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(72) Inventors:
• **Jinnai, Hiroyuki**
Tokyo, 102-0073 (JP)
• **Kubono, Toshiyuki**
Tokyo, 102-0073 (JP)
• **Ooishi, Kazuhiro**
Tokyo, 102-0073 (JP)

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(71) Applicant: **Mitsubishi Electric Corporation**
Chiyoda-ku
Tokyo 100-8310 (JP)

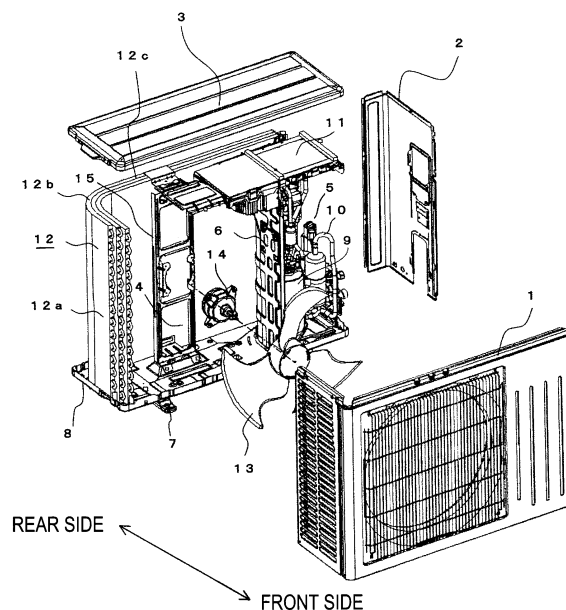
(74) Representative: **Pfenning, Meinig & Partner GbR**
Patent- und Rechtsanwälte
Theresienhöhe 11a
80339 München (DE)

(54) **Outdoor machine of air conditioner**

(57) An outdoor machine of an air conditioner includes a fan motor mount including a fan motor support plate, and a top plate. The fan motor support plate is formed with: a plurality of props; a prop horizontal plane; a prop front plane; a fitting portion, which is provided on the prop horizontal plane and fitted to a rear end of the top plate; and a first screw hole, which is provided on the

prop front plane to fix the top plate. The top plate is formed with: a screw fixing piece, which has a shape parallel to the prop front plane and is provided with a second screw hole corresponding the first screw hole. The fitting portion is fitted to the rear end of the top plate, and the screw fixing piece is located on the front side of the prop front plane.

FIG.1



Description

TECHNICAL FIELD

[0001] This disclosure relates to an outdoor machine of an air conditioner and, more particularly, to a structure of a fan motor mount to support a fan motor.

BACKGROUND

[0002] In an outdoor machine of an air conditioner, a partition plate stands on a bottom plate configuring a bottom part of a housing, and an interior of the housing is laterally separated by the partition plate into a blower room, in which a blower fan or a heat exchanger is located, and a machine room, in which a compressor or a refrigerant piping is located. Further, electrical and electronic components for controlling an operation of the air conditioner are mainly arranged at the top of the machine room.

[0003] In the blower room, the heat exchanger having a substantially L-shaped horizontal cross-section is arranged over a side face on the side opposite to the machine room from the rear side of the housing, and a blower fan is arranged in the front of the heat exchanger located on the rear side, i.e., near the front of the housing. Further, a fan motor that is a driving source of the blower fan is mounted and fixed to a fan motor mount at a position that is located in the rear of the blower fan and in the front of the heat exchanger.

[0004] Similar to the fan motor, the fan motor mount is provided between the blower fan and the heat exchanger in a state where the fan motor mount is substantially erected toward the top face from the bottom plate of the housing in a substantially vertical direction. The fan motor mount supports the fan motor in the middle of the vertical direction, in a substantially central position of the vertical direction. A motor rotation shaft protrudes forward from the fan motor and is connected to the blower fan in order to transmit a rotational driving force of the fan motor to the blower fan. The fan motor mount supports not only the fan motor but also the blower fan connected to the fan motor.

[0005] The fan motor mount to support the fan motor or the blower fan is fixed in such a way that a lower end portion thereof is screwed to the bottom plate of the housing and an upper end portion thereof is engaged with the top of the heat exchanger.

[0006] There is an outdoor machine of an air conditioner having a configuration, in which a locking part is provided separately from the fan motor mount and screwed to the upper end portion of the fan motor mount when fixing the upper end portion of the fan motor mount to the top of the heat exchanger. The locking part has a configuration in which flanges are suspended from both ends of the top of the fan motor mount, and the upper end of the heat exchanger is inserted through a cutout portion that is provided in the flanges (for example, see JP-A-

2011-038657 (Paragraph 28, FIG. 2)). Further, a mounting plate for locking the upper end of the heat exchanger may be mounted to the upper end of the fan motor mount and then screwed to the upper end from above (for example, see JP-UM-Y-H03-032901 (FIG. 3)).

SUMMARY

[0007] An outdoor machine of an air conditioner according to a background art has a configuration in which a rear side of an upper portion of the fan motor mount is locked to an upper portion of the heat exchanger, but a front side thereof is not fixed anywhere.

[0008] Further, in an interior of the blower room, the upper sides of the fan motor and the blower fan are covered with a top panel that serves as a top face of a housing of the outdoor machine. For example, when a load is applied from above of the top panel, such as in the case of stacking the outdoor machines in a warehouse, the load is not supported from the rear side of the top panel. Accordingly, there is a problem that the top panel is deformed depending on the magnitude of the load.

[0009] Further, in JP-A-2011-038657, it is necessary to fasten a screw into a prop to support the fan motor from the front and side directions when fixing the locking part having the cutout portion through which the upper end of the heat exchanger is inserted to the upper end portion of the fan motor mount by an operation of fixing the fan motor mount and the heat exchanger to each other at the upper end portion of the fan motor mount. In this operation, it is necessary to fasten a screw from the front and lateral directions by one hand while aligning the locking part with a screw hole by the other hand. Accordingly, there is a problem in mounting efficiency.

[0010] Further, in JP-UM-Y-H03-032901 a screw is fastened from above when fixing a mounting plate sandwiched between the top plate and the upper end of the heat exchanger to the upper end portion of the motor mount. Accordingly, it is necessary to fasten the screw by placing a driver against the screw from right above. Therefore, the operation efficiency is low, since a worker is required to ride on a work bench and also it is difficult to perform a fixing operation while watching the screw hole. For example, in case of an outdoor machine of an air conditioner whose entire height is high, such as a case arranging two blower fans in a vertical direction, a mounting operation is particularly difficult. Accordingly, there is a problem that the productivity is low.

[0011] This disclosure provides at least an outdoor machine of an air conditioner that is capable of suppressing a top panel from being deformed even when a large load is applied to the top panel from above and improving the mounting workability of the fan motor mount, thereby enhancing the productivity.

[0012] An outdoor machine of an air conditioner of this disclosure includes: a housing; a heat exchanger, which is placed on a rear side; a blower fan, which is placed on a front side of the heat exchanger and blows air from the

rear side to the front side of the housing; a fan motor, which is placed between the heat exchanger and the blower fan and drives the blower fan; and a fan motor mount, to which the fan motor is fixed, wherein the heat exchanger, the blower fan, the fan motor and the fan motor mount are placed inside the housing. The fan motor mount includes: a fan motor support plate, which has a lower end portion fixed to a bottom plate configuring a bottom face of the housing, is provided substantially in a vertical direction toward a top face of the housing and supports the fan motor in a middle of the vertical direction; and a top plate, which connects to fix an upper end portion of the fan motor support plate and a front panel configuring a front face of the housing, wherein the fan motor support plate is formed with: a plurality of props which extends substantially in the vertical direction from the bottom plate; a prop horizontal plane, which connects upper end portions of the props to each other and extends in a front-rear direction from the upper end portions of the props; a prop front plane, which is downwardly and substantially vertically bent from the prop horizontal plane to face the front panel; a fitting portion, which is provided on the prop horizontal plane and fitted to a rear end of the top plate; and a first screw hole, which is provided on the prop front plane to fix the top plate, wherein the top plate is formed with: a screw fixing piece, which has a shape parallel to the prop front plane and extending downward and is provided with a second screw hole corresponding the first screw hole of the fan motor support plate, wherein the fitting portion of the fan motor support plate is fitted to the rear end of the top plate, and wherein the screw fixing piece of the top plate is located on the front side of the prop front plane of the fan motor support plate.

