23), and in that the panel is upwardly or downwardly opened by the opening and closing mechanism in such a manner that the rod (32) is moved forward by the moving section (50) while the opening direction of the panel (20) is regulated by the regulating section (51).

12. The air conditioner according to claim 11, wherein the panel (20) is rotated about the upper shaft (23) so as to be upwardly opened and is rotated about the lower shaft (22) so as to be downwardly opened, and in that the opening angle at the time when the panel is upwardly opened is set larger than the opening angle at the time when the panel (20) is downwardly opened.

13. The air conditioner according to claim 12, wherein the rod (32) is attached closer to the upper shaft (23) of the panel (20).

14. The air conditioner according to claim 13, wherein the moving amount of the rod (32) at the time when the panel is upwardly opened is the same as the moving amount of the rod (32) at the time when the panel is downwardly opened.

15. The air conditioner according to claim 11, wherein the moving section (50) includes a moving plate (81) which rotatably holds the rod (32) and which is rotated about a shaft, and in that when the moving plate is rotated, and when the lock of the lower shaft (22) is released by the regulation section, the front end of the rod attached to the panel is moved to the

front side while the panel being upwardly opened, and when the lock of the upper shaft (23) is released, the front of the rod is moved to the front side gradually downwardly while the panel being downwardly opened.

16. The air conditioner according to claim 15, wherein a left and right pair of the rods are arranged outside the blow-out port in the left and right direction of the cabinet (3), and in that the rod (32) is formed to have a circular cross section.

Patentansprüche

1. Klimaanlagenvorrichtung, die Folgendes aufweist: einen Ausblasekanal (5), der in der Vorderseite eines Gehäuses (3) gebildet ist, eine die Vorderseite bedeckende Platte (20); eine obere Achse (23), die in einem oberen Teil der Platte (20) bereitgestellt ist, und eine untere Achse (22), die in einem unteren Teil der Platte bereitgestellt ist; wobei die Platte so gestaltet ist, dass sie um die obere und untere Achse (22, 23) aufwärts und abwärts geöffnet werden kann; und einen Öffnungs- und Schließmechanismus, durch den die Platte zum Öffnen und Schließen gemäß einem Betriebszustand bewegt wird, **dadurch gekennzeichnet, dass** der Öffnungs- und Schließmechanismus einen Einstellabschnitt (51) beinhaltet, der die Öffnungsrichtung der Platte (20) einstellt, und dass der Einstellabschnitt (51) durch Halten von einer von der oberen und unteren Achse (22, 23) einen von dem Aufwärts- und Abwärtsöffnungsbetrieb zulässt und dass der Einstellabschnitt (51) ein Paar aus einem oberen und einem unteren Halteabschnitt, das die obere und die untere Achse (22, 23) hält, und einen Antriebsabschnitt (56), der die Halteabschnitte betreibt, beinhaltet und dass die Halteabschnitte einen oberen Haken (52), der die obere Achse der Platte (20) hält, und einen unteren Haken (53), der die untere Achse (22) der Platte (20) hält, beinhalten und dass beim Aufwärtsöffnen der Platte (20) der untere Haken (53) die untere Achse (22) auslöst und der obere Haken (52) sich an der oberen Achse (23) verhakt und sie drehbar hält und beim Abwärtsöffnen der Platte (20) der obere Haken (52) die obere Achse (23) auslöst und der untere Haken (53) sich an der unteren Achse (22) verhakt und sie drehbar hält.

2. Klimaanlagenvorrichtung nach Anspruch 1, wobei der Antriebsabschnitt (56) unabhängig bereitgestellt ist, um sowohl dem oberen Haken (52) als auch dem unteren Haken (53) zu entsprechen.

3. Klimaanlagenvorrichtung nach Anspruch 1, wobei beim Schließen der Platte (20) der Einstellabschnitt (51) die obere Achse (22) mit dem oberen Haken (52) verhakt und die untere Achse (23) mit dem unteren Haken (53) verhakt.

4. Klimaanlagenvorrichtung nach Anspruch 1, wobei beim Öffnen der Platte (20) und beim Ändern der Öffnungsrichtung der Platte (20) der Einstellabschnitt (51) die Platte (20) einmal schließt, um die obere Achse und die untere Achse verhaken zu lassen, und dann die Verhakung von einer von der oberen und der unteren Achse (22, 23) löst.

5. Klimaanlagenvorrichtung nach Anspruch 1, wobei der Einstellabschnitt einen Verbindungsabschnitt (55), der obere und untere Haken (52, 53) mechanisch miteinander verbindet, um die Haken zu betätigen, und einen Änderungsabschnitt (54), der die Betätigung von jedem der Haken zum Ändern der Öffnungsrichtung einstellt, aufweist.

6. Klimaanlagenvorrichtung nach Anspruch 5, wobei beim Bewegen von einem der Haken der Änderungsabschnitt (54) die Bewegung des anderen Hakens einstellt, um dadurch die Bewegung von jedem der Haken gemäß der Öffnungsrichtung zu bestimmen.

7. Klimaanlagenvorrichtung nach Anspruch 5, wobei der Verbindungsabschnitt (55) ein drehbares Verbindungsstück und ein Paar aus einem oberen und einem unteren Glied (64, 65), die das Verbindungsstück (66) mit jedem der Haken (52, 53) verbinden, aufweist und dass jedes der Glieder durch die Drehung des Verbindungsstücks zusammenarbeitend zwischen feststehenden Achsen (61) der Haken (52, 53) und einer feststehenden Achse (67) des Verbindungsstücks (66) bewegt wird, so dass die jeweiligen Haken bewegt werden.

8. Klimaanlagenvorrichtung nach Anspruch 7, wobei das andere Ende des oberen Glieds (64) und des unteren Glieds (65) drehbar an dem Verbindungsstück (66) angebracht sind, wobei der obere Haken (52) drehbar am einen Ende des oberen Glieds (64) gelagert ist, wobei der untere Haken (53) drehbar an dem einen Ende des unteren Glieds (65) gelagert ist, wobei der Änderungsabschnitt die Bewegung des anderen Endes von jedem der Glieder führt, wobei beim Drehen des Verbindungsstücks (66) im Uhrzeigersinn das eine Ende des oberen Glieds (64) nicht bewegt wird und die Bewegung des oberen Hakens eingestellt wird, das eine Ende des unteren Glieds (65) bewegt wird und der untere Haken (53) bewegt wird und die Verhakung der unteren Achse (22) gelöst wird und wobei beim Drehen des Verbindungsstücks (66) entgegen dem Uhrzeigersinn das eine Ende des unteren Glieds (65) nicht bewegt wird und die Bewegung des unteren Hakens (53) eingestellt wird, während das eine Ende des oberen Glieds

(64) bewegt wird und der obere Haken (52) bewegt wird und die Verhakung der oberen Achse (23) gelöst wird.

9. Klimaanlagenvorrichtung nach Anspruch 1, wobei die obere und die untere Achse (22, 23) jeweils auf jeder der linken und der rechten Seite der Platte (20) bereitgestellt sind und dass der Einstellabschnitt (51) sowohl auf der linken als auch der rechten Seite angeordnet ist, so dass der linke und der rechte Einstellabschnitt zusammenarbeitend betrieben werden.

10. Klimaanlagenvorrichtung nach Anspruch 1, wobei der Öffnungs- und Schließmechanismus einen Bewegungsabschnitt (50) aufweist, der die Platte (20) durch Hin- und Herbewegen einer Stange (32) nahe an das und weg von dem Gehäuse (3) bewegt, dass der Bewegungsabschnitt gestaltet ist, um beim Öffnen der Platte die Platte (20) in der Richtung vom Gehäuse (3) weg zu bewegen, und gestaltet ist, um beim Schließen der Platte (20) die Platte (20) in der Richtung nahe an das Gehäuse (3) zu bewegen, und dass der Öffnungs- und Schließmechanismus die Platte (20) durch Vorwärtsbewegen der Stange durch den Bewegungsabschnitt (50) in einer von der Aufwärts- und der Abwärtsrichtung öffnet, während er die Öffnungsrichtung der Platte (20) einstellt.

11. Klimaanlagenvorrichtung nach Anspruch 10, wobei die Stange (32) bereitgestellt ist, um in das bzw. aus dem Gehäuse (3) hinein- und herausbewegt zu werden, dass die Stange (32) die Platte (20) drehbar zwischen der oberen und unteren Achse (22, 23) lagert und dass die Platte durch den Öffnungs- und Schließmechanismus so aufwärts und abwärts geöffnet wird, dass die Stange (32) durch den Bewegungsabschnitt (50) vorwärtsbewegt wird, während die Öffnungsrichtung der Platte (20) durch den Einstellabschnitt (51) eingestellt wird.

12. Klimaanlagenvorrichtung nach Anspruch 11, wobei die Platte (20) um die obere Achse (23) gedreht wird, um aufwärts geöffnet zu werden, und um die untere Achse (22) gedreht wird, um abwärts geöffnet zu werden, und dass der Öffnungswinkel zu dem Zeitpunkt, an dem die Platte aufwärts geöffnet wird, größer als der Öffnungswinkel zu dem Zeitpunkt, an dem die Platte (20) abwärts geöffnet wird, eingestellt ist.

13. Klimaanlagenvorrichtung nach Anspruch 12, wobei die Stange (32) näher an der oberen Achse (23) der Platte (20) angebracht ist.

