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(54) **Indoor unit of air conditioner**

(57) Provided is an indoor unit of an air conditioner. The indoor unit includes a main body receiving a heat exchanger and a fan and a signal receiver protruding from a bottom surface of the main body to receive a wireless signal. The signal receiver includes a sensor for re-

ceiving a signal, a circuit board to which the sensor is attached, and a housing in which the circuit board is installed. The circuit board is disposed perpendicular to the housing.

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Description

BACKGROUND

[0001] Embodiments relate to an indoor unit of an air conditioner.

[0002] Generally, an air conditioner is a cooling/heating apparatus that cools or heats air within an inner space of a building, etc.

[0003] The air conditioner includes an outdoor unit receiving a compressor and an indoor unit installed at an indoor space to perform heat-exchange between air and refrigerant. According to the types of air conditioners, the indoor unit and the outdoor unit may be integrated in one body.

[0004] An indoor heat exchanger, a fan assembly, and a filter for filtering sucked air are installed in the indoor unit. The indoor unit is classified into a wall-mounted type, a floor-mounted type, and a window type according to an installation position thereof.

[0005] The indoor unit may operate by receiving a signal of a remote controller. For this, the indoor unit includes a signal receiver for receiving the signal of the remote controller.

SUMMARY

[0006] Embodiments provide an indoor unit of an air conditioner capable of improving reception sensitivity of a signal transmitted from a remote controller.

[0007] In one embodiment, an indoor unit of an air conditioner includes: a main body receiving a heat exchanger and a fan; and a signal receiver protruding from a bottom surface of the main body to receive a wireless signal, wherein the signal receiver comprises: a sensor for receiving a signal; a circuit board to which the sensor is attached; and a housing in which the circuit board is installed, and wherein the circuit board is disposed perpendicular to the housing.

[0008] The details of one or more embodiments are set forth in the accompanying drawings and the description below. Other features will be apparent from the description and drawings, and from the claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009]

FIG. 1 is a cross-sectional view illustrating an indoor unit of an air conditioner according to an embodiment.

FIG. 2 is a perspective view of an indoor unit in which a signal receiver is installed according to an embodiment.

FIGS. 3 and 4 are perspective views of a process in which a signal receiver is installed in an indoor unit according to an embodiment.

FIG. 5 is a cross-sectional view taken along line I-I'

of FIG. 4.

FIG. 6 is a view of a state in which a signal receiver is inserted into a mounting hole according to an embodiment.

FIG. 7 is a view of a state in which the signal receiver is completely installed.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0010] Reference will now be made in detail to the embodiments of the present disclosure, examples of which are illustrated in the accompanying drawings.

[0011] In the following detailed description of the preferred embodiments, reference is made to the accompanying drawings that form a part hereof, and in which is shown by way of illustration specific preferred embodiments in which the invention may be practiced. These embodiments are described in sufficient detail to enable those skilled in the art to practice the invention, and it is understood that other embodiments may be utilized and that logical structural, mechanical, electrical, and chemical changes may be made without departing from the spirit or scope of the invention. To avoid detail not necessary to enable those skilled in the art to practice the invention, the description may omit certain information known to those skilled in the art. The following detailed description is, therefore, not to be taken in a limiting sense, and the scope of the present invention is defined only by the appended claims.

[0012] FIG. 1 is a cross-sectional view illustrating an indoor unit 10 of an air conditioner according to an embodiment.

[0013] Referring to FIG. 1, the indoor unit 10 of the air conditioner includes a chassis 11, a main body, a base 12, and a front panel 14. A flow guide 111 for generating airflow is provided on a front surface of the chassis 11. The main body includes a front frame 13 coupled to a front portion of the chassis 11. An intake grill 131 is provided on an upper surface of the front frame 13. The base 12 is rotatably coupled to a back surface of the chassis 11 and fixed to an installation wall surface. The front panel 14 is movably coupled to a front surface of the front frame 13.

[0014] The indoor unit 10 further includes an inner panel 15, a heat exchanger 19, a fan 20, and a discharge grill 16. The inner panel 15 is link-coupled to a back surface of the front panel 14 and rotatably provided to the front frame 13. The heat exchanger 19 is disposed between the front frame 13 and the chassis 11. The fan 20 is provided at a lower side of the heat exchanger 19 to suck and discharge indoor air. The discharge grill 16 supports a lower end of the heat exchanger 19 and includes a discharge hole.