[0013] According to this disclosure, it is possible to provide an outdoor machine of an air conditioner that is capable of suppressing a top panel from being deformed even when a large load is applied to the top panel from above and improving the mounting workability of the fan motor mount, thereby enhancing the productivity.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] The foregoing and additional features and characteristics of this disclosure will become more apparent from the following detailed descriptions considered with the reference to the accompanying drawings, wherein:

FIG. 1 is an exploded perspective view illustrating an outdoor machine of an air conditioner according to a first illustrative embodiment of this disclosure; FIG. 2 is a lateral configuration view illustrating a fan motor mount and surroundings, according to the first illustrative embodiment; FIG. 3 is an exploded perspective view illustrating a fan motor mount and a fan motor, according to the first illustrative embodiment; FIG. 4 is an enlarged exploded perspective view il-

lustrating a top plate and an upper end portion of a fan motor support plate, according to the first illustrative embodiment;

FIGS. 5A and 5B are explanatory views illustrating a fitting portion of the top plate and a fan motor support plate, according to the first illustrative embodiment;

FIG. 6 is a sectional view taken along a line VI-VI shown in FIG. 4, according to the first illustrative embodiment;

FIG. 7 is a front view illustrating a state where the top plate is fitted to an upper end portion of a fan motor support plate as seen from the front side, according to the first illustrative embodiment;

FIGS. 8A and 8B are explanatory views illustrating a fitting portion of a fan motor support plate and a top plate, according to a second illustrative embodiment;

FIG. 9 is a sectional view illustrating another configuration example regarding a fitting portion of the fan motor support plate and the top plate, according to the second illustrative embodiment;

FIG. 10 illustrates a configuration example of a guide part and is a front view illustrating a state where a top plate is fitted to an upper end portion of a fan motor support plate as seen from the front side, according to a third illustrative embodiment;

FIG. 11 illustrates another configuration example of the guide part and is an explanatory view illustrating the fitting movement of the fan motor support plate and the top plate, as seen from above, according to the third illustrative embodiment;

FIG. 12 illustrates a configuration example of a fan motor support base and is a front view illustrating a state where a top plate is fitted to an upper end portion of a fan motor support plate, as seen from the front side, according to a fourth illustrative embodiment; and

FIG. 13 illustrates another configuration example of the fan motor support base and is an enlarged exploded perspective view illustrating an upper end portion of the fan motor support plate and the top plate, according to the fourth illustrative embodiment.

DETAILED DESCRIPTION

First Illustrative embodiment

[0015] Hereinafter, an outdoor machine of an air conditioner according to a first illustrative embodiment of this disclosure will be described in detail with reference to the drawings.

[0016] FIG. 1 is an exploded perspective view illustrating an outdoor machine of an air conditioner (hereinafter, simply referred to as an "outdoor machine") according to a first illustrative embodiment of this disclosure. As shown in FIG. 1, a substantially rectangular parallelepi-

ped housing of the outdoor machine is configured by a plurality of panels, for example, a front panel 1, a side panel 2, a top panel 3 and a bottom plate 8. All of these panels are made of sheet metal. The front panel 1 has a substantially L-shaped horizontal cross-section. The front panel 1 configures a front part of the housing and also configures a side part on the side opposite to the side panel 2. The top panel 3 configures a top face of the housing of the outdoor machine. Further, a heat exchanger (to be described later) is placed at a rear side.

[0017] A blower room 4 and a machine room 5 are provided in an interior of the housing of the outdoor machine. Respective rooms are separated by a separator 6 that is vertically placed, in a lateral direction. The blower room 4 is located on the left side, and the machine room 5 is located on the right side, as seen from the front of the outdoor machine. Further, a plurality of components inside the outdoor machine is held on the bottom plate 8 that is placed on a bottom face and has leg parts 7. The outdoor machine is to be located outdoors. The outdoor machine is connected to an indoor machine (not shown) that is located indoors via a refrigerant piping to form a refrigerant circuit. The outdoor machine configures an air conditioner performing the heating and cooling of an indoor space in which the indoor machine is attached.

[0018] In the blower room 4, a heat exchanger 12 is located at the rear side and a fan motor mount 15 is located at the front side of the heat exchanger 12. The fan motor mount 15 is adapted to hold a fan motor 14 equipped with a blower fan 13 configured by a propeller fan. The fan motor 14 is placed between the heat exchanger 12 and the blower fan 13 and rotationally drives the blower fan 13. The fan motor mount 15 has a lower end portion fixed to the bottom plate 8 by a screw. The fan motor mount 15 is provided in a substantially vertical direction toward the top panel 3 and holds the fan motor 14 in a middle of the vertical direction. Further, the heat exchanger 12 has a substantially L-shaped horizontal cross-section and includes a lateral side planar part 12a, a curve-shaped corner part 12b and a rear side planar part 12c. The fan motor 14 is located on the front side of the rear side planar part 12c.

[0019] By the rotation of the blower fan 13, air (outside air) flows into the indoor machine through the heat exchanger 12 from the rear side of the outdoor machine. The air flows out to the front side of the outdoor machine through the blower fan 13. In this way, for example, during a cooling operation, refrigerant in the heat exchanger 12 is cooled by the air and the air passing through the heat exchanger 12 is heated by exchanging heat with the refrigerant and then flows to the outside of the outdoor machine.

[0020] A compressor 9 and a refrigerant piping 10 are provided in the machine room 5. The refrigerant sent from the indoor machine (not shown) is compressed in the compressor 9 and then sent to the heat exchanger 12 through the refrigerant piping 10. Electrical components 11 are placed on the upper side of the housing to supply

power to each component of the outdoor machine.

[0021] Here, as shown in FIG. 1, in the description of the present illustrative embodiment, a front direction of the front panel 1 is referred to as a front side and an opposite direction thereof is referred to as a rear side. Further, a direction connecting the front side and the rear side is referred to as a front-rear direction. In addition, as seen from the front, a right side is corresponding to a direction in which the machine room 5 is located and a left side is corresponding to a direction in which the blower room 4 is located. Meanwhile, the front side may be explained as a front direction, the rear side may be explained as a rear direction, the right side may be explained as a right direction and the left side may be explained as a left direction.

[0022] FIG. 2 is a lateral configuration view illustrating the fan motor mount 15 and surroundings, according to the first illustrative embodiment. FIG. 2 illustrates a lateral configuration of the blower room 5 in which the side part of the front panel 1, the side panel 2, the lateral side planar part 12a and the corner part 12b of the heat exchanger 12 and the separator 6 are removed, as seen from the left direction to the right direction. Further, FIG. 3 is an exploded perspective view illustrating the fan motor 14 and the fan motor mount 15, according to the first illustrative embodiment.

[0023] The fan motor mount 15 includes two members of a fan motor support plate 16 and a top plate 17, which are separated from each other. The top plate 17 is fixed to the fan motor support plate 16 by an assembly process of the outdoor machine.

[0024] The fan motor support plate 16 includes: a mounting part 16a that is formed at a lower end portion thereof and mounted to the bottom plate 8; a prop part 16b that extends in a substantially vertical direction from the bottom plate 8; a motor support plane 15a that is formed in the middle of the vertical direction of the prop part 16b; a heat-exchanger-upper-end fixing part 16d to which an upper end of the heat exchanger 12 is fixed on the rear side of the prop part 16b; and a prop horizontal plane 16m that extends horizontally in a front-rear direction (to the rear side, in the present illustrative embodiment) from the prop part 16b and is connected to the heat-exchanger-upper-end fixing part 16d. Further, as shown in FIG. 3, the prop part 16b includes: a plurality of props 16i (two props 16i extending in a vertical direction, in the present illustrative embodiment); prop supports 16k that transversely span two props 16i at plural locations of the vertical direction of the props 16i to reinforce the strength of the lateral direction of the prop part 16b; and a prop front plane 16j that connects two props 16i at an upper end portion of the prop part 16b and is a plane facing the front panel 1. The prop front plane 16j is downwardly and substantially vertically and bent from the prop horizontal plane 16m. The heat-exchanger-upper-end fixing part 16d is formed on a rear end of the prop horizontal plane 16m.

