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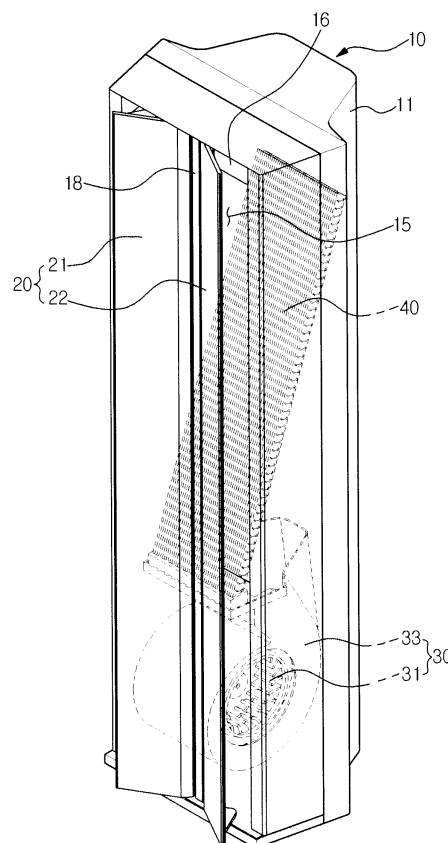
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(54) **Indoor unit of an airconditioner**

(57) Disclosed herein is an air conditioner including a front panel (16) divided into first and second panels (21,22) to be rotated by rotating units (50). The air conditioner may control an air stream to be discharged or a discharge direction of air as rotating angles of the first and second panels (21,22) are controlled by the rotating units (50).

FIG. 1



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Description

BACKGROUND

1. Field

[0001] Embodiments of the present invention relate to an air conditioner including a front panel divided into rotatable first and second panels.

2. Description of the Related Art

[0002] Generally, an air conditioner is an apparatus to cool or warm an indoor space using a refrigerant cycle consisting of a compressor, condenser, expander and heat exchanger, to provide a user with a more pleasant indoor environment.

[0003] A conventional air conditioner includes a cabinet having an open front side, and a front panel coupled to the front side of the cabinet. The front panel is moved forward by a drive unit provided at a rear thereof, thus allowing heat-exchanged air to be discharged between the forwardly moved front panel and both sides of the cabinet.

[0004] However, in the air conditioner having the above-described configuration, discharging the heat-exchanged between the front panel and both sides of the cabinet has a limit to control an air stream to be discharged or a discharge direction of air.

SUMMARY

[0005] Therefore, it is an aspect of the present invention to provide an air conditioner to easily control an air stream to be discharged or a discharge direction of air.

[0006] Additional aspects of the invention will be set forth in part in the description which follows and, in part, will be obvious from the description, or may be learned by practice of the invention.

[0007] In accordance with one aspect of the present invention, an air conditioner includes a cabinet, a front panel provided at a front side of the cabinet and divided into a first panel and a second panel, and rotating units to rotate the first panel and second panel respectively.

[0008] The first panel and second panel may be rotated respectively about one side thereof close to each other, and air in the cabinet may be discharged from opposite sides of the first panel and second panel when the first panel and second panel are rotated by the rotating units.

[0009] The rotating units may respectively rotate the first panel and second panel simultaneously or individually.

[0010] The rotating units may respectively control rotating angles of the first panel and second panel, thus changing an air stream to be discharged.

[0011] A center panel may be provided behind the first panel and second panel and may be exposed via rotation of the first panel and second panel.

[0012] The cabinet may include a body and a front cover coupled to the body, and the center panel may be provided in the center of the front cover.

[0013] Each of the rotating units may include a drive motor, and a rotating member having one end connected to the drive motor and the other end connected to the front panel.

[0014] Each of the rotating units may further include a case mounted to the front cover, and a cover to cover an upper side of the case, and the drive motor and rotating member may be received in the case.

[0015] Brackets may extend from rear surfaces of the first panel and second panel, and each of the brackets may have a protrusion connected to the rotating member.

[0016] The cover may have a guide region through which the protrusion penetrates the cover to thereby be connected to the rotating member.

[0017] The guide region may include a first guide region to guide lateral movement of the first panel or second panel, and a second guide region to guide rotation of the first panel or second panel, the first guide region and second guide region being connected to each other.

[0018] The rotating member may have a connecting hole for connection of the protrusion, and the protrusion may be moved in the connecting hole when being moved along the first guide region for lateral movement of the first panel or second panel.