[0015] The indoor unit 10 further includes a discharge vane 21, a discharge louver 22, a bottom plate 23, and a holder member 24. The discharge vane 21 selectively shields the discharge hole. The discharge louver 22 is provided in the discharge hole to adjust a discharge di-

rection of air together with the discharge vane 21. The bottom plate 23 shields a piping passing through a lower end of the indoor unit 10. The holder member 24 is rotatably coupled to the chassis 11 and supports the piping. Although not shown, the discharge vane 21 and the discharge louver 22 may be driven by a motor.

[0016] The indoor unit 10 further includes a pre-filter 17 and a dust-collecting filter 18. The pre-filter 17 filters air sucked through the front surface of the front frame 13 and the intake grill 131. The dust-collecting filter 18 is provided between the pre-filter 17 and the heat exchanger 19.

[0017] FIG. 2 is a perspective view of an indoor unit in which a signal receiver is installed according to an embodiment.

[0018] Referring to FIG. 2, a signal receiver 40 according to an embodiment is installed on a bottom surface of the indoor unit 10. The signal receiver 40 protrudes from the bottom surface of the indoor unit 10 in order to improve reception sensitivity. Thus, since a sensor (that will be described later) constituting the signal receiver 40 protrudes outside the indoor unit 10, the signal reception sensitivity is improved.

[0019] FIGS. 3 and 4 are perspective views of a process in which a signal receiver is installed in an indoor unit according to an embodiment, and FIG. 5 is a cross-sectional view taken along line I-I' of FIG. 4.

[0020] Referring to FIGS. 3 to 5, the signal receiver 40 is installed on a bottom surface around an edge of a side of the front frame 13.

[0021] In detail, edges of both sides of the front frame 13 are bent several times to define an upper surface, a front surface, and a bottom surface. A mounting hole 132 in which the signal receiver 40 is inserted is defined in the bottom surface of the front frame 13. A plurality of coupling ribs 133 is disposed apart by a predetermined distance on an inner surface of the mounting hole 132. A stopper 134 extends at an upper side of the bottom surface of the front frame in which the mounting hole is defined. The stopper 134 extends radially from an edge of the mounting hole 132.

[0022] The stopper 134 is a protrusion for setting a rotation limit when the signal receiver 40 is installed.

[0023] The signal receiver 40 includes a housing 42, a bracket 41, and a circuit board 43. The housing 42 receives a sensor 44 for receiving a command signal. The bracket 41 extends laterally from the housing 42 and is closely attached to the bottom surface of the front frame 13. The circuit board 43 is vertically inserted inside the housing 42. The sensor 44 is attached to a lower end of one surface of the circuit board 43.

[0024] In detail, the bracket 41 and the housing 42 may be injection-molded in one body, or separately provided to couple the bracket 41 to the housing 42. A plurality of coupling protrusions 421 is arranged on an outer surface of the housing 42. The coupling protrusions 421 interfere with the coupling ribs 133 to allow the signal receiver 40 to be fixed to the mounting hole 132. A support rib for

supporting the circuit board 43 protrudes from a bottom surface of the housing 42.

[0025] In detail, the housing 42 has a length greater than a thickness of a lower surface portion of the front frame 13. Thus, when the signal receiver 40 is installed, the sensor 44 may protrude from the indoor unit 10 to the outside.

[0026] The circuit board 43 has a mounting surface 431 on which the sensor 44 is mounted. The mounting surface 431 is perpendicular to the bottom surface of the housing 42 in a state where the circuit board 43 is mounted on the housing 42.

[0027] Hereinafter, a coupling process of the signal receiver 40 will be described in detail with reference to the drawings.

[0028] FIG. 6 is a view of a state in which a signal receiver is inserted into a mounting hole according to an embodiment, and FIG. 7 is a view of a state in which the signal receiver is completely installed.

[0029] Referring to FIGS. 6 and 7, for installing the signal receiver 40, first, the housing 42 is inserted into the mounting hole 132.

[0030] The coupling protrusions 421 disposed apart by the predetermined distance on the outer surface of the housing 42 pass through the coupling ribs 133 protruding from the inner surface of the mounting hole 132. The bracket 41 is pushed into the mounting hole 132 until the bracket is closely attached to the bottom surface of the front frame 13. As a result, top surfaces of the coupling protrusions 421 have the same height as bottom surfaces of the coupling ribs 133.