[0025] As shown in FIG. 2 and FIG. 3, the heat-ex-

changer-upper-end fixing part 16d includes a locking part that is opened downward and has a substantially U-shaped cross-section. By sandwiching an upper end portion of the rear side planar part 12c of the heat exchanger 12 with the locking part, the upper end portion of the rear side planar part 12c of the heat exchanger 12 is fixed to an upper end portion of the fan motor support plate 16. In the front side of the fan motor mount 15, a flange-like front end of the top plate 17 that is turned back downward and an upper end portion of the front panel 1 are fixed to each other by a screw 1a (see FIG. 2).

[0026] A buffer material 18 made of, e.g., polypropylene is fixed to the upper portion of the top plate 17 shown in FIG. 2. Although the buffer material 18 is omitted in the drawings other than FIG. 2, the buffer material 18 is interposed between the top panel 3 and the top plate 17.

[0027] As seen from the side of the blower room 4, the rear side planar part 12c of the heat exchanger 12 is located on the rear side of the fan motor support plate 16. Therefore, even when a force is applied to the outdoor machine from above, the rear side of the fan motor support plate 16 is adapted to secure the strength in the vertical direction. On the other hand, the front side of the fan motor support plate 16 is an air passage, in which the blower fan 13 is provided and, has a wider space. In the outdoor machine described in the present illustrative embodiment, the top plate 17 for connecting and fixing the front panel 1 and an upper end portion of the fan motor support plate 16 is provided at an upper part of the wider space. By screwing the top plate 17 to the front panel 1 and the top plate 17 to the fan motor support plate 16, respectively, the fan motor support plate 16 can be supported in the front-rear direction. Further, since, the top plate 17 is provided along the plane of the top panel 3 and below the top panel 3, the top panel 3 is reinforced by the top plate 17 from the below. Therefore, it is possible to suppress the bending or denting deformation of the top panel 3 even when a load is applied from above of the top panel 3, such as by stacking. By providing the top plate 17, it is possible to provide an outdoor machine that has a strong strength against the load or impact from the above of the outdoor machine.

[0028] Further, the buffer material 18 is sandwiched between the top plate 17 and the top panel 3, and the load applied from above of the outdoor machine is transmitted to the inside of the outdoor machine via the buffer material 18. Therefore, the impact is alleviated when the outdoor machine receives a local impact.

[0029] When the fan motor support plate 16 and the top plate 17 are integrally configured as the fan motor mount 15, the fan motor mount 15 including the top plate 17 has a T shape and the size thereof has the same level as the length in the front-rear direction of the outdoor machine and the length in the depth direction of the outdoor machine. In case that the fan motor mount 15 is configured as a large three-dimensional component in this way, the delivery property becomes low in the assembly line and in the time of transporting the fan motor

mount 15. In the above illustrative embodiment, the fan motor support plate 16 and the top plate 17 are configured as separate members, and the delivery property becomes good in the assembly line and in the time of transporting the component. Further, in the assembly line of the outdoor machine, the fan motor support plate 16 is fixed to the bottom plate 8 and then the top plate 17 is mounted to an upper end portion of the fan motor support plate 16, thereby forming the fan motor mount 15.

[0030] Hereinafter, a mounting structure for mounting the top plate 17 to the fan motor support plate 16 will be described. FIG. 4 is an enlarged exploded perspective view illustrating an upper end portion of the fan motor support plate 16 and the top plate 17. Two-dot chain line shown in FIG. 4 is a line that connects matching parts when mounting the top plate 17 to the fan motor support plate 16. As shown in FIG. 4, the fan motor support plate 16 and the top plate 17 are configured as separate members. In the front side of the heat-exchanger-upper-end fixing part 16d that is formed on the rear side of the upper end portion of the fan motor support plate 16, a fan-motor-support-plate-side fitting portion 16c is provided to restrict the movement in the vertical direction of the top plate 17. The fan-motor-support-plate-side fitting portion 16c is configured to fit to the rear end (hereinafter, referred to as a top-plate-side fitting portion 17b) of the top plate 17. Specifically, the fan-motor-support-plate-side fitting portion 16c is formed by cutting and raising upward a portion of the central part in a lateral direction of the prop horizontal plane 16m so as to have an L-shaped cross-section with a predetermined lateral width. Accordingly, the fan-motor-support-plate-side fitting portion 16c forms an L-shaped cross-section by an L-shaped upright portion 16q (see FIG. 5) and an L-shaped horizontal plate piece 16p (see FIG. 5). An opening is provided at both left and right sides and the front side of the fan-motor-support-plate-side fitting portion 16c. That is, the opening is provided at positions other than the L-shaped upright portion 16q. The fan-motor-support-plate-side fitting portion 16c will be described in detail with reference to FIG. 5.

[0031] Further, in the prop front plane 16j of the upper end portion of the prop part 16b, a screw hole 16e for fixing the top plate 17 is provided at a center portion in the lateral direction. In addition, a guide part 16f is formed by cutting and raising a portion of the periphery of the top-plate fixing screw hole 16e, e.g., from the rear side to the front side and in the direction of the screw hole 16e. When a screw fixing piece 17c (to be described later) of the top plate 17 is fixed, the guide part 16f is provided to protrude to the front side at a position along a substantially semi-circular contour of the lower end portion of the screw fixing piece 17c. In other words, the guide part 16f is formed to protrude to the front side with crossing in the lateral side and the lower side so that the guide part 16f is corresponding to the fixed position of the contour of the screw fixing piece 17c. In the prop front plane 16j, a hole 16g is left at the periphery of the guide part 16f as a result of the cutting and raising of the guide part 16f.

Hereinafter, this hole 16g is simply referred to as a "left hole".

[0032] The top plate 17 includes a top-plate horizontal plane 17m on the rear side thereof. The top-plate horizontal plane 17m is substantially parallel to a horizontal plane (hereinafter, referred to as a top face) of the top panel 3. Further, the top plate 17 includes a top-plate-side fitting portion 17b that is located on the center portion in the lateral direction of the rear end portion of the top-plate horizontal plane 17m. A rear end face of the top-plate-side fitting portion 17b is referred to as a fitting-portion rear end face 17a. In the present illustrative embodiment, the top-plate-side fitting portion 17b is a plane part forming a portion of the top-plate horizontal plane 17m. The top-plate-side fitting portion 17b is located at a substantially central portion in the lateral direction of the rear end portion and fitted to the fan-motor-support-plate-side fitting portion 16c when being mounted to the fan motor support plate 16. In the drawing, the top-plate-side fitting portion 17b is indicated by a dotted line. The fitting-portion rear end face 17a is located on the rear end face of the top-plate-side fitting portion 17b. In the present illustrative embodiment, the fitting-portion rear end face 17a is a portion of the side that linearly extends in the lateral direction of the rear end face of the top-plate horizontal plane 17m. Further, the top plate 17 includes at least one (three, in the present illustrative embodiment) front-panel fixing screw hole 17d on the front side thereof.

[0033] Further, the top plate 17 includes the screw fixing piece 17c that is placed on the front side of the top-plate fixing screw hole 16e provided at the fan motor support plate 16. The screw fixing piece 17c is a planar plate piece that is branched downward from the top-plate horizontal plane 17m on the front side of the top-plate-side fitting portion 17b and extends downward in parallel with the prop front plane 16j of the prop part 16b. A fan-motor-support-plate fixing screw hole 17e is provided at a substantially central portion of the screw fixing piece 17c. The fan-motor-support-plate fixing screw hole 17e is located at a position substantially the same as the top-plate fixing screw hole 16e provided at the prop front plane 16j and is formed as a hole that is slightly larger than the top-plate fixing screw hole 16e.