[0019] In accordance with another aspect of the present invention, an air conditioner includes a cabinet, a front panel provided at a front side of the cabinet and including at least two panels, and rotating units to rotate the panels respectively.

[0020] The front panel may be divided into a first panel and a second panel, and a display panel may be provided behind the first panel and second panel and may be exposed when the first panel and second panel are rotated by the respective rotating units.

[0021] The first panel and second panel may be rotated respectively about one side thereof close to each other, and air in the cabinet may be discharged from opposite sides of the first panel and second panel when the first panel and second panel are rotated by the rotating units.

[0022] The rotating units may respectively control rotating angles of the first panel and second panel, thus changing an air stream to be discharged.

[0023] Each of the rotating units may include a case, a drive motor installed in the case, a rotating member having one end connected to the drive motor and the other end connected to the front panel, and a cover to cover the case.

[0024] The first panel and second panel may be moved laterally by a predetermined distance so as not to interfere with the display panel when being rotated by the rotating units.

[0025] The cover may include a first guide region to guide lateral movement of the front panel, and a second guide region to guide rotation of the front panel, the first guide region and second guide region being connected

to each other.

BRIEF DESCRIPTION OF THE DRAWINGS

[0026] These and/or other aspects of the invention will become apparent and more readily appreciated from the following description of the embodiments, taken in conjunction with the accompanying drawings of which:

FIG. 1 is a perspective view illustrating an air conditioner according to an embodiment of the present invention;

FIG. 2 is an exploded perspective view illustrating a partial configuration of the air conditioner shown in FIG. 1;

FIG. 3 is an exploded perspective view illustrating a coupling relationship of a rotating unit and a front panel shown in FIG. 2; and

FIGS. 4 to 7 are cross sectional views illustrating an operation of the air conditioner shown in FIG. 1.

DETAILED DESCRIPTION

[0027] Reference will now be made in detail to an air conditioner according to the embodiment of the present invention, examples of which are illustrated in the accompanying drawings, wherein like reference numerals refer to like elements throughout.

[0028] The air conditioner according to the embodiment of the present invention, as shown in FIGS. 1 and 2, includes a cabinet 10 defining an external appearance of the air conditioner, and a front panel 20 to cover an entire front side of the cabinet 10.

[0029] The cabinet 10 includes a body 11, and a front cover 16 provided in front of the body 11. The body 11 is formed with an air suction hole (not shown) in a lower position of a side surface or rear surface thereof, through which indoor air is suctioned into the body 11.

[0030] A blower 30 is installed in a lower region of the body 11 and serves to blow the air suctioned into the cabinet 10 through the air suction hole. Also, a heat exchanger 40 is installed in an upper region of the body 11 and serves to heat exchange the air blown by the blower 30.

[0031] The blower 30 includes a fan 31, a drive motor (not shown) to apply rotating force to the fan 31, and a fan duct 33 in which the fan 31 is received. The blower 30, as shown, is arranged orthogonal to a front side of the body 11, to suction air from both sides of the body 11.

[0032] The fan 31 is a conventional centrifugal fan and as described above, serves to suction indoor air into the cabinet 10 and then, discharge the air having passed through the heat exchanger 40 to the outside. The drive motor is coupled to the fan 31 and provides the fan 31 with rotating force. The fan duct 33, as described above,

receives the fan 31 therein and serves to guide the air blown by the fan 31 toward the heat exchanger 40.

[0033] The heat exchanger 40 takes the form of a flat panel to allow the air blown by the blower 30 to be heat exchanged while passing through the heat exchanger 40. The heat exchanger 40 is obliquely installed to divide an upper interior space of the body 11.

[0034] The front cover 16 is provided at a front upper part of the body 11 and has air discharge holes 17 to discharge the heat-exchanged air from the body 11. In addition, the front cover 16 is centrally provided with a display panel 18 that displays general operations of the air conditioner.

[0035] The front panel 20 is provided to cover the entire front side of the cabinet 10. As shown, the front panel 20 includes a first panel 21 and a second panel 22, which are provided individually at left and right sides in front of the front cover 16. The first and second panels 21 and 22 close the front side of the cabinet 10 when the operation of the air conditioner is halted, thus serving to hide the display panel 18 provided at the front cover 16.

[0036] The air conditioner according to the present embodiment includes rotating units 50 to rotate the first and second panels 21 and 22 individually or simultaneously by predetermined angles. The rotating units 50 rotate the first and second panels 21 and 22 respectively about portions of the first and second panels 21 and 22 close to each other, thus serving to define discharge regions 15, through which the heat-exchanged air in the cabinet 10 is discharged from outer sides of the first and second panels 21 and 22.