14. Klimaanlagenvorrichtung nach Anspruch 13, wobei der Bewegungsgrad der Stange (32) zu dem Zeitpunkt, an dem die Platte aufwärts geöffnet wird, der gleiche wie der Bewegungsgrad der Stange (32) zu dem Zeitpunkt ist, an dem die Platte abwärts geöffnet wird.

15. Klimaanlagenvorrichtung nach Anspruch 11, wobei der Bewegungsabschnitt (50) ein Bewegungselement (81) beinhaltet, das die Stange (32) drehbar hält und das um eine Achse gedreht wird, und dass beim Drehen des Bewegungselements und beim Lösen der Verhakung der unteren Achse (22) durch den Einstellabschnitt das an der Platte angebrachte vordere Ende der Stange zur Vorderseite bewegt wird, während die Platte aufwärts geöffnet wird, und beim Lösen der Verhakung der oberen Achse (23) das Vorderteil der Stange allmählich abwärts zur Vorderseite bewegt wird, während die Platte abwärts geöffnet wird.

16. Klimaanlagenvorrichtung nach Anspruch 15, wobei ein linkes und rechtes Paar der Stangen außerhalb des Ausblasekanals in der Links- und Rechtsrichtung des Gehäuses (3) angeordnet sind und dass die Stange (32) so gebildet ist, dass sie einen kreisförmigen Querschnitt hat.

Revendications

1. Conditionneur d'air comportant : un orifice de sortie de soufflage (5) formé dans la surface avant d'un boîtier (3), un panneau (20) recouvrant la surface avant ; un arbre supérieur (23) mis en œuvre dans une partie supérieure du panneau (20) et un arbre inférieur (22) mis en œuvre dans une partie inférieure du panneau ; le panneau étant configuré pour être en mesure d'être ouvert vers le haut et vers le bas autour des arbres supérieur et inférieur (22, 23) ; et un mécanisme d'ouverture et de fermeture, au moyen duquel le panneau est déplacé pour être ouvert et fermé en fonction d'un état de fonctionnement, **caractérisé en ce que** le mécanisme d'ouverture et de fermeture comprend une section de régulation (51) qui régule la direction d'ouverture du panneau (20), et **en ce que** la section de régulation (51), en retenant l'un des arbres supérieur et inférieur (22, 23), permet l'une parmi une opération d'ouverture vers le haut et une opération d'ouverture vers le bas, et **en ce que** la section de régulation (51) comprend une paire de sections de retenue supérieure et inférieure servant à retenir les arbres supérieur et inférieur (22, 23) et une section d'entraînement (56) qui actionne les sections de retenue, et **en ce que** les sections de retenue comprennent un crochet supérieur (52) retenant l'arbre supérieur du panneau (20) et un crochet inférieur (53) retenant l'arbre inférieur (22) du panneau (20), et **en ce que**, quand le panneau (20) est ouvert vers le haut, le crochet inférieur (53) libère l'arbre inférieur (22), et le crochet supé-

rieur (52) verrouille et retient de manière rotative l'arbre supérieur (23), et, quand le panneau (20) est ouvert vers le bas, le crochet supérieur (52) libère l'arbre supérieur (23) et le crochet inférieur (53) verrouille et retient de manière rotative l'arbre inférieur (22).

2. Conditionneur d'air selon la revendication 1, dans lequel la section d'entraînement (56) est mise en œuvre de manière indépendante de manière à correspondre à chacun parmi le crochet supérieur (52) et le crochet inférieur (53).

3. Conditionneur d'air selon la revendication 1, dans lequel, quand le panneau (20) est fermé, la section de régulation (51) verrouille l'arbre supérieur (22) au moyen du crochet supérieur (52) et verrouille l'arbre inférieur (23) au moyen du crochet inférieur (53).

4. Conditionneur d'air selon la revendication 1, dans lequel, quand le panneau (20) est ouvert et quand la direction d'ouverture du panneau (20) est changée, la section de régulation (51) ferme une fois le panneau (20) pour verrouiller l'arbre supérieur et l'arbre inférieur, et puis libère le verrou de l'un des arbres supérieur et inférieur (22, 23).

5. Conditionneur d'air selon la revendication 1, dans lequel la section de régulation comporte une section de liaison (55) qui raccorde mécaniquement les crochets supérieur et inférieur (52, 53) l'un par rapport à l'autre pour actionner les crochets, et une section de changement (54) qui régule le fonctionnement de chacun des crochets pour changer la direction d'ouverture.

6. Conditionneur d'air selon la revendication 5, dans lequel, quand l'un des crochets est déplacé, la section de changement (54) régule le mouvement de l'autre crochet, pour de ce fait déterminer le mouvement de chacun des crochets en fonction de la direction d'ouverture.

7. Conditionneur d'air selon la revendication 5, dans lequel la section de liaison (55) comprend une plaque de liaison rotative et une paire d'éléments de liaison supérieur et inférieur (64, 65) qui raccordent la plaque de liaison (66) à chacun des crochets (52, 53), et en ce que chacun des éléments de liaison est déplacé en association l'un par rapport à l'autre entre des arbres fixes (61) des crochets (52, 53) et un arbre fixe (67) de la plaque de liaison (66) par la rotation de la plaque de liaison de telle sorte que les crochets respectifs sont déplacés.

8. Conditionneur d'air selon la revendication 7, dans lequel l'autre extrémité de l'élément de liaison supérieur (64) et celle de l'élément de liaison inférieur (65) sont attachées de manière rotative à la plaque de liaison (66), dans lequel le crochet supérieur (52) est supporté de manière rotative au niveau de ladite une extrémité de l'élément de liaison supérieur (64), dans lequel le crochet inférieur (53) est supporté de manière rotative au niveau de ladite une extrémité de l'élément de liaison inférieur (65), dans lequel la section de changement guide le mouvement de l'autre extrémité de chacun des éléments de liaison, dans lequel, quand la plaque de liaison (66) est tournée dans le sens des aiguilles d'une montre, ladite une extrémité de l'élément de liaison supérieur (64) n'est pas déplacée et le mouvement du crochet supérieur est régulé, ladite une extrémité de l'élément de liaison inférieur (65) est déplacée et le crochet inférieur (53) est déplacé et le verrou de l'arbre inférieur (22) est libéré, et dans lequel, quand la plaque de liaison (66) est tournée dans le sens inverse des aiguilles d'une montre, ladite une extrémité de l'élément de liaison inférieur (65) n'est pas déplacée et le mouvement du crochet inférieur (53) est régulé alors que ladite une extrémité de l'élément de liaison supérieur (64) est déplacée et le crochet supérieur (52) est déplacé et le verrou de l'arbre supérieur (23) est libéré.

9. Conditionneur d'air selon la revendication 1, dans lequel les arbres supérieur et inférieur (22, 23) sont respectivement mis en œuvre sur chacun des côtés gauche et droit du panneau (20) et en ce que la section de régulation (51) est agencée sur les deux côtés gauche et droit de telle sorte que les sections de régulation gauche et droite sont actionnées en association l'une par rapport à l'autre.

10. Conditionneur d'air selon la revendication 1, dans lequel le mécanisme d'ouverture et de fermeture comprend une section de déplacement (50) qui déplace le panneau (20) à des fins de rapprochement et d'éloignement du boîtier (3) par un mouvement de va et vient d'une tige (32), en ce que la section de déplacement est configurée, quand le panneau est ouvert, pour déplacer le panneau (20) dans la direction allant en s'éloignant du boîtier (3), et est configurée, quand le panneau (20) est fermé, pour déplacer le panneau (20) dans la direction allant en se rapprochant du boîtier (3), et en ce que le mécanisme d'ouverture et de fermeture ouvre le panneau (20) dans l'une parmi les directions allant vers le haut et allant vers le bas en déplaçant la tige vers l'avant par la section de déplacement (50) tout en régulant la direction d'ouverture du panneau (20).

11. Conditionneur d'air selon la revendication 10, dans lequel la tige (32) est mise en œuvre de manière à être déplacée dans et hors du boîtier (3), en ce que la tige (32) supporte de manière rotative le panneau (20) entre les arbres supérieur et inférieur (22, 23),

et en ce que le panneau est ouvert vers le haut ou vers le bas par le mécanisme d'ouverture et de fermeture d'une telle manière que la tige (32) est déplacée vers l'avant par la section de déplacement (50) alors que la direction d'ouverture du panneau (20) est régulée par la section de régulation (51).

12. Conditionneur d'air selon la revendication 11, dans lequel le panneau (20) tourne autour de l'arbre supérieur (23) de manière à être ouvert vers le haut et tourne autour de l'arbre inférieur (22) de manière à être ouvert vers le bas, et en ce que l'angle d'ouverture au moment où le panneau est ouvert vers le haut est réglé comme étant supérieur par rapport à l'angle d'ouverture au moment où le panneau (20) est ouvert vers le bas.

13. Conditionneur d'air selon la revendication 12, dans lequel la tige (32) est attachée plus près de l'arbre supérieur (23) du panneau (20).

14. Conditionneur d'air selon la revendication 13, dans lequel la quantité de déplacement de la tige (32) au moment où le panneau est ouvert vers le haut est identique à la quantité de déplacement de la tige (32) au moment où le panneau est ouvert vers le bas.