[0034] FIGS. 5A and 5B are explanatory views illustrating a fitting portion of the fan motor support plate 16 and the top plate 17 according to the first illustrative embodiment. FIG. 5A is a plan view of the fan-motor-support-plate-side fitting portion 16c and the top-plate-side fitting portion 17b, as seen from above, illustrating a state where the top plate 17 is slid relative to the fan motor support plate 16. Further, FIG. 5B is a sectional view illustrating a fitted state of the fan-motor-support-plate-side fitting portion 16c and the top-plate-side fitting portion 17b. In FIG. 5, the fan-motor-support-plate-side fitting portion 16c has a substantially L-shaped cross-section. The L-shaped cross-section is formed by the L-shaped horizontal plate piece 16p that is a part parallel to the prop horizontal plane 16m and the L-shaped up-

right portion 16q that is a part perpendicular to the prop horizontal plane 16m.

[0035] In the assembly process of the blower room 4, the heat exchanger 12 is fixed to the bottom plate 8 and then the fan motor mount 15 is mounted to the bottom plate 8. First, the fan motor support plate 16 configuring a portion of the fan motor mount 15 is mounted to the bottom plate 8. At this time, in a state where an upper end portion of the rear side planar part 12c of the heat exchanger 12 is fitted into the U-shaped part of the heat-exchanger-upper-end fixing part 16d. The mounting part 16a is fixed to the bottom plate 8 by a screw. Next, as shown in FIGS. 5A and 5B, the top plate 17 is slid relative to the fan motor support plate 16 from the front side to the rear side (in a direction of an arrow F). When sliding the top plate 17 relative to the fan motor support plate 16 in the direction of the arrow F, the fitting-portion rear end face 17a that is a rear end of the top-plate horizontal plane 17m is inserted into an opening on the front side of the fan-motor-support-plate-side fitting portion 16c and the top-plate-side fitting portion 17b is slid below the L-shaped horizontal plate piece 16p.

[0036] As shown in FIG. 5B, when a distance between the L-shaped horizontal plate piece 16p of the fan-motor-support-plate-side fitting portion 16c and the prop horizontal plane 16m is set to be slightly longer than the thickness of the top-plate horizontal plane 17m, the fitting-portion rear end face 17a can be easily fitted to the fan-motor-support-plate-side fitting portion 16c.

[0037] During the above sliding, a portion of the contour of the screw fixing piece 17c shown in FIG. 4 is guided by the convex-shaped guide part 16f, and therefore the screw fixing piece 17c is brought into contact with the prop front plane 16j. Further, the top-plate fixing screw hole 16e and the fan-motor-support-plate fixing screw hole 17e are positioned so as to substantially coincide with each other.

[0038] FIG. 6 is a sectional view taken along a line VI-VI shown in FIG. 4, illustrating a state where the fan-motor-support-plate-side fitting portion 16c and the top-plate-side fitting portion 17b are fitted to each other by sliding the top plate 17 relative to the fan motor support plate 16 from the front side to the rear side. In FIG. 6, a reference numeral A represents the moment due to the weight of the top plate 17, a position B represents the fixed position of the rear side planar part 12c of the heat exchanger 12, a position C represents the position of the prop front plane 16j, a position D represents the fixed position of the front panel 1 and a position E represents the branch point of the screw fixing piece 17c of the top plate 17.

[0039] Movement in the vertical direction of the top plate 17 is restricted by the fitting of the fitting portions 16c, 17b. In other words, movement in the vertical direction of the top-plate-side fitting portion 17b is suppressed by the fan-motor-support-plate-side fitting portion 16c from above. Further, in the position C, the screw fixing piece 17c extends downward from the branch point E

and is in contact with the front side of the prop front plane 16j. Therefore, against the moment A that occurs around the branch point E by the weight of the top plate 17, the above state is stably held even in the state of releasing hands.

[0040] The top plate 17 stops moving and is temporarily fixed in a state where an upper face of the prop horizontal plane 16m and a lower face of the top-plate horizontal plane 17m are in contact with each other by the weight of the top plate 17 and in a state where the screw fixing piece 17c is contact with the prop front plane 16j.

[0041] Thus, in the assembly process, the fan-motor-support-plate-side fitting portion 16c and the top-plate-side fitting portion 17b can be fitted to each other just by sliding the top plate 17 from the front side to the rear side. Further, this fitted state can be stably held even in the state of releasing hands and therefore the top plate 17 can be temporarily fixed. Here, the temporary fixing means that the mounted state can be held in the state of releasing hands and then secure fixation can be made by a screw. Since the top plate 17 is temporarily fixed to the fan motor support plate 16 in a stable manner, a worker can freely use both hands and fasten a screw by placing a driver against the fan-motor-support-plate fixing screw hole 17e and the top-plate fixing screw hole 16e from the front side. Alignment in the lateral direction will be described below.

[0042] FIG. 7 is a front view illustrating a state where the top plate 17 is fitted and temporarily fixed to an upper end portion of the fan motor support plate 16, as seen from the front side, according to the first illustrative embodiment. The guide parts 16f are provided on at least both left and right sides of the contour of the screw fixing piece 17c in the prop front plane 16j of the fan motor support plate 16. The guide parts 16f have a shape protruding to the front side by being cut and raised in the direction of the top-plate fixing screw hole 16e and are adapted to guide the sliding in the front-rear direction of the screw fixing piece 17c. Upon sliding the top plate 17, the contour of the screw fixing piece 17c is slid along the guide parts 16f and positioned in the fixed position of the screw fixing piece 17c. As the screw fixing piece 17c of the top plate 17 is fixed to the inside of the guide parts 16f, movement in a lateral direction W of the screw fixing piece 17c is restricted and positioning in the lateral direction W of the top plate 17 relative to the fan motor support plate 16 is accurately made.

[0043] Further, the screw fixing piece 17c is configured by a plate piece that extends downward parallel to the prop front plane 16j of the fan motor support plate 16. Here, the screw fixing piece 17c is located at the lowermost position of the top plate 17 in a state where the top plate 17 is fitted to the fan-motor-support-plate-side fitting portion 16c of the fan motor support plate 16. In other words, the screw holes 16e, 17e for fixing the top plate 17c to the fan motor support plate 16 are located below the front-panel fixing screw hole 17d. In a state where the top plate 17 is temporarily fixed to the fan motor sup-

port plate 16, the top-plate fixing screw hole 16e and the fan-motor-support-plate fixing screw hole 17e are positioned so as to substantially coincide with each other and the fan-motor-support-plate fixing screw hole 17e of the screw fixing piece 17c is arranged in a position where there is no obstacle on the front side, so that the screw holes 16e, 17e are visible, as seen from the front side. Therefore, a worker can place a driver against a screw while watching the screw holes 16e, 17e from the front side and therefore it is possible to further enhance the mounting workability of the top plate 17. Unlike a conventional configuration in which screwing is made from above, a worker can perform an operation without riding on the work bench and the aligned state is temporarily fixed, so that a worker can freely fasten a screw with both hands while watching the screw holes from the front. As a result, the mounting workability of the fan motor mount 15 is enhanced, thereby improving the productivity.

[0044] In this way, since, in the first illustrative embodiment, the fan motor mount 15 is configured by two members and the top plate 17 is fixed to the fan motor support plate 16 in the assembly process of the outdoor machine, there is an effect that can prevent the delivery property in the assembly line and in the time of transporting the fan motor mount 15 from getting worse due to the fact that the fan motor mount 15 is configured as one large three-dimensional T-shaped component.

[0045] Further, since an upper end portion of the fan motor support plate 16 and the front panel 1 are connected to fix each other via the top plate 17, the mounted state of the upper end portion of the fan motor mount 15 in the front-rear direction can be supported.

[0046] Further, since the back of the top panel 3 is supported by the top plate 17, it is possible to suppress the top panel 3 from being deformed even when a large load is applied from above of the top panel 3.

[0047] Furthermore, since the top plate 17 is temporarily fixed by the fitting portions 16c, 17b and the screw fixing piece 17c when the top plate 17 is slid from the front side to the rear side at the time of mounting the top plate 17 to the upper end portion of the fan motor support plate 16, a stable temporary fixing is possible in which the mounted state is held in the state of releasing hands.