[0031] In this state, the signal receiver 40 is rotated in a clockwise direction or a counter-clockwise direction until the bracket 41 is hung on the stopper 134. As a result, the top surfaces of the coupling protrusions 421 are hung on the bottom surfaces of the coupling ribs 133 to complete the installation of the signal receiver 40. A separate process of the signal receiver 40 is performed in reverse order of the installation process thereof. The circuit board 43 is detachably coupled to the support rib 422.

[0032] Thus, in order to replace the signal receiver 40, only the circuit board 43 may be separated, or the housing 42 itself may be separated from the front frame 13.

[0033] As described above, since the circuit board 43 constituting the signal receiver 40 can be vertically disposed inside the housing 42, the sensor 44 can be maximally close to the bottom surface of the housing 42. In a related art, since the circuit board 43 must be horizontally disposed, the sensor 44 was spaced from the bottom surface of the housing 42 to the inside of the indoor unit 40. Therefore, there is a limitation that the reception sensitivity is reduced.

[0034] However, as described in the embodiment, when the sensor 44 is installed on a lower end of the circuit board 43 and vertically disposed inside the housing 42, the sensor 44 can protrude from the bottom surface of the indoor unit 10 to improve the reception sensitivity.

[0035] While the present disclose has been particularly shown and described with reference to exemplary embodiments thereof, it will be understood by those of ordinary skill in the art that various changes in form and details may be made therein without departing from the scope of the present disclose as defined by the following claims.

Claims

1. An indoor unit of an air conditioner, the indoor unit comprising:

a main body receiving a heat exchanger and a fan; and
a signal receiver protruding from a bottom surface of the main body to receive a wireless signal,

wherein the signal receiver comprises:

a sensor for receiving a signal;
a circuit board to which the sensor is attached;
and
a housing in which the circuit board is installed,
and

wherein the circuit board is disposed perpendicular to the housing.

2. The indoor unit according to claim 1, wherein a mounting hole in which the housing is installed is defined in a bottom surface of the main body, and at least portion of the housing protrudes from the bottom surface of the main body.

3. The indoor unit according to claim 2, wherein a plurality of coupling ribs is disposed on an inner surface of the mounting hole, and a plurality of coupling protrusions respectively hung on the coupling ribs is disposed on an outer surface of the housing.

4. The indoor unit according to claim 3, wherein the coupling protrusions are respectively hung on the coupling ribs because the housing is rotated in a state where the housing is inserted into the mounting hole.

5. The indoor unit according to claim 2, wherein a support rib for supporting the circuit board protrudes from a bottom surface of the housing, and the circuit board is separably coupled to the support rib.

6. The indoor unit according to claim 2, further comprising a bracket extending in a horizontal direction of the housing,
wherein the bracket is close to an upper portion of

the bottom surface of the main body in a state where the housing passes through the mounting hole.

7. The indoor unit according to claim 1, wherein a mounting surface on which the sensor is mounted is defined on the circuit board, and the mounting surface is perpendicular to a bottom surface of the housing in a state where the circuit board is installed inside the housing.

8. The indoor unit according to claim 7, wherein the sensor is installed on a lower side portion of the mounting surface.