[0037] In this case, the rotating units 50 may change a direction of air discharged through the discharge regions 15 based on rotating angles of the first and second panels 21 and 22, thereby controlling an air stream to be discharged. In addition, the rotating units 50 may rotate the first and second panels 21 and 22 by different angles, to control a direction of the air discharged through the discharge regions 15.

[0038] The rotating units 50 are provided respectively at both sides of the display panel 18 of the front cover 16. More specifically, each of the rotating units 50, as shown in FIG. 3, includes a case 51, a drive motor 53 received in the case 51, a rotating member 55 coupled to a shaft of the drive motor 53, and a cover 57 to cover an open upper side of the case 51.

[0039] The case 51 is mounted to the front cover 16 and is located at either side of the display panel 18. As described above, the case 51 receives the drive motor 53 and rotating member 55. The drive motor 53 is installed in the case 51 to rotate the rotating member 55.

[0040] The rotating member 55 is rotated in the case 51 by the drive motor 53. The rotating member 55 may be curved to assure smooth rotation thereof in the case 51.

[0041] The rotating member 55 serves to rotate the first and second panels 21 and 22 by predetermined angles via rotation of the drive motor 53. For this, brackets

25 extend rearward from middle positions of rear surfaces of the first and second panels 21 and 22, and protrusions 26 are formed at lower surfaces of the brackets 25. Each of the protrusions 26 is connected to the rotating member 55, and the rotating member has a connecting hole 56 for connection of the protrusion 26. The connecting hole 56 has a predetermined length sufficient to allow the protrusion 26 connected into the connecting hole 56 to be moved by a predetermined distance.

[0042] The brackets 25 may be additionally provided at upper and lower ends of the rear surfaces of the first and second panels 21 and 22. The protrusions 26 of the additional brackets 25 may be guided by guide portions (not shown) formed at upper and lower ends of the body 11 during operation of the rotating units 50.

[0043] The cover 57 has a guide region 58, through which the protrusion 26 of the bracket 25 provided at the first or second panel 21 or 22 penetrates to thereby be connected to the rotating member 55.

[0044] The first and second panels 21 and 22 may interfere with the display panel 18 when being rotated by the rotating units 50. Therefore, in the present embodiment, the first and second panels 21 and 22 are first moved laterally by a predetermined distance and then, are rotated via operation of the rotating units 50.

[0045] In this case, the guide region 58 of the cover 57, as described above, guides the lateral movement and rotation of the first or second panel 21 or 22. The guide region 58 includes a first guide region 58a to guide lateral movement of the first or second panel 21 or 22, and a second guide region 58b to guide rotation of the first or second panel 21 or 22.

[0046] The first guide region 58b, as shown, is linearly formed and is inclined outwards and towards a front thereof. The second guide region 58b is connected to the first guide region 58a and is curved outwards and towards a front thereof similar to the first guide region 58a.

[0047] Now, operation and effects of the air conditioner having the above-described configuration will be described.

[0048] First, as shown in FIG. 4, the front panel 20 consisting of the first and second panels 21 and 22 is installed to cover the entire front side of the cabinet 10. The front panel 20 hides a center panel provided at the front cover 16, i.e. the display panel 18 when the air conditioner is halted.

[0049] As shown in FIG. 5, if the drive motors 53 are rotated, the rotating members 55 connected to the drive motors 53 are rotated. With rotation of the rotating members 55, the protrusions 26 connected to the rotating members 55 are guided along the first guide regions 58a so as to be linearly moved.

[0050] In the above-described operation, the linearly moved protrusions 26 move the first and second panels 21 and 22 outwards and towards a front thereof. In this case, the protrusions 26 are moved by a predetermined distance in the connecting holes 56 of the rotating mem-

bers 55.

[0051] As shown in FIG. 6, the protrusions 26 are guided along the second guide regions 58b connected to the first guide regions 58a with a continuous further rotation of the drive motor 53. The protrusions 26 moved along the second guide regions 58b rotate the first and second panels 21 and 22 outwards and towards a front thereof.

[0052] With the above-described operation, the first and second panels 21 and 22 are rotated by the rotating units 50, allowing the heat-exchanged air to be discharged from the cabinet 10 through the discharge regions 15 defined at outer sides of the first and second panels 21 and 22.