[0048] Further, in an operation of fixing the top plate 17 to the fan motor support plate 16, a worker can slide the top plate 17 relative to the fan motor support plate 16 from the front side to the rear side and fasten a screw while watching the screw holes 17e, 16e provided on the screw fixing piece 17c from the front side. Accordingly, a worker can perform all of the operations from the front side and thus does not need to move. As a result, the assembly workability and productivity of the outdoor machine is improved.

Second Illustrative embodiment

[0049] In the first illustrative embodiment, the movement in the vertical direction of the top plate 17 during

sliding is restricted by cutting and raising an L-shaped cross-section part to form the fan-motor-support-plate-side fitting portion 16c and sliding the fitting-portion rear end face 17a and the top-plate-side fitting portion 17b of the top-plate horizontal plane 17m below the L-shaped prop horizontal plane 16m. The second illustrative embodiment of this disclosure illustrates another configuration example of the fitting portion that performs aligning in the vertical direction of the top plate 17 relative to the fan motor support plate 16 by restricting the movement in the vertical direction of the top plate 17 during the sliding of the top plate 17.

[0050] FIGS. 8A and 8B are explanatory views illustrating a fitting portion of the top plate 17 and the fan motor support plate 16 according to the second illustrative embodiment of this disclosure. FIG. 8A is a plan view illustrating a state where the top plate 17 is slid relative to the fan motor support plate 16, as seen from above of a fan-motor-support-plate-side fitting portion 20 and a top-plate-side fitting portion 21. Further, FIG. 8B is a sectional view illustrating the fitted state of the fan-motor-support-plate-side fitting portion 20 and the top-plate-side fitting portion 21. Here, a length L3 in the lateral direction of the fan-motor-support-plate-side fitting portion 20 is set to be greater than a length L4 in the lateral direction of the top-plate-side fitting portion 21. An upper face of the fan-motor-support-plate-side fitting portion 20 indicated by a dotted line is the same as the prop horizontal plane 16m of the portion of the fan motor support plate 16 in which the fan-motor-support-plate-side fitting portion 20 is provided. A fitting portion insertion hole 20a is provided on the front side of the fan-motor-support-plate-side fitting portion 20. Meanwhile, the top-plate-side fitting portion 21 is a plate piece that is provided on the rear end face of the top plate 17 and protrudes to the rear side. In the vertical direction, an upper face of the top-plate-side fitting portion 21 is located below the top-plate horizontal plane 17m of the top plate 17 on the front side of the top-plate-side fitting portion 21.

[0051] When sliding the top plate 17 relative to the fan motor support plate 16 in a direction of an arrow F, the top-plate-side fitting portion 21 is inserted into the fitting portion insertion hole 20a and, as shown in FIG. 8B, fitting is performed so that a lower face of the fan-motor-support-plate-side fitting portion 20 and an upper face of the top-plate-side fitting portion 21 are brought into contact with each other. At this time, a leading end of the top-plate-side fitting portion 21 is inserted slightly downward to the fitting portion insertion hole 20a and then slid, as indicated by an arrow G. Since the lower face of the fan-motor-support-plate-side fitting portion 20 and the upper face of the top-plate-side fitting portion 21 are in contact with each other, the upper face of the top-plate-side fitting portion 21 is pressed by the lower face of the fan-motor-support-plate-side fitting portion 20 from above and therefore the movement in the vertical direction of the top-plate-side fitting portion 21 is restricted. By the screw fitting piece 17c and the fitting portions 20, 21 having

such a configuration, the movement of the top plate 17 due to the moment A around the branch point E shown in FIG. 6 is suppressed and therefore the top plate 17 is temporarily fixed in a stable manner.

[0052] Since the length L3 in the lateral direction of the fan-motor-support-plate-side fitting portion 20 is set to be greater than the length L4 in the lateral direction of the top-plate-side fitting portion 21, the top-plate-side fitting portion 21 can be easily inserted into the fitting portion insertion hole 20a at the time of sliding the top plate 17.

[0053] Further, in a case where the length L3 and the length L4 are substantially the same and the length L3 is slightly greater than the length L4, both left and right edges of the top-plate-side fitting portion 21 are guided by both left and right edges of the fitting portion insertion hole 20a and therefore positioning in the lateral direction of the top plate 17 relative to the fan motor support plate 16 is also performed. Therefore, it is not necessary to form a special guide part (for example, the guide part 16f in the first illustrative embodiment) for restricting the movement in the lateral direction of the top plate 17 relative to the fan motor support plate 16.

[0054] Further, FIG. 9 is a sectional view illustrating another configuration example of a fitting portion of the top plate 17 and the fan motor support plate 16 according to the second illustrative embodiment. FIG. 9 shows a fitted state of a fan-motor-support-plate-side fitting portion 22 and a top-plate-side fitting portion 23. The fan-motor-support-plate-side fitting portion 22 has a J-shaped cross-section that is formed by cutting and raising upward a portion of the central part in the lateral direction of the prop horizontal plane 16m and turning back downward the front side of the cut and raised plate piece. Further, the top-plate-side fitting portion 23 is provided on the rear end of the top plate 17 and a leading end thereof is turned back upward to form an L-shaped cross-section. The length in the vertical direction of a turned-back piece 22a with the J-shaped cross-section and a turned-back piece 23a with the L-shaped cross-section is substantially the same. In a case where the fan-motor-support-plate-side fitting portion 22 is formed by cutting and raising the prop horizontal plane 16m, a hole 22b is formed on the front side as a result of cutting and raising of the fan-motor-support-plate-side fitting portion 22. Hereinafter, this hole 22b is simply referred to as a "left hole". Further, in a lower end portion of the screw fixing piece 17c, the guide part 16f is provided at the prop front plane 16j and protrudes to the front side so as to match the contour of the lower end portion.

[0055] When sliding the top plate 17 to the fan motor support plate 16 from the front side to the rear side, the top-plate-side fitting portion 23 is inserted into the left hole 22b and, as shown in FIG. 9, the J-shaped turned-back piece 22a of the fan-motor-support-plate-side fitting portion 22 and the L-shaped turned-back piece 23a of the top-plate-side fitting portion 23 are fitted in a state of being hooked with each other. At this time, a leading end of the top-plate-side fitting portion 23 is inserted slightly

downward to the left hole 22b and then slid, as indicated by an arrow H. Since the J-shaped turned-back piece 22a of the fan-motor-support-plate-side fitting portion 22 and the L-shaped turned-back piece 23a of the top-plate-side fitting portion 23 are fitted to each other, the top plate 17 is restricted in moving relative to the fan motor support plate 16 in the vertical direction and therefore is positioned. Also in the fitting portions 22, 23 of such a configuration, the movement in the vertical direction of the top plate 17 is restricted. Although a force is applied upward to the top-plate-side fitting portion 23 due to the weight of the top plate 17, the fan-motor-support-plate-side fitting portion 22 presses the top-plate-side fitting portion 23 from above, against the upward force. With these fitting portions 22, 23 of such a configuration, it is possible to suppress the movement of the top plate 17 due to the moment A by the weight of the top plate 17 shown in FIG. 6. Accordingly, the fitted state can be temporarily fixed in a stable manner even in the state of releasing both hands.

[0056] Herein, two configuration examples of the fitting portions are shown in FIG. 8 and FIG. 9. In both configuration examples, the movement in the vertical direction of the top-plate horizontal plane 17m is restricted by the fan-motor-support-plate-side fitting portions 20, 22 provided in the prop horizontal plane 16m. As a result, positioning of the temporary fixing of the top plate 17 relative to the fan motor support plate 16 is made.

Third Illustrative embodiment

[0057] Although, in the first illustrative embodiment, the guide part 16f shown in FIG. 7 has a function of restricting the movement in the lateral direction W of the top plate 17 and positioning the top plate 17 when a worker slides the top plate 17 relative to the fan motor support plate 16 from the front side to the rear side, this disclosure is not limited to the configuration of the guide part 16f shown in FIG. 7. With the function of the guide part, the fan motor support plate 16 and the top plate 17 are relatively positioned in the lateral direction W when sliding the top plate 17. Since, by the guide part, the fan motor support plate 16 and the top plate 17 are relatively positioned in the lateral direction W, the fan-motor-support-plate-side fitting portion 16c of the fan motor support plate 16 and the top-plate-side fitting portion 17b of the top plate 17 are aligned in the lateral direction and the top-plate fixing screw hole 16e and the fan-motor-support-plate fixing screw hole 17e are also aligned in the lateral direction.