15. Conditionneur d'air selon la revendication 11, dans lequel la section de déplacement (50) comprend une plaque de déplacement (81) qui retient la tige (32) de manière rotative et qui tourne autour d'un arbre, et en ce que, quand la plaque de déplacement est tournée, et quand le verrou de l'arbre inférieur (22) est libéré par la section de régulation, l'extrémité avant de la tige attachée au panneau est déplacée jusque sur le côté avant alors que le panneau est ouvert vers le haut, et quand le verrou de l'arbre supérieur (23) est libéré, la partie avant de la tige est déplacée jusque sur le côté avant progressivement vers le bas alors que le panneau est ouvert vers le bas.

16. Conditionneur d'air selon la revendication 15, dans lequel une paire gauche et une paire droite des tiges sont agencées à l'extérieur de l'orifice de sortie de soufflage dans la direction gauche et la direction droite du boîtier (3), et en ce que la tige (32) est formée pour avoir une coupe transversale circulaire.

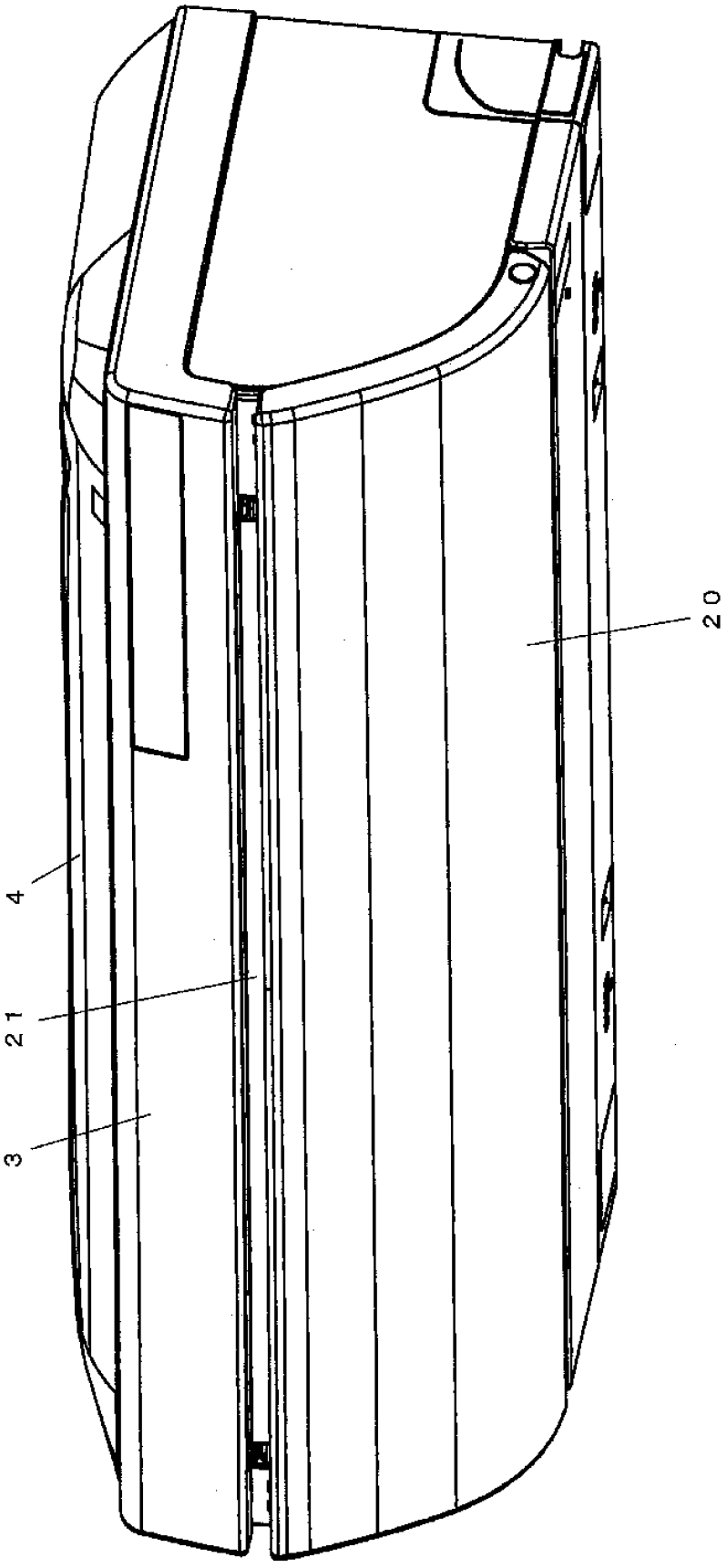


FIG. 1

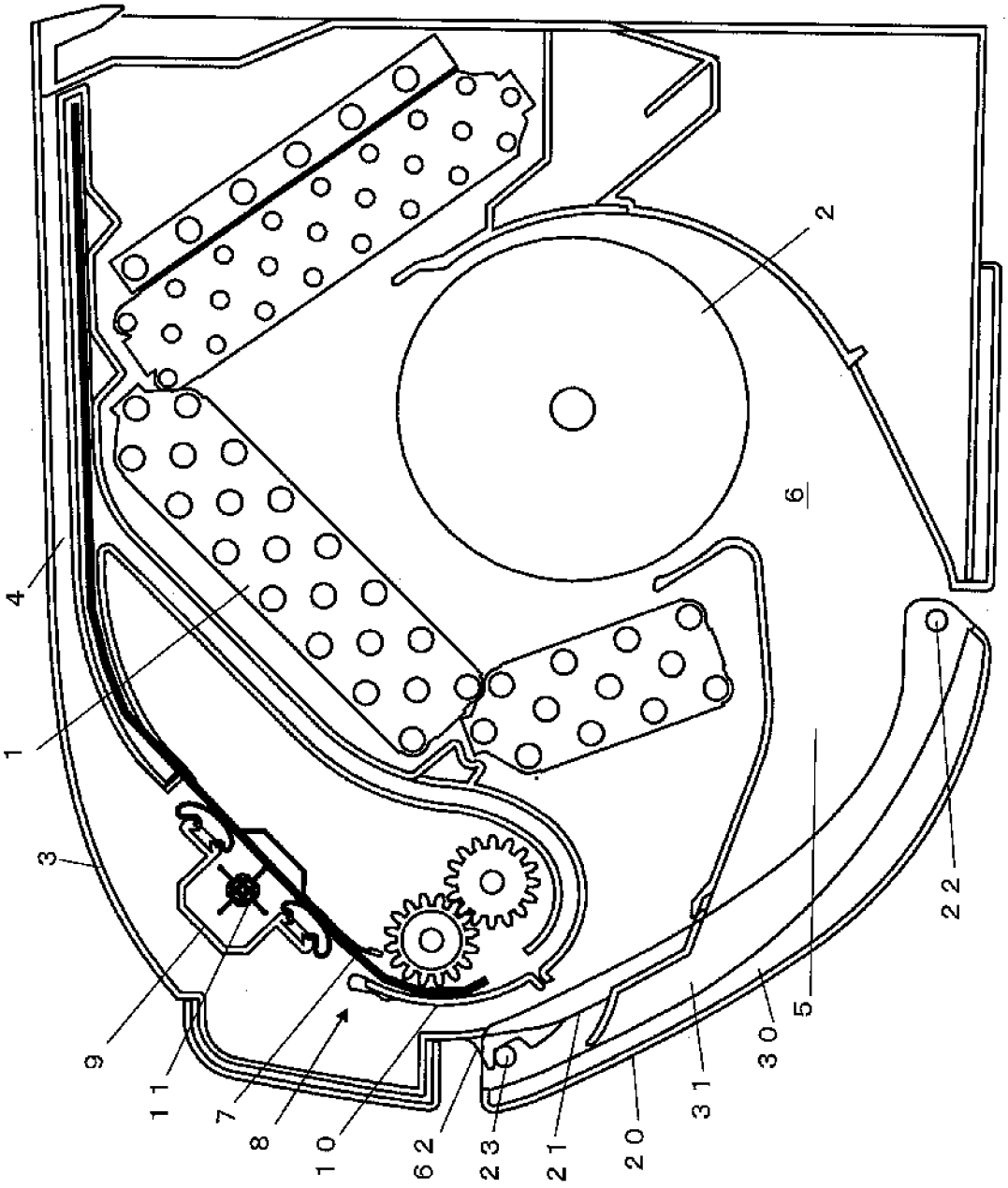