[0053] In the present embodiment, the first and second panels 21 and 22 are rotated individually or simultaneously by the rotating units 50, and a direction of air streams discharged through the discharge regions 15 may be changed based on rotation angles of the first and second panels 21 and 22.

[0054] Further, in the present embodiment, as the first and second panels 21 and 22 are rotated by the rotating units 50, the display panel 18 provided at the front cover 16 is exposed. In this case, the first and second panels 21 and 22 do not interfere with the display panel 18 of the front cover 16 when being rotated by the rotating units 50 because the first and second panels 21 and 22 are first moved laterally by a predetermined distance as the protrusions 26 are moved along the first guide regions 58a and then, are rotated as the protrusions 26 are moved along the second guide regions 58b by operation of the rotating units 50.

[0055] As shown in FIG. 7, the rotating units 50 may rotate the first and second panels 21 and 22 by different angles, to change discharge directions of air. In this case, the air discharged through the discharge regions 15 may create a leftward air stream or rightward air stream based on the different rotation angles of the first and second panels 21 and 22.

[0056] As is apparent from the above description, an air conditioner according to the embodiment of the present invention includes a front panel consisting of rotatable first and second panels, to control an air stream to be discharged and a discharge direction of air based on rotation angles of the first and second panels.

[0057] Although the embodiment of the present invention has been shown and described, it would be appreciated by those skilled in the art that changes may be made in these embodiments without departing from the principles and spirit of the invention, the scope of which is defined in the claims and their equivalents.

Claims

1. An air conditioner comprising:

a cabinet;
a front panel provided at a front side of the cab-

- inet and including at least two panels; and rotating units to rotate the panels respectively.
2. The air conditioner according to claim 1, wherein:
- the front panel is divided into a first panel and a second panel; and
a center panel is provided behind the first panel and second panel and is exposed when the first panel and second panel are rotated by the respective rotating units.
3. The air conditioner according to claim 2, wherein:
- the first panel and second panel are rotated respectively about one side thereof close to each other; and
air in the cabinet is discharged from opposite sides of the first panel and second panel when the first panel and second panel are rotated by the rotating units.
4. The air conditioner according to claim 3, wherein the rotating units respectively rotate the first panel and second panel simultaneously or individually.
5. The air conditioner according to claim 3, wherein the rotating units respectively control rotating angles of the first panel and second panel, thus changing an air stream to be discharged.
6. The air conditioner according to claim 5, wherein:
- the cabinet includes a body and a front cover coupled to the body; and
the center panel is provided in the center of the front cover.
7. The air conditioner according to claim 6, wherein the first panel and second panel are moved laterally by a predetermined distance so as not to interfere with the center panel when being rotated by the rotating units.
8. The air conditioner according to claim 7, wherein each of the rotating units includes a drive motor, and a rotating member having one end connected to the drive motor and the other end connected to the front panel.
9. The air conditioner according to claim 8, wherein:
- each of the rotating units further includes a case mounted to the front cover, and a cover to cover an upper side of the case; and
the drive motor and rotating member are received in the case.
10. The air conditioner according to claim 9, wherein:
- brackets extend from rear surfaces of the first panel and second panel; and
each of the brackets has a protrusion connected to the rotating member.
11. The air conditioner according to claim 10, wherein the cover has a guide region through which the protrusion penetrates the cover to thereby be connected to the rotating member.
12. The air conditioner according to claim 11, wherein the guide region includes a first guide region to guide lateral movement of the first panel or second panel, and a second guide region to guide rotation of the first panel or second panel, the first guide region and second guide region being connected to each other.
13. The air conditioner according to claim 12, wherein:
- the rotating member has a connecting hole for connection of the protrusion; and
the protrusion is moved in the connecting hole when being moved along the first guide region for lateral movement of the first panel or second panel.