[0058] In the third illustrative embodiment of this disclosure, another configuration of the guide part having the above-described function will be described.

[0059] FIG. 10 illustrates a configuration example of the guide part and is a front view illustrating a state where the top plate 17 is fitted to an upper end portion of the fan motor support plate 16, the third illustrative embodiment of this disclosure. In the configuration example

shown in FIG. 10, two guide parts 16h are provided on the left and right sides of the fixed position of the screw fixing piece 17c. The guide part 16 is also configured in such a way that the guide part is provided on the prop front plane 16j and protrudes to the front side. Even with such a configuration, the movement in the lateral direction W of the screw fixing piece 17 during the sliding of the top plate 17 can be restricted and therefore positioning of the screw holes 16e, 17e can be made. The guide part 16h is configured by contracting the prop front plane 16j to the front side and then deforming the prop front plane 16j so as to have a convex shape.

[0060] The guide part that is provided on the prop front plane 16j and restricts the movement in the lateral direction W of the top plate 17 may be projected to the front side from the plane of the prop front plane 16j to which the screw fixing piece 17c is fixed. Similar to the guide part 16f shown in FIG. 7, the guide part may be formed by cutting and raising a portion of the prop front plane 16j. Further, similar to the guide part 16h shown in FIG. 10, the guide part may be configured by contracting and deforming the prop front plane 16j without cutting and raising a portion of the prop front plane. Here, in a case where the guide part is formed by the cutting and raising, as in the guide part 16f, the left hole 16g is formed on the prop part 16b. By providing the left hole 16g penetrating in the front-rear direction on the prop part 16, the air that is heat-exchanged in the heat exchanger 12 can easily flow out to the front side through the left hole 16g, so that the heat exchange efficiency is enhanced. Therefore, in view of the heat exchange efficiency, it is preferable that the guide part is formed to have a shape convex to the front side by the cutting and raising.

[0061] Meanwhile, in a case where the strength of the fan motor mount 15 is insufficient due to the formation of the left hole 16g, it is preferable to contract and deform the fan motor mount 15, similarly to the guide part 16h.

[0062] Since the guide parts are provided in at least the left and right sides of the contour of the prop front plane 16i on which the screw fixing piece 17c is placed, it is possible to restrict the movement in the lateral direction of the screw fixing piece 17c. The guide parts 16f shown in FIG. 7 are formed on at least the left and right sides of the lower end portion of the screw fixing piece 17c along the substantially semi-circular contour of the lower end portion. For example, in a case where the shape of the lower end portion of the screw fixing piece 17c is an angular shape, the guide parts may be provided along the left and right sides of the contour of the screw fixing piece 17c, similarly to the guide parts 16h shown in FIG. 10.

[0063] Hereinafter, as another configuration example of the guide part, a configuration in which a guide part is provided in the top plate 17 will be described. FIG. 11 is an explanatory view illustrating a configuration of a guide part according to the third illustrative embodiment. FIG. 11 is an explanatory view illustrating the fitting movement of the fan motor support plate 16 and the top plate 17,

as seen from above. In FIG. 11, the length L1 in the lateral direction W of the fan-motor-support-plate-side fitting portion 16c is substantially the same as the length L2 in the lateral direction W of the top-plate-side fitting portion 17b that is fitted to the fan-motor-support-plate-side fitting portion 16. As in the configuration of FIG. 4, the fan-motor-support-plate-side fitting portion 16c has an L-shaped cross-section and has a shape that is opened on the front side and both left and right sides. The guide parts 17f provided on the rear end of the top plate 3 are further extended to the rear side from both sides of the top-plate-side fitting portion 17b. Further, the guide parts 17f are inclined in opposite directions so that a width therebetween is gradually widened toward a rear end 19g of the top plate 17 from the top-plate-side fitting portion 17b.

[0064] When the top plate 17 is slid in a direction of an arrow F, both ends in the lateral direction W of the upright portion (having a substantially L-shaped cross-section) of the fan-motor-support-plate-side fitting portion 16c are guided by the inclination of the guide parts 17f so that the both ends are gradually aligned with the top-plate-side fitting portion 17b in the lateral direction W and fitted thereto. Therefore, the movement in the vertical direction and lateral direction W of the fitting portions 16c, 17b is restricted so that the fitting portions are positioned. In this state, the top-plate fixing screw hole 16e and the fan-motor-support-plate fixing screw hole 17e of the screw fixing piece 17c may be, respectively, provided at positions substantially matching each other. In this configuration, since the top plate 17 can be smoothly slid relative to the fan motor support plate 16 and positioned in the vertical direction and lateral direction W, it is possible to improve the efficiency of the mounting operation. Further, since there is no need for the guide parts 16f that are provided on the prop part 16b of the fan motor support plate 16, as shown in FIG. 7 or the guide parts 16h as shown in FIG. 10, it is possible to simplify the shape of sheet metal parts and the mold.

[0065] Further, another configuration of the guide part will be described. In the plane parallel to the top panel 3 shown in FIG. 11, i.e., in the prop horizontal plane 16m and the top-plate horizontal plane 17m, the length (lateral width) in the lateral direction W of the prop horizontal plane 16m is set to be slightly longer than the length (lateral width) in the lateral direction W of the top-plate horizontal plane 17m and therefore both front-side ends 16n of the fan motor support plate 16 are projected in both sides from both back-side ends 17h of the top plate 17, respectively. In addition, a convex part may be provided on both front-side ends 16n of the projected portion of the fan motor support plate 16 so as to protrude upward (to the top panel 3 side) from the prop horizontal plane 16m. The convex part may be employed as the guide part. As the both back-side ends 17h of the top plate 17 are slid along the convex part provided on both front-side ends 16n of the fan motor support plate 16, it is possible to restrict the movement in the lateral direction W of the top plate 17 relative to the fan motor support plate 16.

The convex part may be formed by cutting and raising upward a corner portion of the both front-side ends 16n of the prop horizontal plane 16m.

[0066] On the contrary, in the plane parallel to the top panel 3 shown in FIG. 11, the length (lateral width) in the lateral direction W of the top-plate horizontal plane 17m is set to be slightly longer than the length (lateral width) in the lateral direction W of the prop horizontal plane 16m and therefore both back-side ends 17h of the top plate 17 are projected in both sides from both front-side ends 16n of the fan motor support plate 16, respectively. In addition, a convex part may be provided on both back-side ends 17h of the projected portion of the top plate 17 so as to protrude downward from the top-plate horizontal plane 17m. The convex part may be employed as the guide part. As both front-side ends 16n of the fan motor support plate 16 are slid along the convex part provided on the both back-side ends 17h of the top plate 17, it is possible to restrict the movement in the lateral direction W of the top plate 17 relative to the fan motor support plate 16. The convex part may be formed by cutting and raising downward a corner portion of the both back-side ends 17h of the top-plate horizontal plane 17m.

[0067] As shown in the third illustrative embodiment, the guide part may be provided on the fan motor support plate 16 or the top plate 17. The guide part may be configured in such a way that at least one of both back-side ends 17h of the top-plate horizontal plane 17m, the screw fixing piece 17c and the top-plate-side fitting portion 17b of the top plate 17 is restricted in moving relative to the fan motor support plate 16 in the lateral direction W and therefore positioning is made when sliding the top plate 17 relative to the fan motor support plate 16.

Fourth Illustrative embodiment

[0068] In a fourth illustrative embodiment of this disclosure, a configuration relating to the improvements of the heat exchange efficiency inside the outdoor machine will be described. FIG. 12 is a front view illustrating a state where the top plate 7 is temporarily fixed to an upper end portion of the fan motor support plate 16, as seen from the front side, according to the fourth illustrative embodiment. Vent holes 19 are provided on both left and right sides of the screw fixing piece 17c in the prop front plane 16j of the fan motor support plate 16. The vent hole 19 is a hole that is provided in the prop front plane 16j and penetrates the prop front plane 16j in the front-rear direction.