FIG. 2

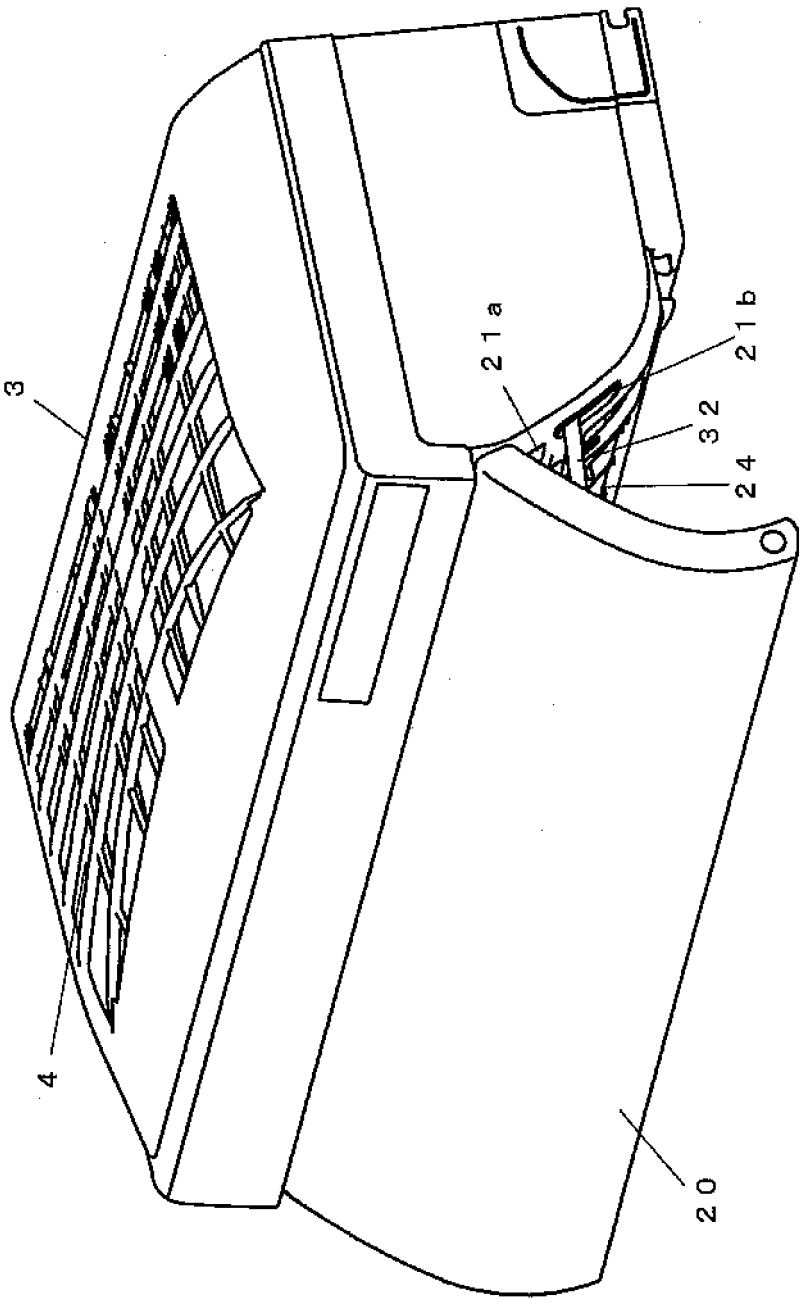


FIG. 3

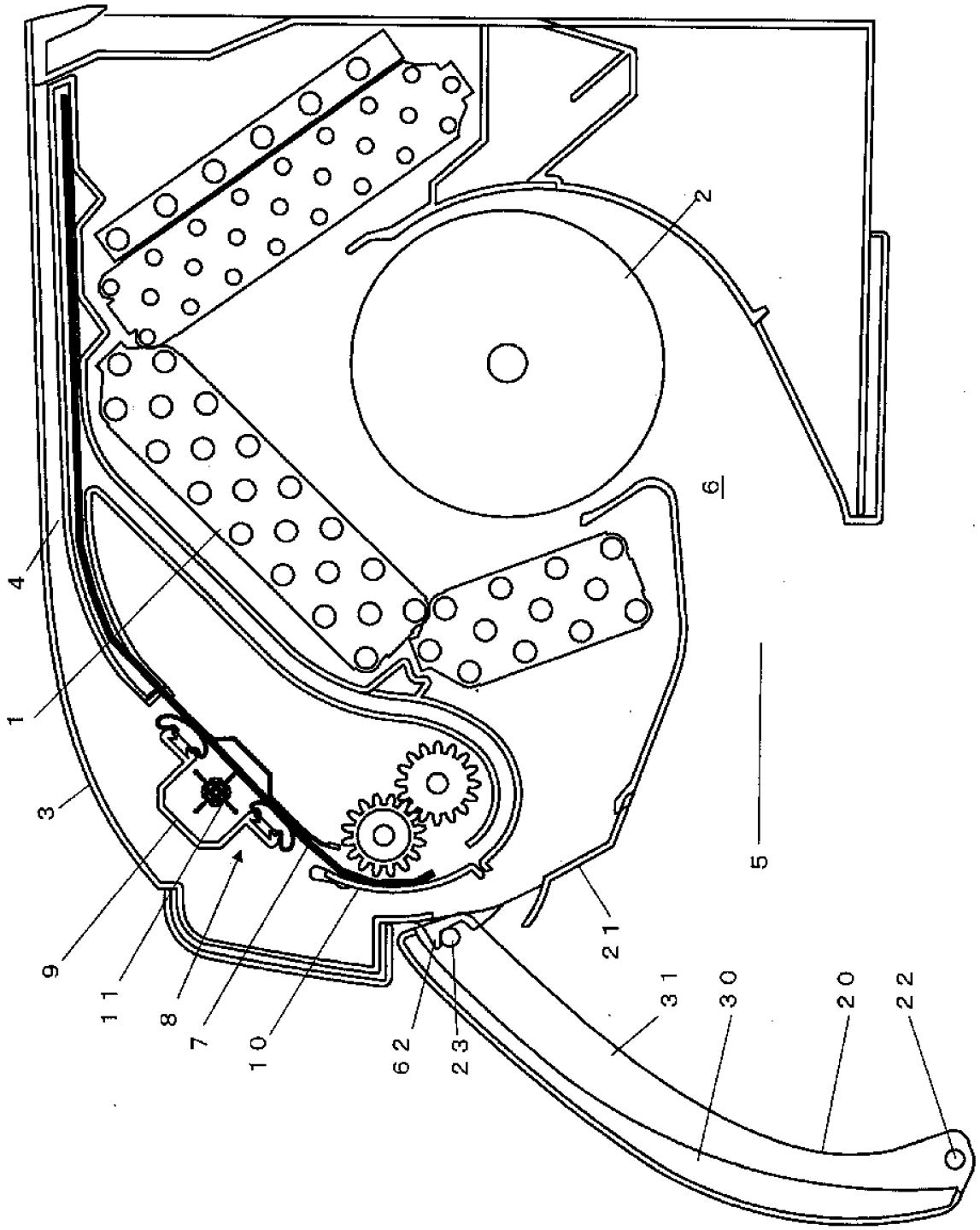


FIG. 4

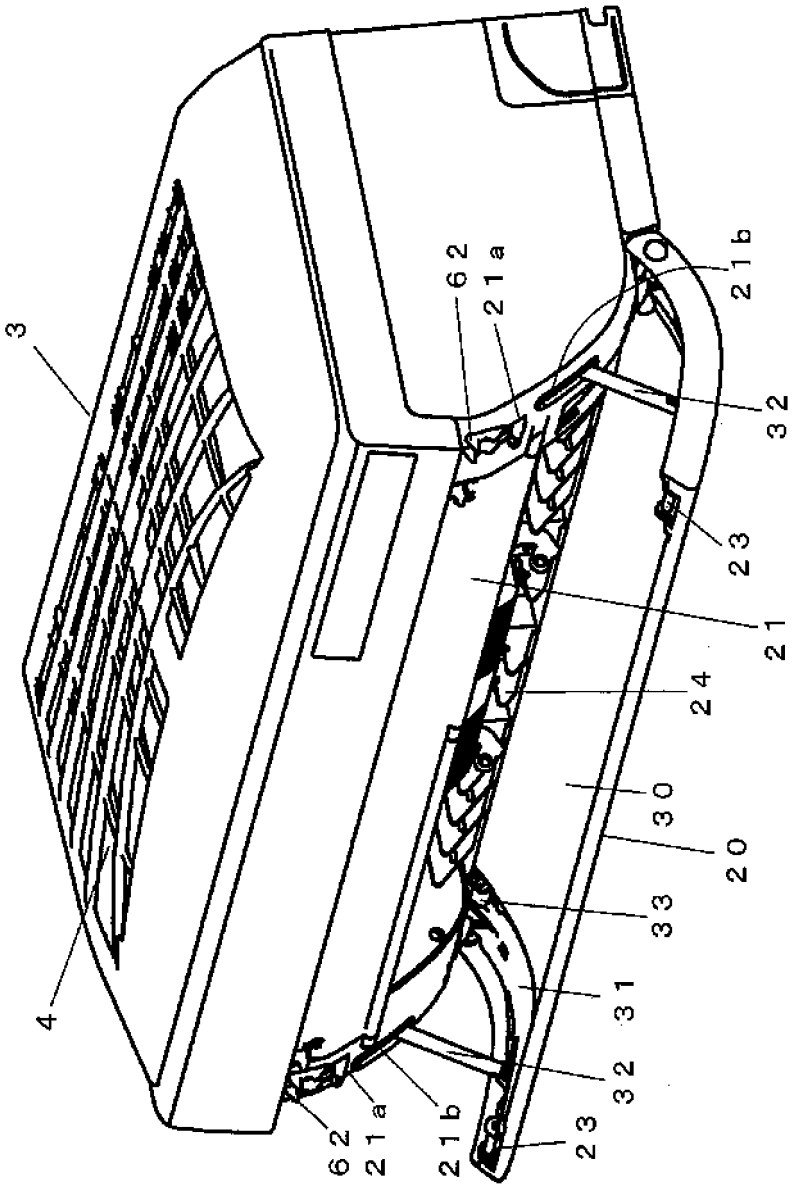


FIG. 5

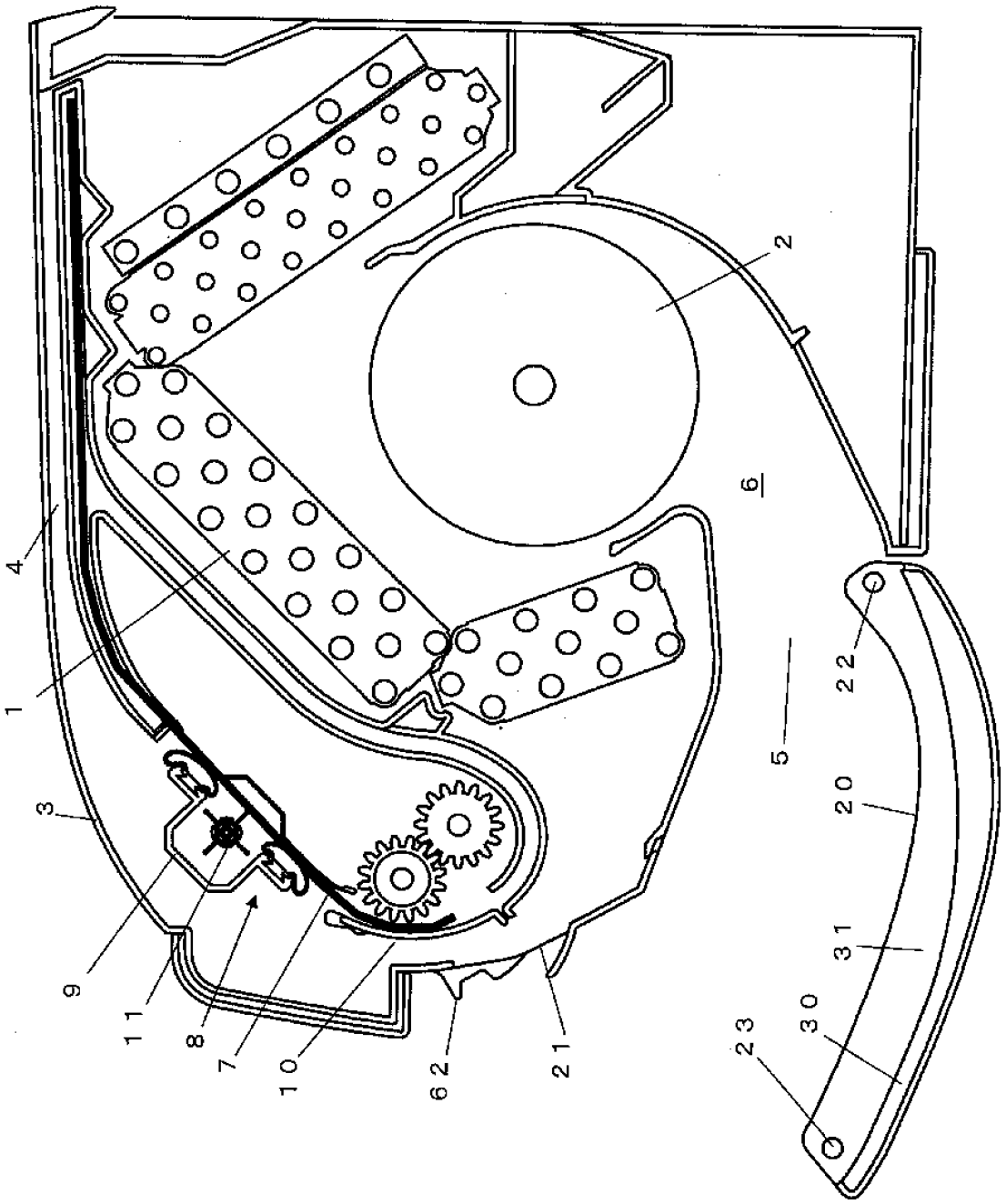
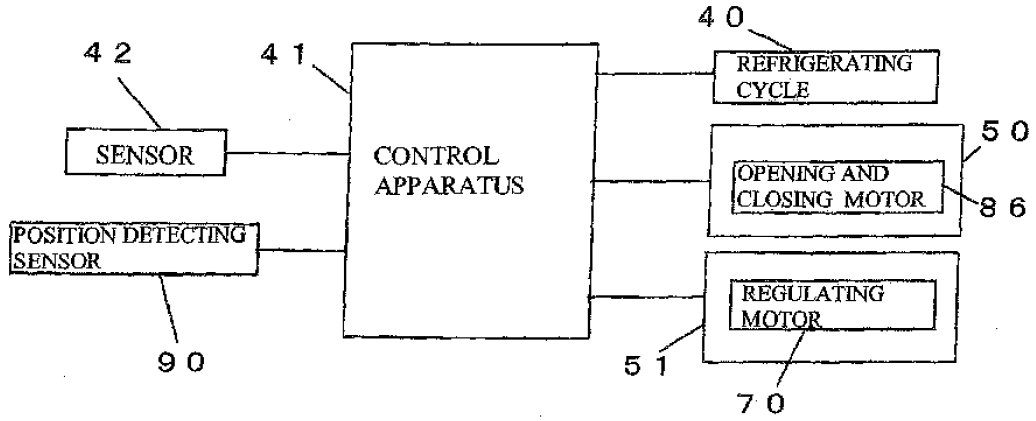


FIG. 6

FIG. 7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42
41
REFRIGERATING CYCLE
SENSOR
CONTROL APPARATUS
50
OPENING AND CLOSING MOTOR
86
POSITION DETECTING SENSOR
REGULATING MOTOR
90
51
70

FIG. 8

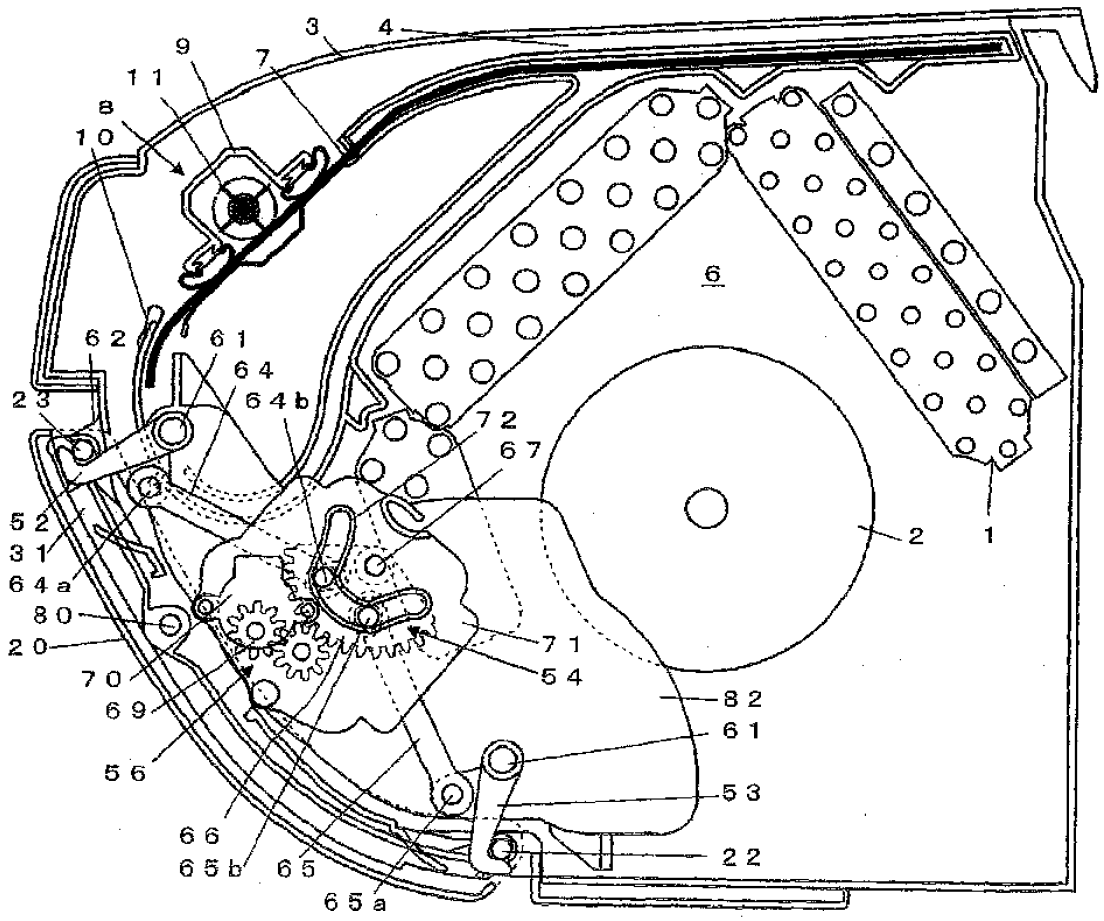
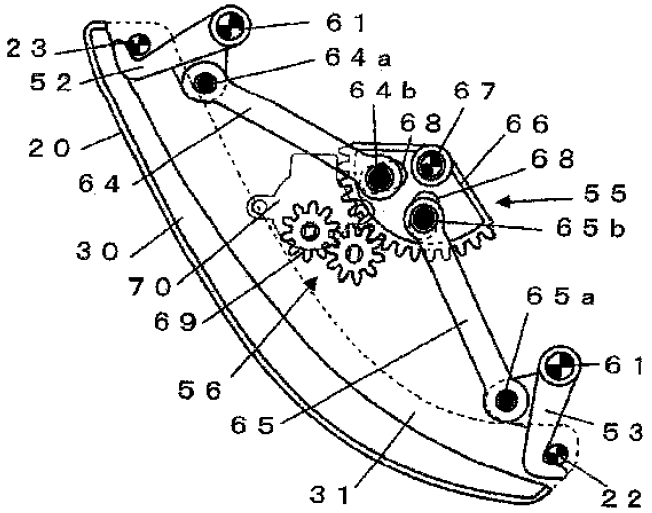