FIG. 1

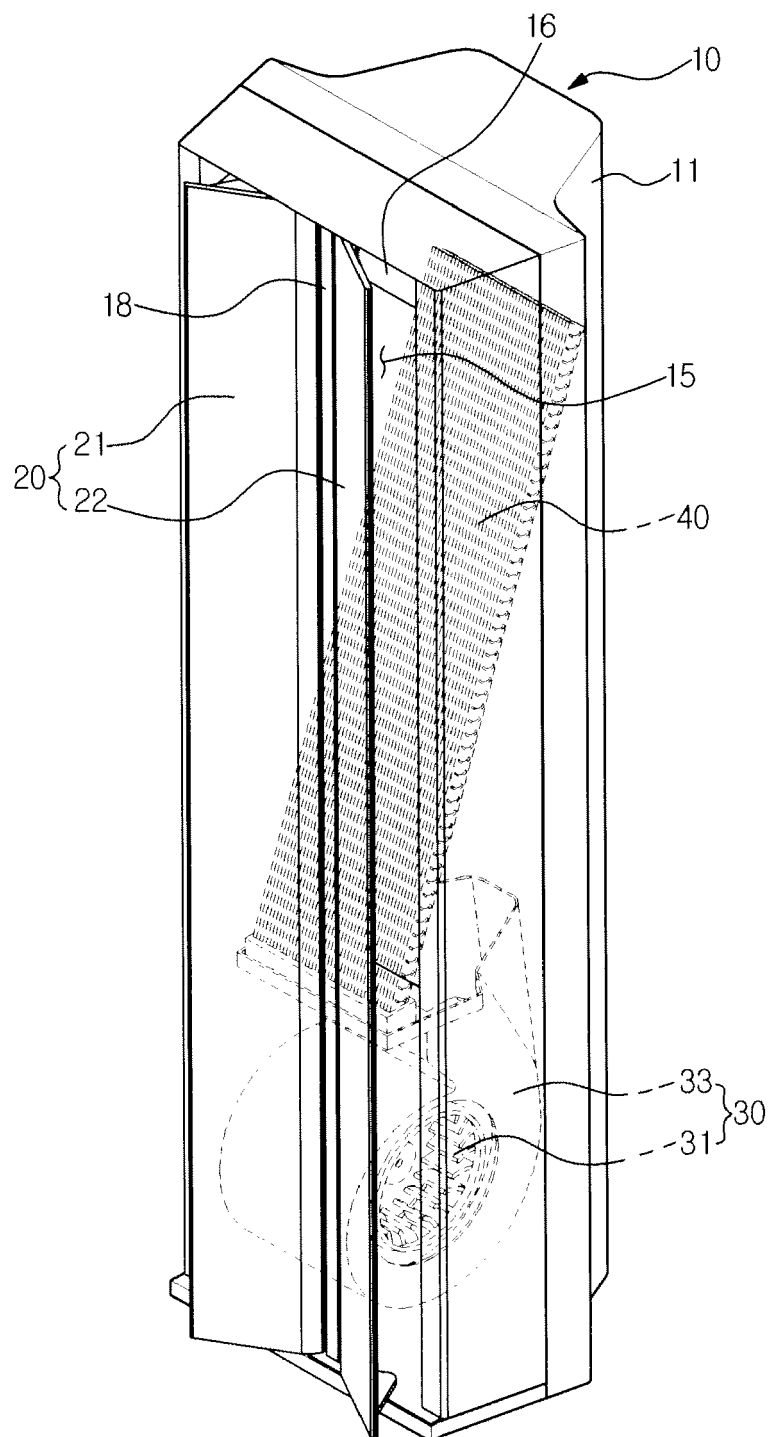


FIG. 2

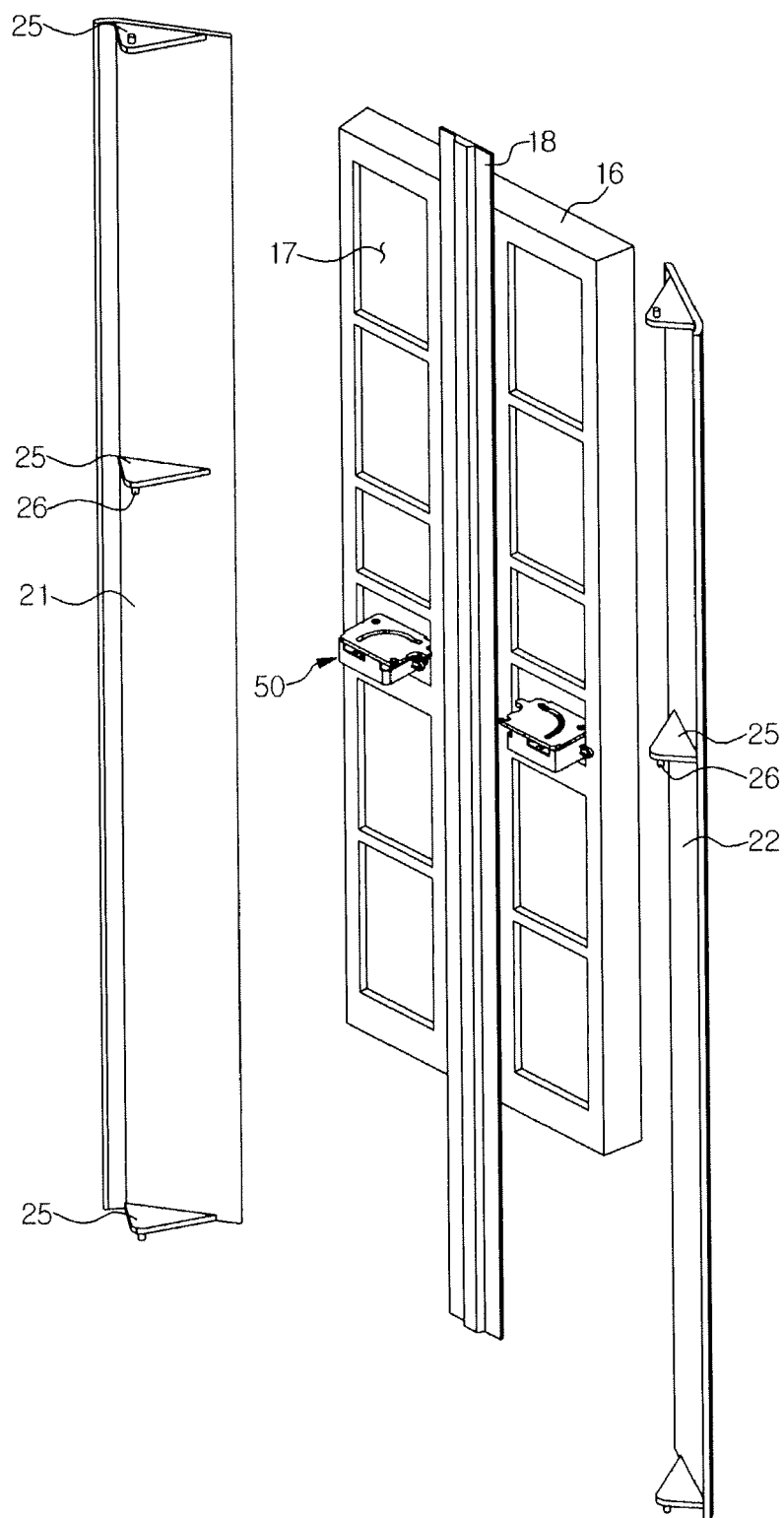


FIG. 3

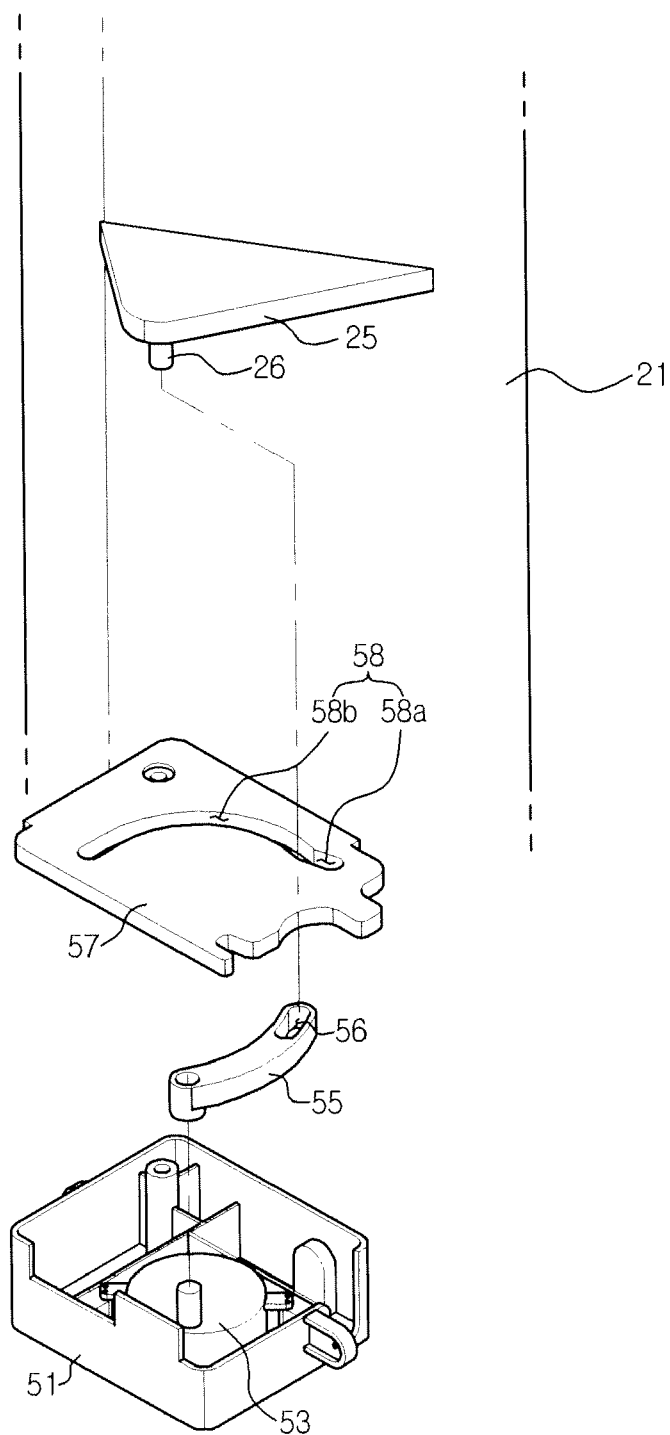


FIG. 4

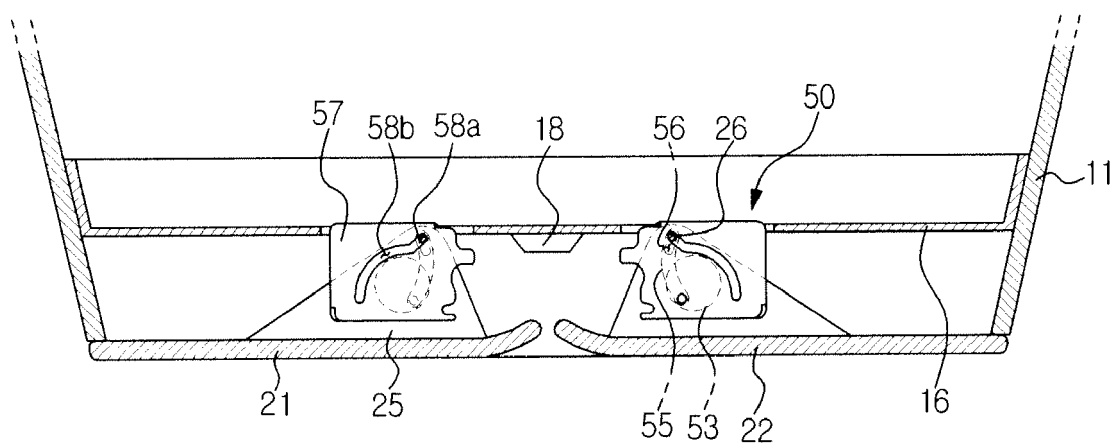


FIG. 5

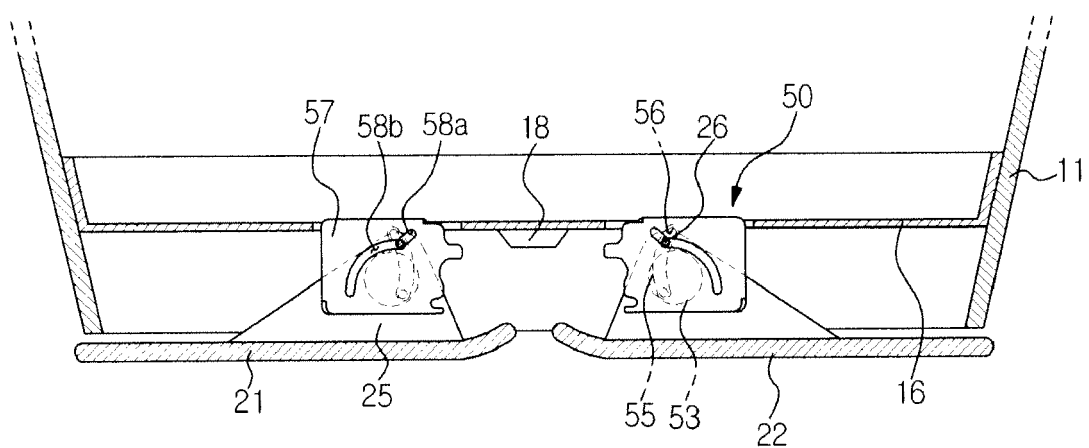


FIG. 6