[0069] In the blower room 4 of the outdoor machine, the outside air taken in from the rear side of the outdoor machine is heat-exchanged in the heat exchanger 12, blown to the front side and flows out to the outside of the outdoor machine through an air outlet provided in the front panel 1. Therefore, the blower room 4 in which the air can easily flow in the front-rear direction is preferable in view of the heat exchange efficiency of the heat exchanger 12. By the vent holes 19 shown in FIG. 12, the

ventilation of the blower room 4 of the outdoor machine becomes good and the air that is heat-exchanged in the heat exchanger 12 can easily flow out to the front side. As a result, the heat exchange efficiency is enhanced.

[0070] In a case where, in the range that there is no problem in strength, a vent hole for passing the air from the rear side to the front side is provided on the periphery of the fixed position of the screw fixing piece 17c or, besides the periphery, a portion of the prop part 16b that does not contribute to the support of other members, the heat exchange efficiency of the heat exchanger 12 is enhanced.

[0071] A configuration for further enhancing the heat exchange efficiency is shown in FIG. 13. FIG. 13 is an enlarged exploded perspective view illustrating the upper end portion of the fan motor support plate 16 and the top plate 17. As shown in FIG. 13, a prop-part-side screw fixing piece 24 protruding downward is provided on the prop front plane 16j and the vent hole 19 penetrating in the front-rear direction is formed on the portion of the prop front plane 16j other than the prop-part-side screw fixing piece 24. The prop-part-side screw fixing piece 24 is formed so as to substantially match the fixed position of the screw fixing piece 17c and has substantially the same shape and size as the screw fixing piece 17c. All of both left and right sides and lower side of the prop-part-side screw fixing piece 24 are formed as the vent hole 19. When such a large vent hole 19 is provided, the ventilation in the front-rear direction of the blower room 4 is improved and therefore it is possible to further enhance the heat exchange efficiency of the heat exchanger 12.

[0072] In such a configuration, the guide part may be configured by enlarging the size in both left and right directions of the prop-part-side screw fixing piece 24 to be larger than the screw fixing piece 17c of the top plate 17 and turning back and jutting, to the front side, outer edges 24a on both left and right sides of the enlarged portion of the prop-part-side screw fixing piece 24. In this configuration, the moving direction of the top plate 17 is guided by causing the contour of the screw fixing piece 17c to be slid to the turned-back edge provided on the outer edge 24a of the prop-part-side screw fixing piece 24 at the time of sliding the top plate 17. Then, since the screw fixing piece 17c is positioned inside the guide part, the top plate 17 is restricted in moving relative to the fan motor support plate 16 in the lateral direction and therefore is temporarily fixed.

[0073] On the contrary, the guide part may be configured by enlarging the size in both left and right directions of the screw fixing piece 17c of the top plate 17 to be larger than the prop-part-side screw fixing piece 24 and turning back and jutting, to the rear side, outer edges on both left and right sides of the enlarged portion of the screw fixing piece 17c. In this configuration, the moving direction of the top plate 17 is guided by causing the outer edge 24a of the prop-part-side screw fixing piece 24 to be slid to the turned-back edge provided on the outer

edge of the screw fixing piece 17c at the time of sliding the top plate 17. Then, since the prop-part-side screw fixing piece 24 is positioned inside the guide part, the top plate 17 is restricted in moving relative to the fan motor support plate 16 in the lateral direction and therefore is temporarily fixed.

[0074] In the configuration of the present illustrative embodiment, as shown in FIG. 13, the guide part may be provided at the periphery of the screw fixing piece 17c, the periphery of the fitting portions 16c, 17b, both upper-side ends 16n of the fan motor support plate 16, both back-side ends 17h of the top plate 17 or the like. When sliding the top plate 17 relative to the fan motor support plate 16, positioning may be made in such a way that the movement in the lateral direction of the top plate 17 is restricted by the guide part and the positions in the lateral direction of the fan-motor-support-plate-side fitting portion 16c and the top-plate-side fitting portion 17b, and the positions in the lateral direction of the top-plate fixing screw hole 16e and the fan-motor-support-plate fixing screw hole 17e are substantially coincided with each other.

[0075] Further, although one fitting portion is provided in the first to fourth illustrative embodiments, a plurality of fitting portions may be provided. For example, the top plate 17 is more stably held in the lateral direction when two fitting portions are provided at positions that are spaced apart in the lateral direction, as seen from the front side. Further, instead of one, a plurality of screw holes 16e, 17e and a plurality of screw fixing piece 17c may be provided at predetermined intervals in the lateral direction.

[0076] Further, although the heat-exchanger-upper-end fixing part 16d is formed integrally with the fan motor support plate 16 on the rear side of the fan motor support plate 16 in the first to fourth illustrative embodiments, this disclosure is not limited to this configuration. The heat-exchanger-upper-end fixing part 16d may be configured separately from the fan motor support plate 16. In other words, the fan motor mount 15 may be configured by three members, i.e., the fan motor support plate 16 extending in the vertical direction, the heat-exchanger-upper-end fixing part 16d extending in the rear side direction and the top plate 17 extending in the front side direction and these members may be, respectively, fixed by a screw in the assembly operation process of the outdoor machine. In this case, each of three members has a shape extending linearly in one direction and therefore it is possible to further enhance the delivery property in the assembly line and in the time of transporting the fan motor mount 15.

[0077] Further, although the prop horizontal plane 16m is configured by a horizontal plane protruding from the upper end portion of the prop 16i to the rear side in the first to fourth illustrative embodiments, the prop horizontal plane 16m may be configured by a horizontal plane protruding to the front side. For example, as shown in FIG. 4, the prop horizontal plane 16m of the fan motor support

plate 16 may be formed so as to protrude from the upper end portion of the prop 16i to the front side. In other words, the prop horizontal plane 16m is formed by a horizontal plane that connects a plurality of props 16i to each other and extends from the props 16i to the front. Further, the prop front plane 16j is configured by a plane that is substantially vertically bent downward from the prop horizontal plane 16m on the front side of the props 16i and faces the front panel 1. Also in this configuration, when the fan-motor-support-plate-side fitting portion 16c provided on the prop horizontal plane 16m is fitted to the rear end of the top plate 17 and, on the front side of the prop front plane 16j, the fan motor support plate 16 is temporarily fixed so as to come into contact with the screw fixing piece 17c provided on the top plate 17, the top plate 17 can be temporarily fixed to the fan motor support plate 16 in a stable manner, as described above.

[0078] As described above, according to this disclosure, an outdoor machine of an air conditioner includes a housing, a heat exchanger 12 which is placed on the rear side, a blower fan 13 which is placed on the front face of the heat exchanger 12 and blows air from the rear side to the front side of the housing, a fan motor 14 which is placed between the heat exchanger 12 and the blower fan 13 and drives the blower fan 13 and a fan motor mount 15 to which the fan motor 14 is fixed. The heat exchanger 12, the blower fan 13, the fan motor 14 and the fan motor mount 15 are placed inside the housing. The fan motor mount 15 includes a fan motor support plate 16 which has a lower end portion fixed to a bottom plate 8 configuring a bottom face of the housing, is provided substantially in a vertical direction toward a top face of the housing and supports the fan motor 14 in a middle of the vertical direction and a top plate 17 which connects and fixes an upper end portion of the fan motor support plate 16 and a front panel 1 configuring a front face of the housing. The fan motor support plate 16 includes a plurality of props 16i which extends substantially in a vertical direction from the bottom plate 8, a prop horizontal plane 16m which connects upper end portions of the props 16i to each other and protrudes in a front-rear direction from the upper end portions of the props 16i, a prop front plane 16j that is a plane which is downward and substantially vertically bent from the prop horizontal plane 16m and faces the front panel 1, a fitting portion 17c which is provided on the prop horizontal plane 16j and fitted to a rear end 17b of the top plate 17 and a screw hole 16e that is provided on the prop front plane 16j and fixes the top plate 17. The top plate 17 includes a screw fixing piece 17c which has a shape parallel to the prop front plane 16j and extending downward and is provided with a screw hole 17e in substantially the same position as the screw hole 16e on the front side thereof. The fitting portion 16c of the fan motor support plate 16 is fitted to the rear end 17b of the top plate 17 and the screw fixing piece 17c of the top plate 17 is located on the front side of the prop front plane 16j of the fan motor support plate 16. With these configurations, it is possible to provide an outdoor

machine of an air conditioner which is capable of suppressing the top panel 3 from being deformed even when a large load is applied from above of the top panel 3, improving the mounting workability of the fan motor mount 15 and enhancing the productivity.