Fig.1

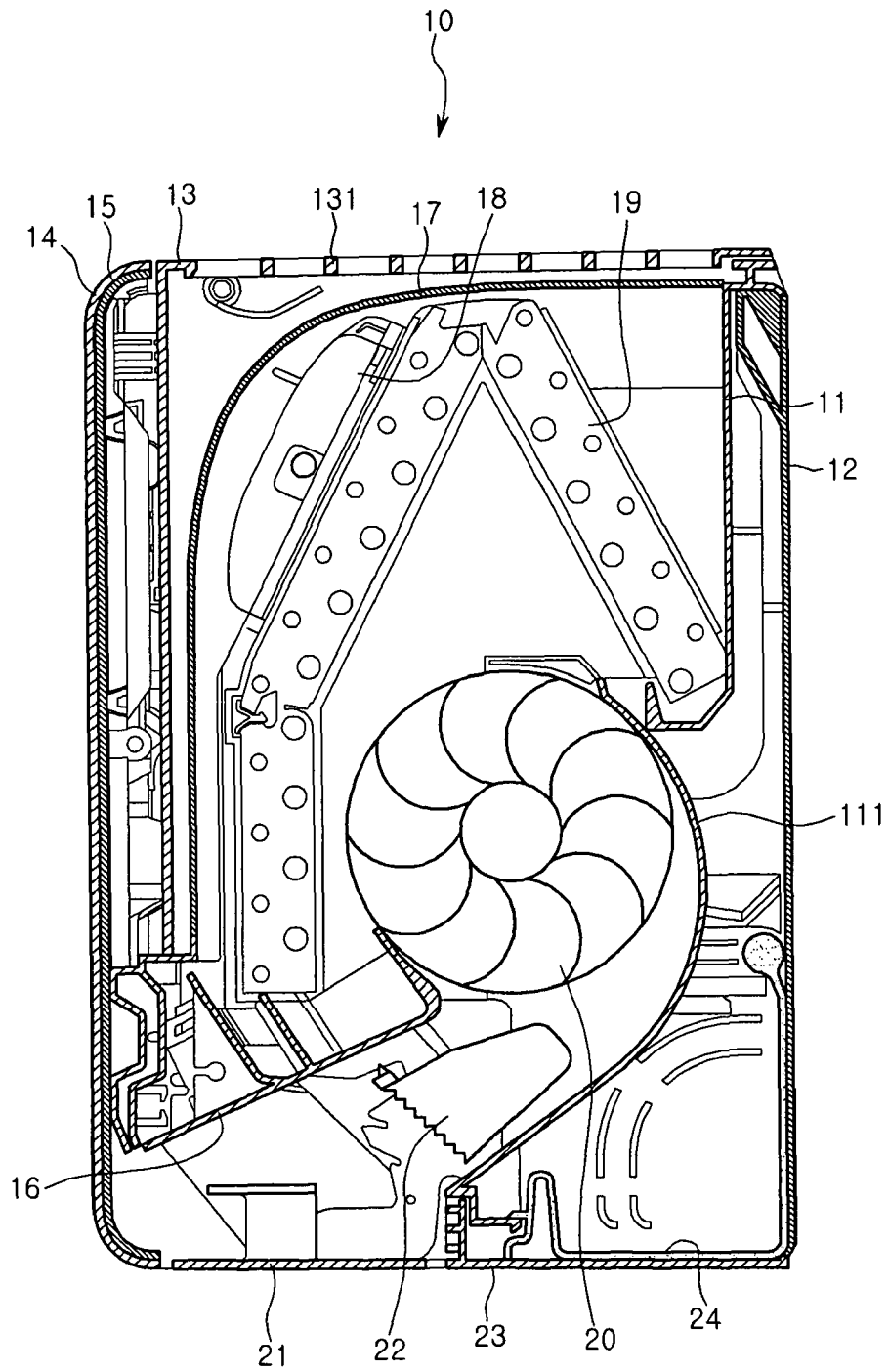


Fig.2

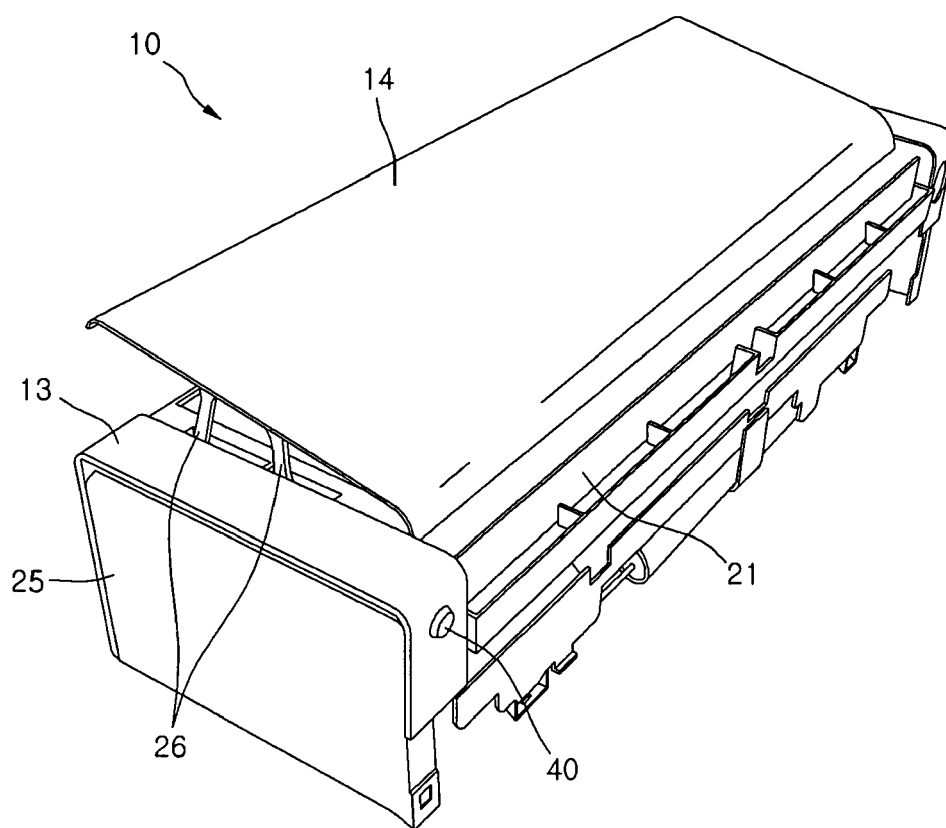


Fig.3

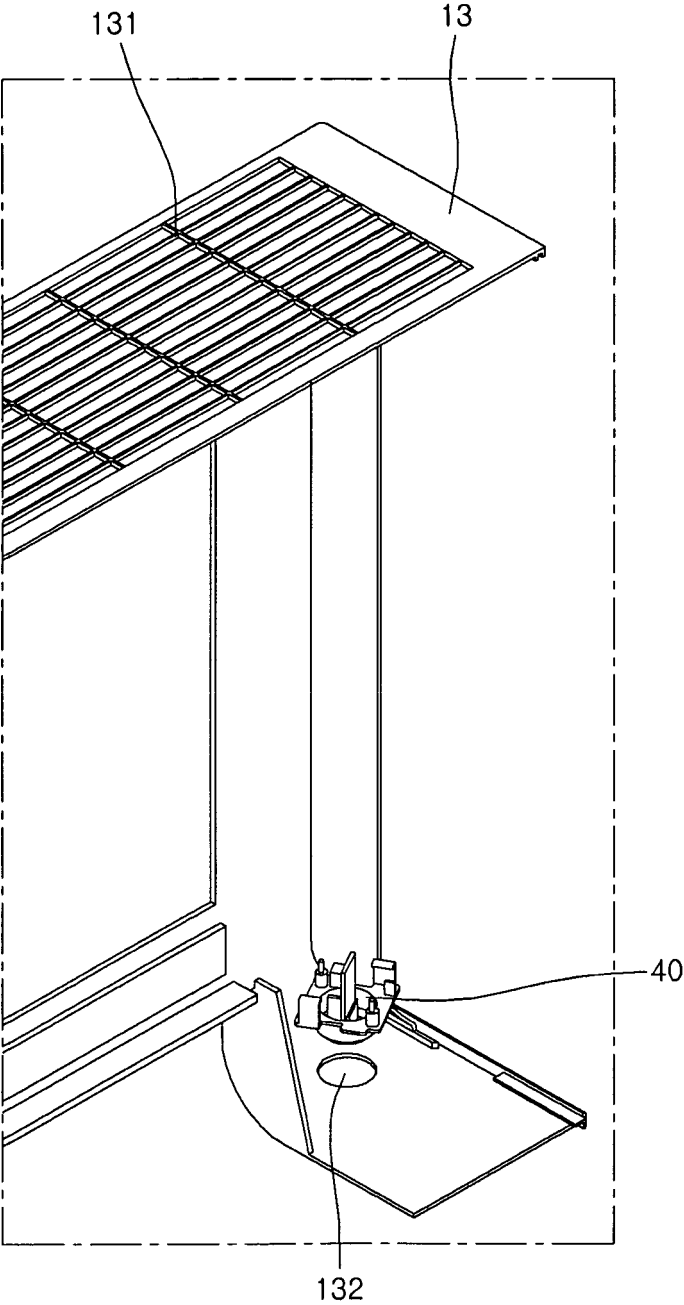


Fig. 4

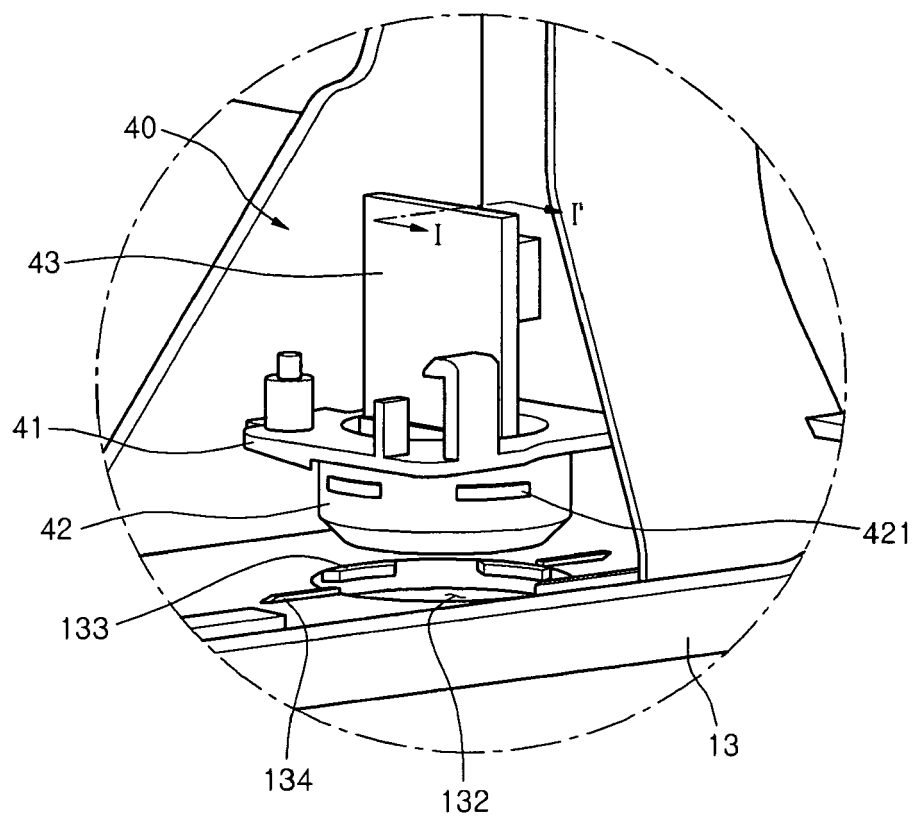


Fig.5

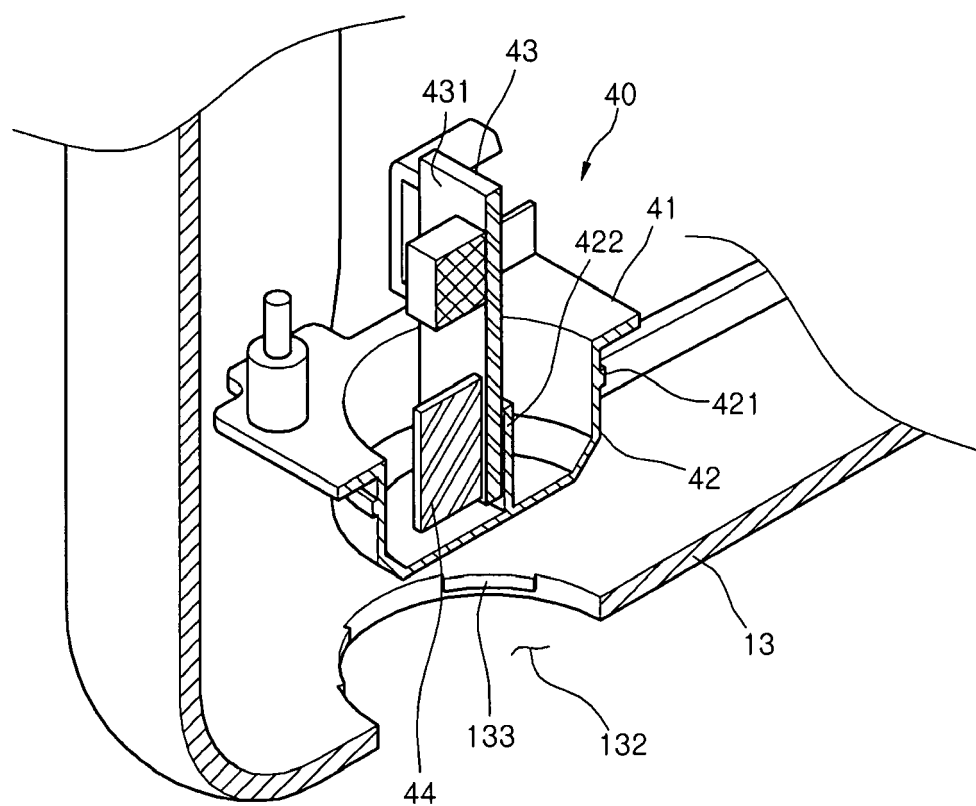