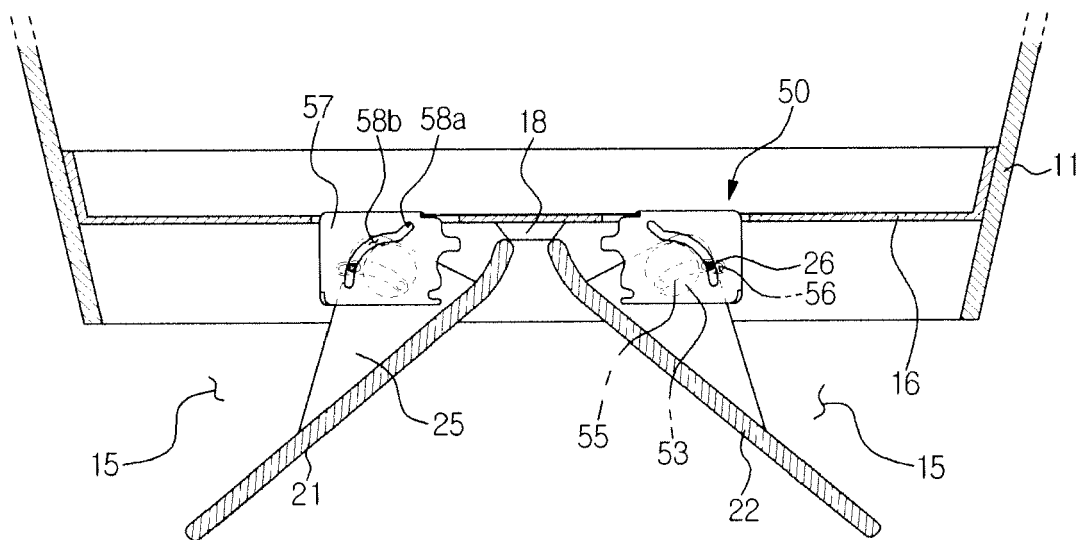
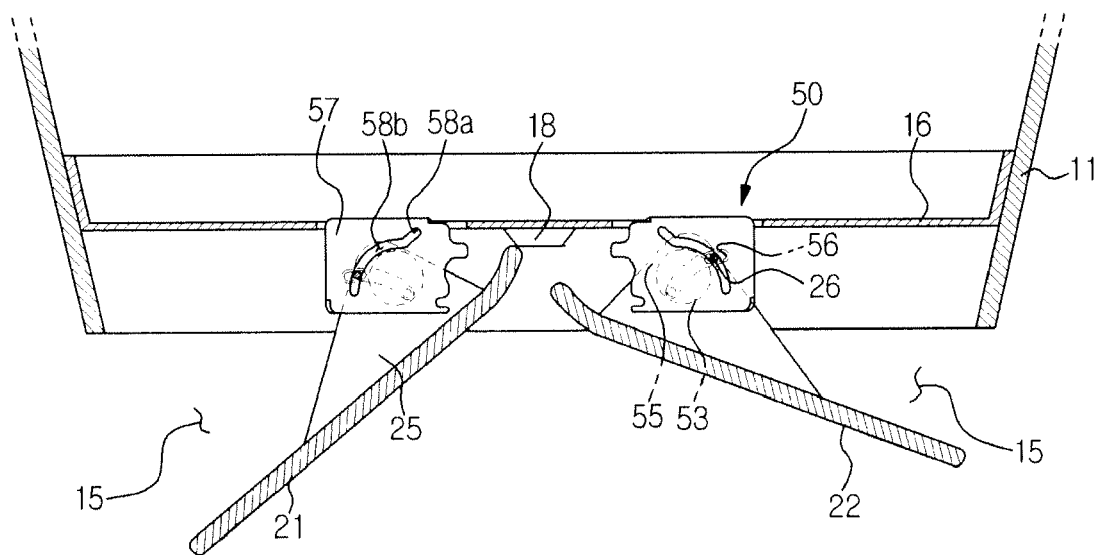


FIG. 7





EUROPEAN SEARCH REPORT

Application Number
EP 10 15 0427

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	JP 11 118176 A (FUJITSU GENERAL LTD) 30 April 1999 (1999-04-30)	1-6	INV. F24F1/00
Y	* abstract; figures 1-3 * -----	7-13	F24F13/14
Y	EP 1 950 501 A1 (LG ELECTRONICS INC [KR]) 30 July 2008 (2008-07-30) * the whole document * -----	7-13	
			TECHNICAL FIELDS SEARCHED (IPC)
			F24F
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 10 May 2010	Examiner Decking, Oliver
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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10-05-2010

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
JP 11118176	A	30-04-1999	NONE	

EP 1950501	A1	30-07-2008	NONE	