3
4
9
7
11
8
10
6
62
61
64
64b
23
72
67
52
31
64a
80
20
71
70
54
69
82
61
56
53
66
65b
65
22
65a
2
1

FIG. 9

(a)


61
23
64a
52
64b
67
68
66
20
68
64
55
65b
30
70
65a
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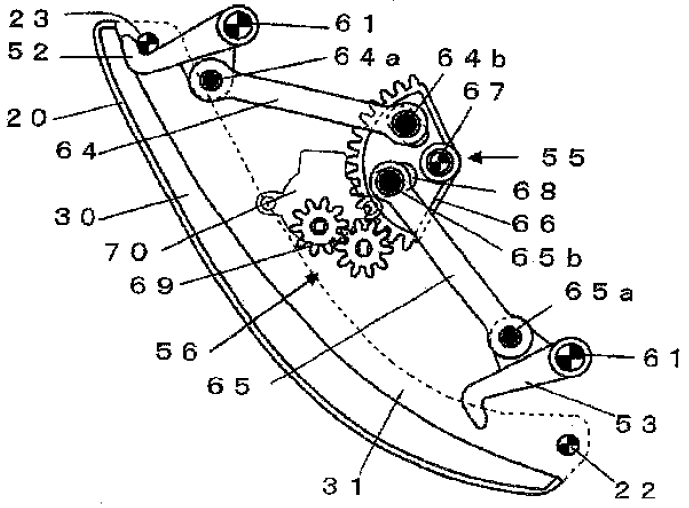
61
56
53
65
31
22

(b)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64a
64b
67
20
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68
30
66
70
65b
69
65a
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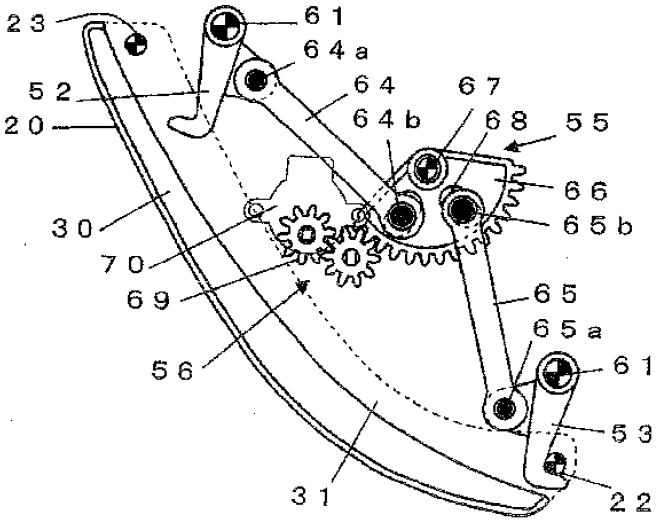
56
65
53
31
22

(c)


23
61
64a
52
64
67
20
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55
66
30
65b
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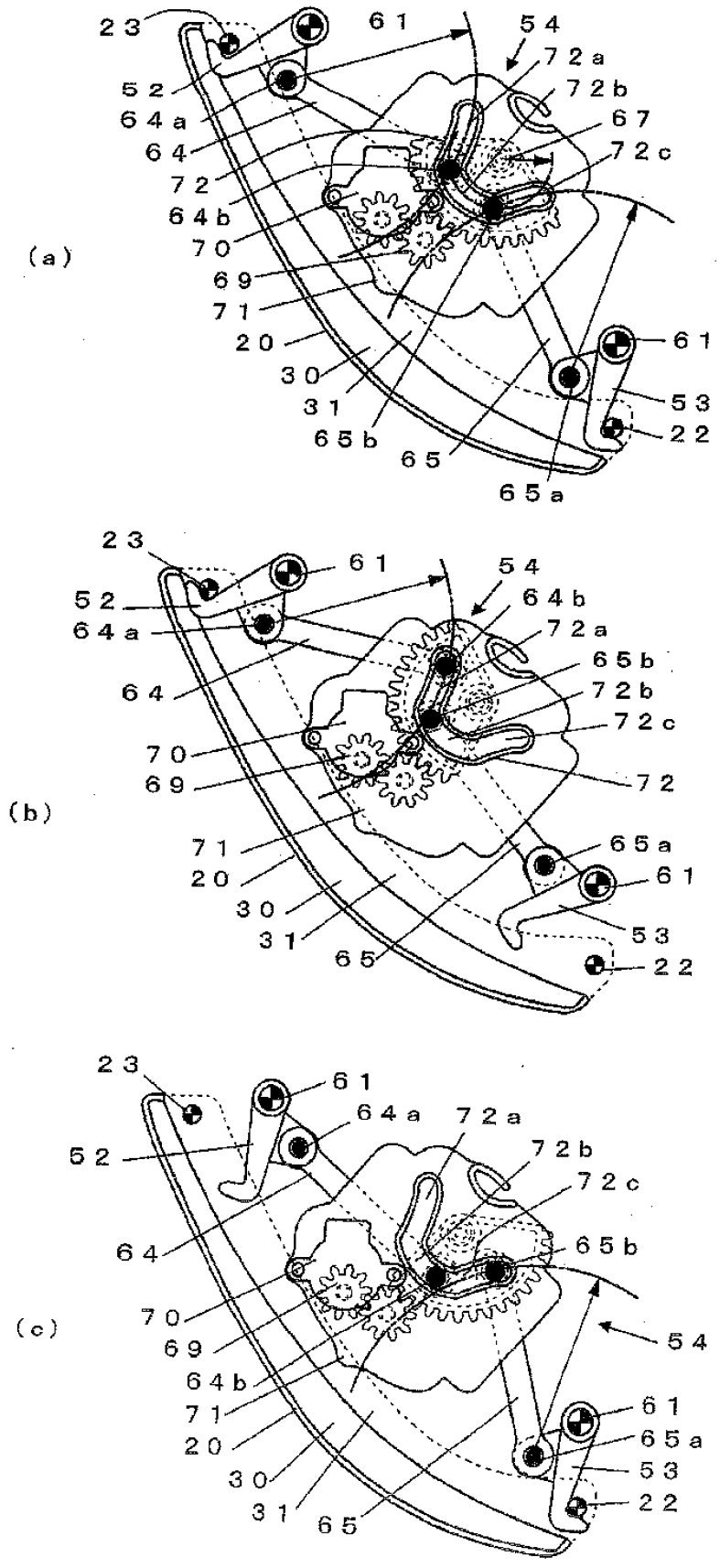
65
69
65a
61
56
53
31
22

FIG. 10


(a)
23
61
54
72a
52
72b
64a
67
64
72c
72
64b
70
69
71
20
30
31
65b
65
65a
61
53
22
(b)
23
61
54
52
64b
64a
72a
65b
64
72b
72c
70
69
72
71
65a
20
61
30
53
31
65
22
(c)
23
61
64a
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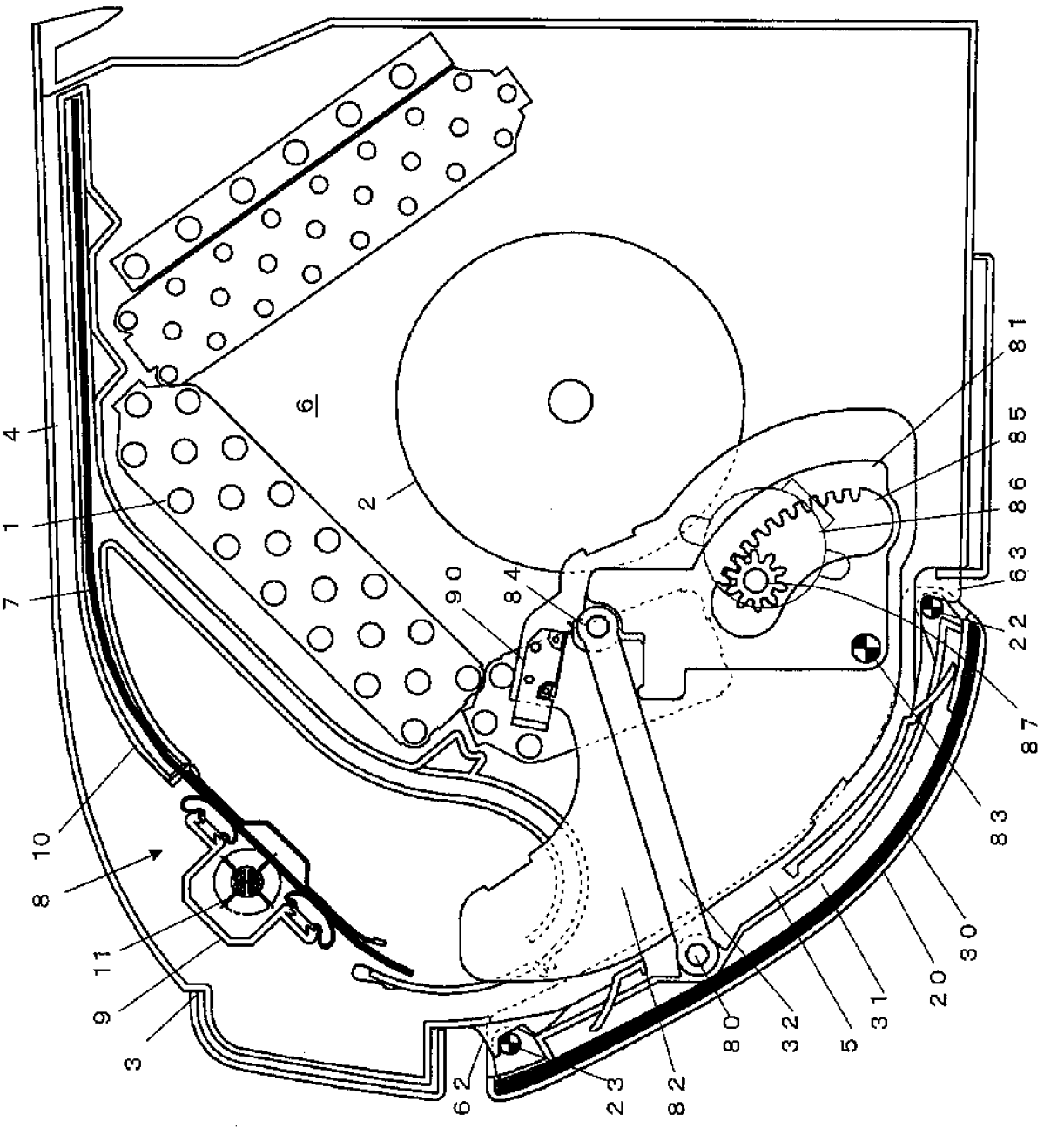