Fig.6

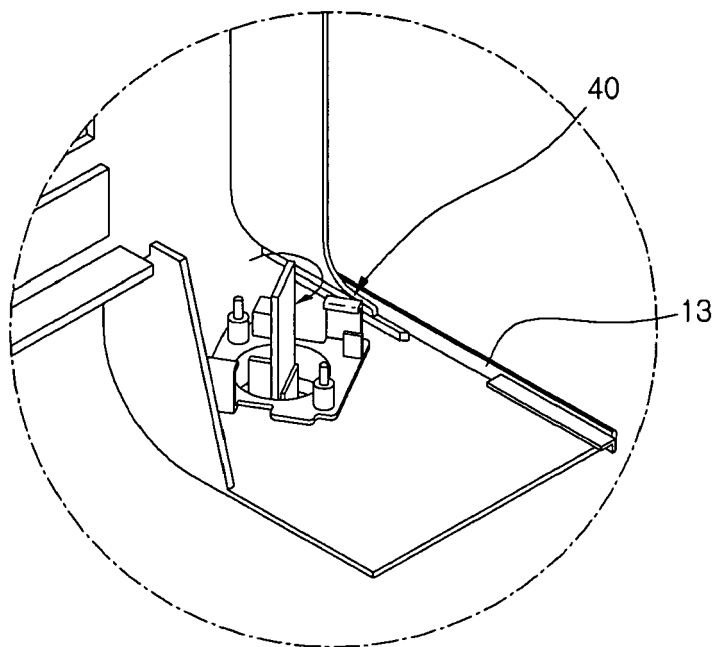
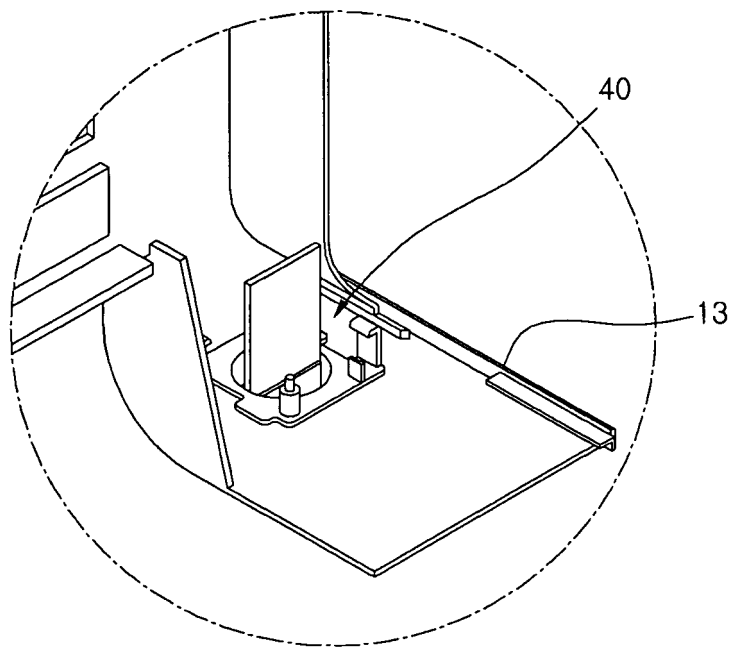


Fig.7





EUROPEAN SEARCH REPORT

Application Number
EP 09 25 0129

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	WO 2006/075730 A1 (TOSHIBA CARRIER CORP [JP]; ISHIKAWA YUTAKA) 20 July 2006 (2006-07-20) * abstract; figures 4-6 *	1-8	INV. F24F1/00 F24F11/02
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Place of search Munich		Date of completion of the search 16 February 2010	Examiner Valenza, Davide
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
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16-02-2010

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