FIG. 11

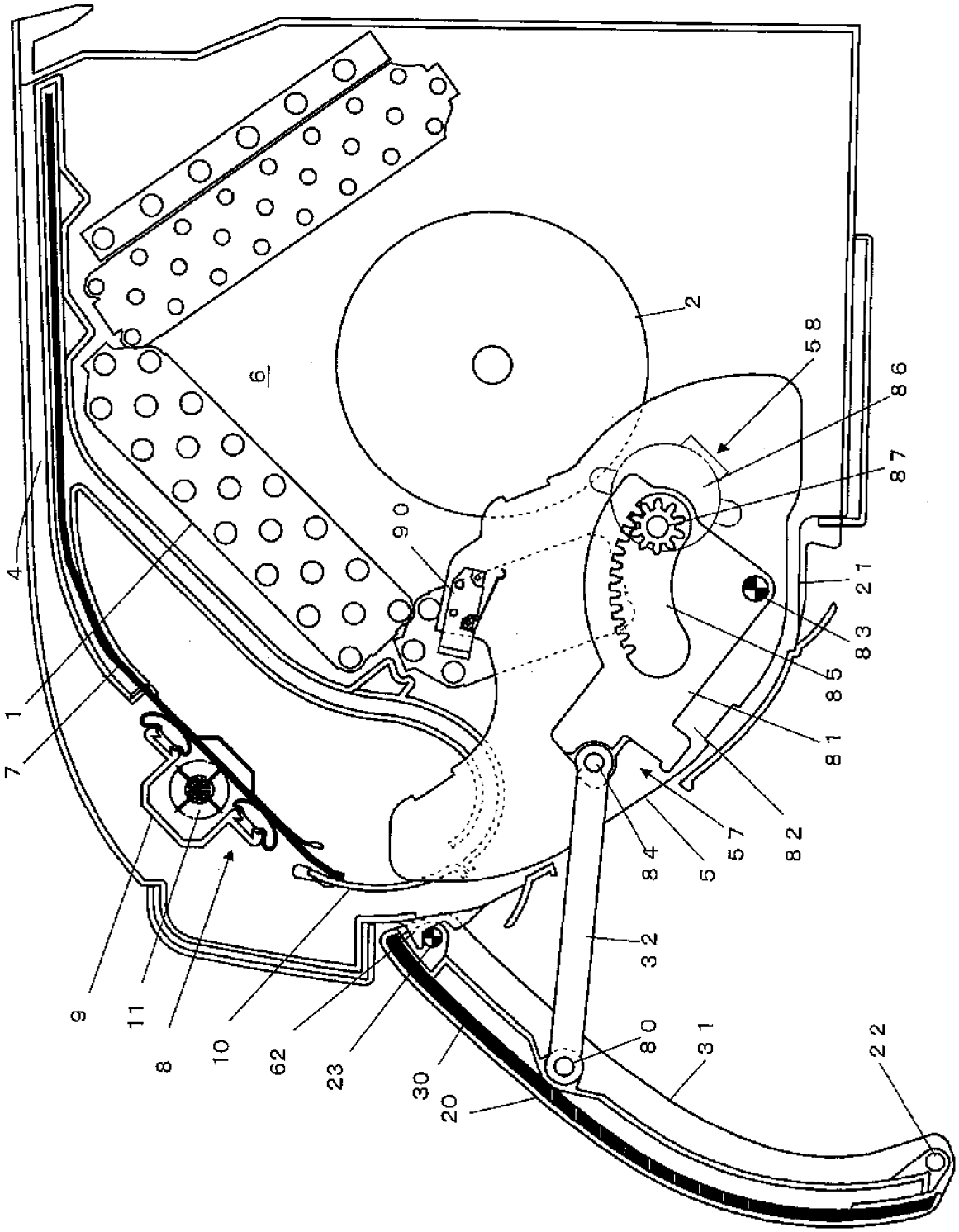
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FIG. 12

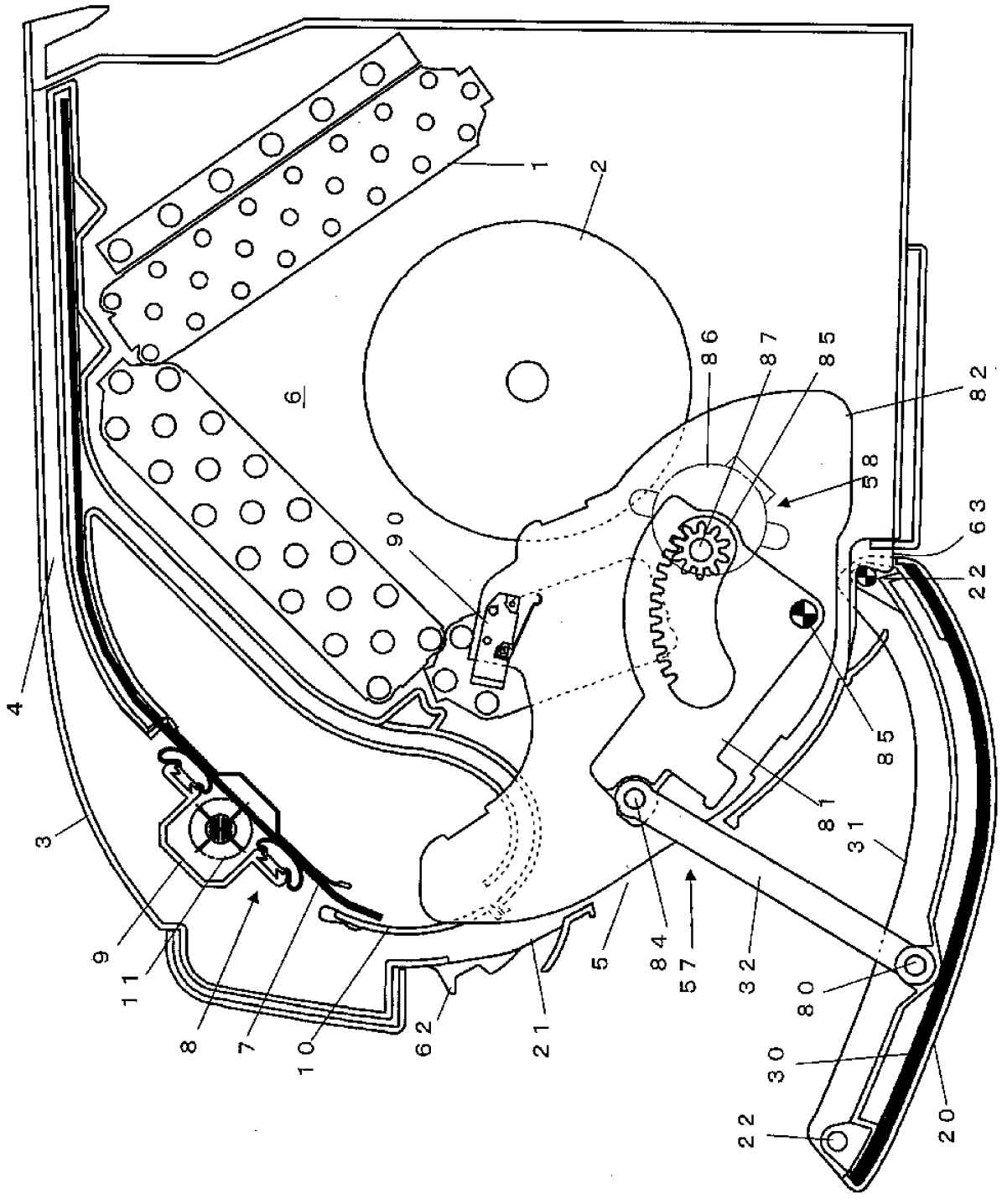
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FIG. 13

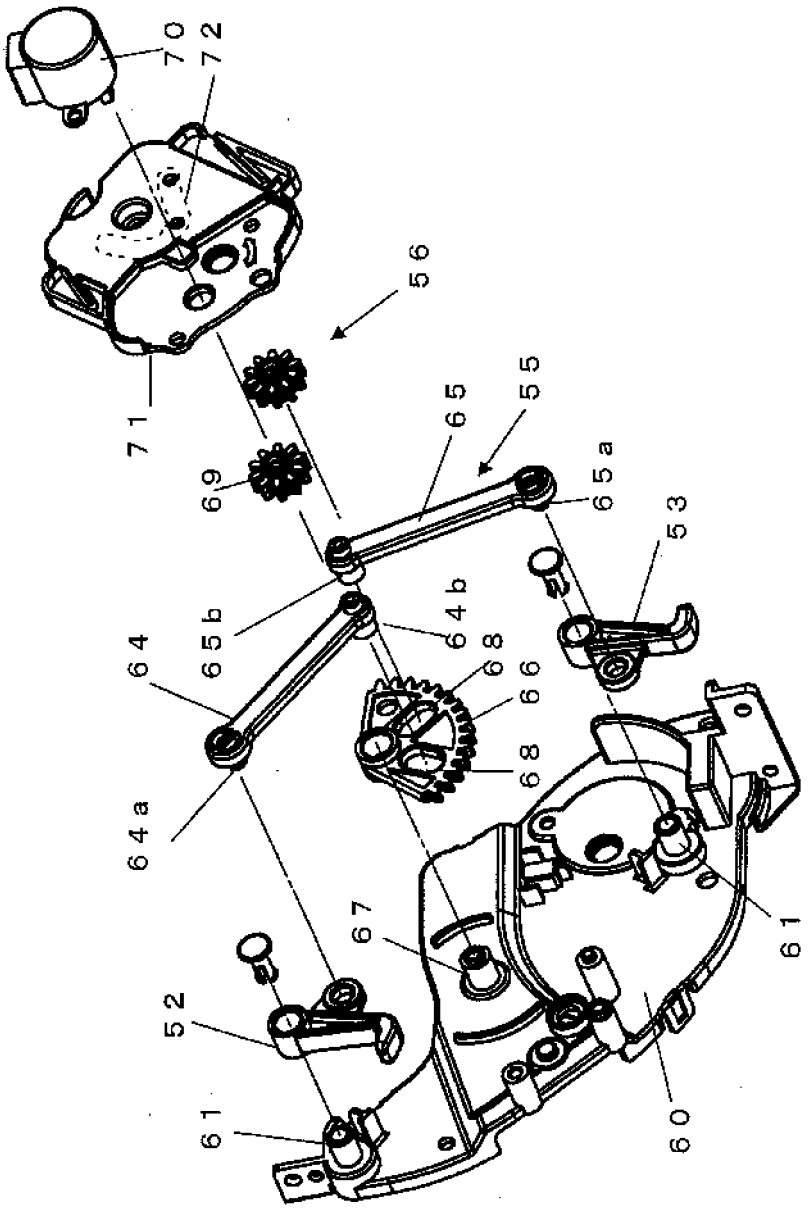


FIG. 14

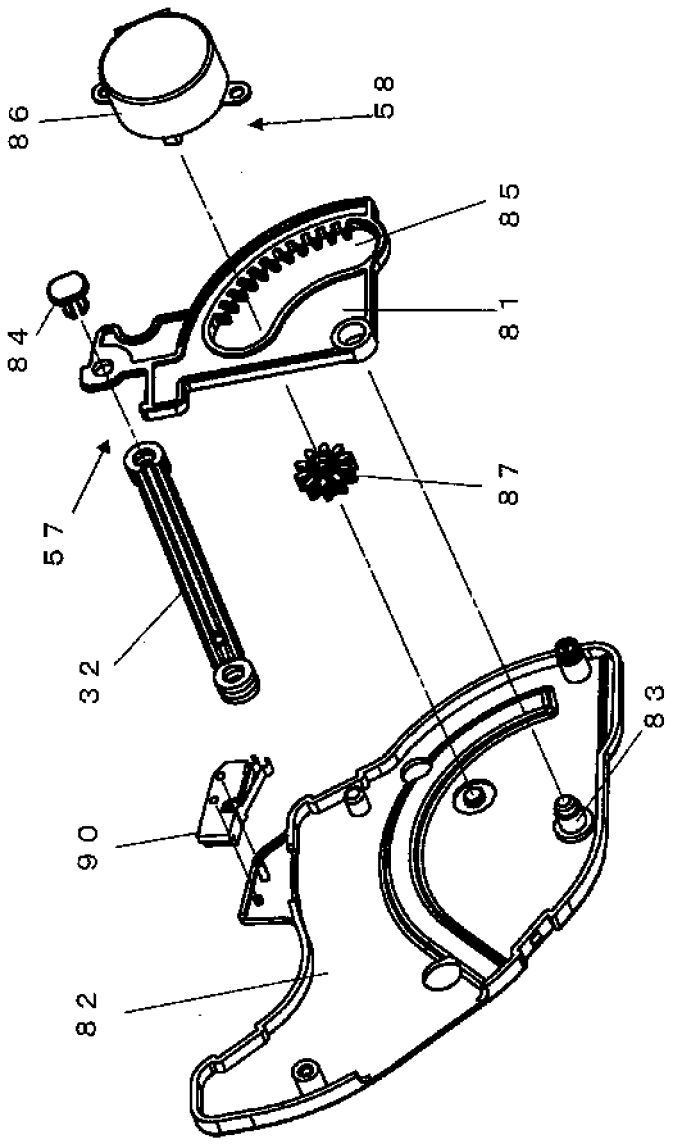
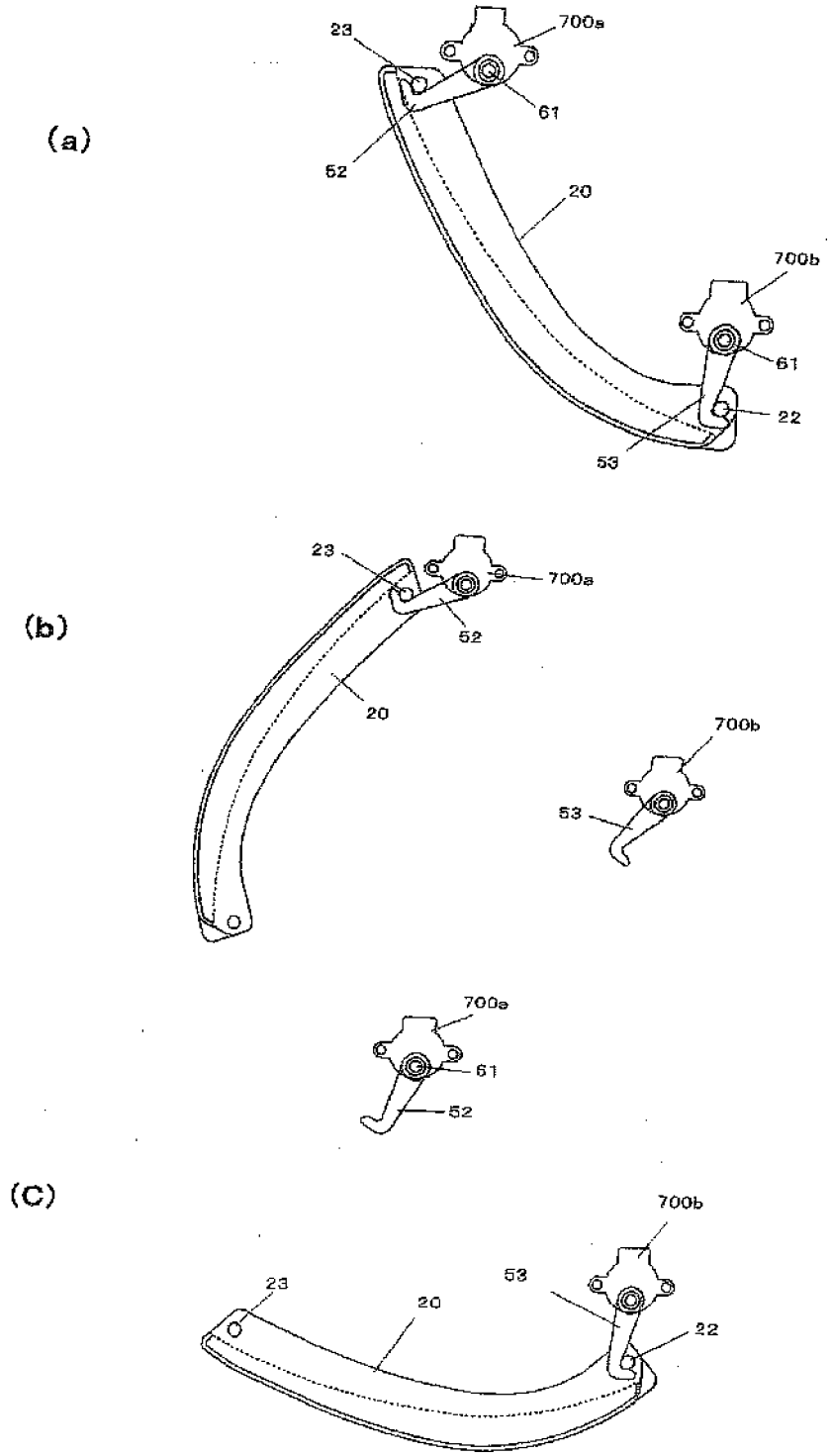


FIG. 15

FIG. 16


(a)
23
700a
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52
20
700b
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22
53
(b)
23
700a
52
20
700b
53
700a
61
52
(C)
700b
53
23
20
22

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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- JP 8247491 A **[0005]**