[0079] Further, the prop front plane 16j is a plane connecting the upper end portions of the props 16i to each other and the prop horizontal plane 16m protrudes to the rear side from the upper end portion of the prop front plane 16j and is provided at the rear end thereof with a heat-exchanger-upper-end fixing part 16d for fixing the upper end portion of the heat exchanger. With these configurations, it is possible to provide an outdoor machine of an air conditioner which is capable of suppressing the top panel 3 from being deformed even when a large load is applied from above of the top panel 3, improving the mounting workability of the fan motor mount 15 and enhancing the productivity.

[0080] Further, the fitting portion 16c has a shape which includes an upright portion 16q and a horizontal plate piece 16p formed by cutting and raising a center portion in the lateral direction of the prop horizontal plane 16m into an L-shaped cross-section and includes openings at both left and right sides and the front side of the fitting portion other than the upright portion 16q. Further, by locating the rear end 17a of the top plate 17 below the horizontal plate piece 16p, the movement in the vertical direction of the top plate 17 is restricted. With these configurations, it is possible to provide an outdoor machine of an air conditioner which is capable of improving the mounting workability of mounting the top plate 17 to the fan motor support plate 16 and enhancing the productivity.

[0081] Further, the fan motor support plate 16 includes guide parts 16f, 16h for restricting the movement in the lateral direction of the top plate 17 relative to the fan motor support plate 16 whereby the movement in the lateral direction of the top plate 17 relative to the fan motor support plate 16 is restricted. As a result, it is possible to provide an outdoor machine of an air conditioner which is capable of improving the mounting workability of mounting the top plate 17 to the fan motor support plate 16 and enhancing the productivity.

[0082] Further, the top plate 17 includes a guide part 17f for restricting the movement in the lateral direction of the top plate 17 relative to the fan motor support plate 16 whereby the movement in the lateral direction of the top plate 17 relative to the fan motor support plate 16 is restricted. As a result, it is possible to provide an outdoor machine of an air conditioner which is capable of improving the mounting workability of mounting the top plate 17 to the fan motor support plate 16 and enhancing the productivity.

[0083] Further, the guide parts 16f, 16h are provided on at least left and right sides of the contour of the screw fixing piece 17c placed on the front side of the prop front plane 16j of the fan motor support plate 16 and has a shape protruding to the front side. Further, by placing the

screw fixing piece 17c between the left and right guide parts 16f, 16h, the movement in the lateral direction of the screw fixing piece 17c is restricted and the movement in the lateral direction of the top plate 17 relative to the fan motor support plate 16 is restricted. With these configurations, it is possible to provide an outdoor machine of an air conditioner which is capable of improving the mounting workability of mounting the top plate 17 to the fan motor support plate 16 and enhancing the productivity.

[0084] Further, the guide part 16f is formed by cutting and raising the prop front plane 16j to the front side. Accordingly, it is possible to provide an outdoor machine of an air conditioner which is capable of enhancing the mounting workability by restricting the movement in the lateral direction of the top plate 17 with a simple configuration, improving the ventilation of the blower room 4 of the outdoor machine by the hole 16g formed as a result of the cutting and raising and improving the heat exchange efficiency of the heat exchanger 12.

[0085] Further, the screw fixing piece 17c is located at the lowermost position of the top plate 17 in a state where the top plate 17 is fitted to the fitting portion 16c of the fan motor support plate 16. Accordingly, a worker can fasten a screw while watching the screw holes 17e, 16e from the front side. As a result, it is possible to provide an outdoor machine of an air conditioner which is capable of enhancing the mounting workability and further improving the productivity.

[0086] Further, a vent hole 19 penetrating the prop front plane 16j is provided on the prop front plane 16j near which the screw fixing piece 17c is placed. With this configuration, it is possible to provide an outdoor machine of an air conditioner which is capable of improving the ventilation of the blower room of the outdoor machine and improving the heat exchange efficiency of the heat exchanger 12.

Claims

1. An outdoor machine of an air conditioner, comprising:

- a housing;
- a heat exchanger, which is placed on a rear side;
- a blower fan, which is placed on a front side of the heat exchanger and blows air from the rear side to the front side of the housing;
- a fan motor, which is placed between the heat exchanger and the blower fan and drives the blower fan; and
- a fan motor mount, to which the fan motor is fixed,

wherein the heat exchanger, the blower fan, the fan motor and the fan motor mount are placed inside the housing,

wherein the fan motor mount comprises:

a fan motor support plate, which has a lower end portion fixed to a bottom plate configuring a bottom face of the housing, is provided substantially in a vertical direction toward a top face of the housing and supports the fan motor in a middle of the vertical direction; and

a top plate, which connects to fix an upper end portion of the fan motor support plate and a front panel configuring a front face of the housing,

wherein the fan motor support plate is formed with:

a plurality of props which extends substantially in the vertical direction from the bottom plate;

a prop horizontal plane, which connects upper end portions of the props to each other and extends in a front-rear direction from the upper end portions of the props;

a prop front plane, which is downwardly and substantially vertically bent from the prop horizontal plane to face the front panel;

a fitting portion, which is provided on the prop horizontal plane and fitted to a rear end of the top plate; and

a first screw hole, which is provided on the prop front plane to fix the top plate,

wherein the top plate is formed with:

a screw fixing piece, which has a shape parallel to the prop front plane and extending downward and is provided with a second screw hole corresponding the first screw hole of the fan motor support plate, wherein the fitting portion of the fan motor support plate is fitted to the rear end of the top plate, and

wherein the screw fixing piece of the top plate is located on the front side of the prop front plane of the fan motor support plate.

2. The outdoor machine of the air conditioner according to claim 1, wherein the prop front plane connects the upper end portions of the props to each other, wherein the prop horizontal plane protrudes to the rear side from the upper end portion of the prop front plane, and wherein the rear end of the prop horizontal plane is provided with an upper end fixing part to fix the upper end portion of the heat exchanger.
3. The outdoor machine of the air conditioner according to claim 1 or 2,

wherein the fitting portion has a shape an L-shaped cross-section including an upright portion and a horizontal plate piece formed by cutting and raising a center portion in the lateral direction of the prop horizontal plane, so that an opening is formed at both left and right sides and the front side of the fitting portion, except for a position corresponding to the upright portion; and
 wherein, when the rear end of the top plate below the horizontal plate piece is located, the movement in the vertical direction of the top plate is restricted.

4. The outdoor machine of the air conditioner according to any one of claims 1 to 3,
 wherein at least one of the fan motor support plate and the top plate comprises a guide part restricting the movement in the lateral direction of the top plate relative to the fan motor support plate.
5. The outdoor machine of the air conditioner according to claim 4,
 wherein the guide part protrudes to the front side to be placed at least left and right sides of the screw fixing piece placed on the front side of the prop front plane of the fan motor support plate, and
 wherein, when the screw fixing piece between the left and right guide parts is placed, a movement in the lateral direction of the screw fixing piece is restricted, so that the movement in the lateral direction of the top plate relative to the fan motor support plate is restricted.
6. The outdoor machine of the air conditioner according to claim 5,
 wherein the guide part is formed by cutting and raising the prop front plane to the front side.
7. The outdoor machine of the air conditioner according to any one of claims 1 to 6,
 wherein the screw fixing piece is located at the lowermost position of the top plate in a state where the top plate is fitted to the fitting portion of the fan motor support plate.
8. The outdoor machine of the air conditioner according to any one of claims 1 to 7,
 wherein a vent hole penetrating the prop front plane is provided on the prop front plane near the screw fixing piece.

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FIG.1

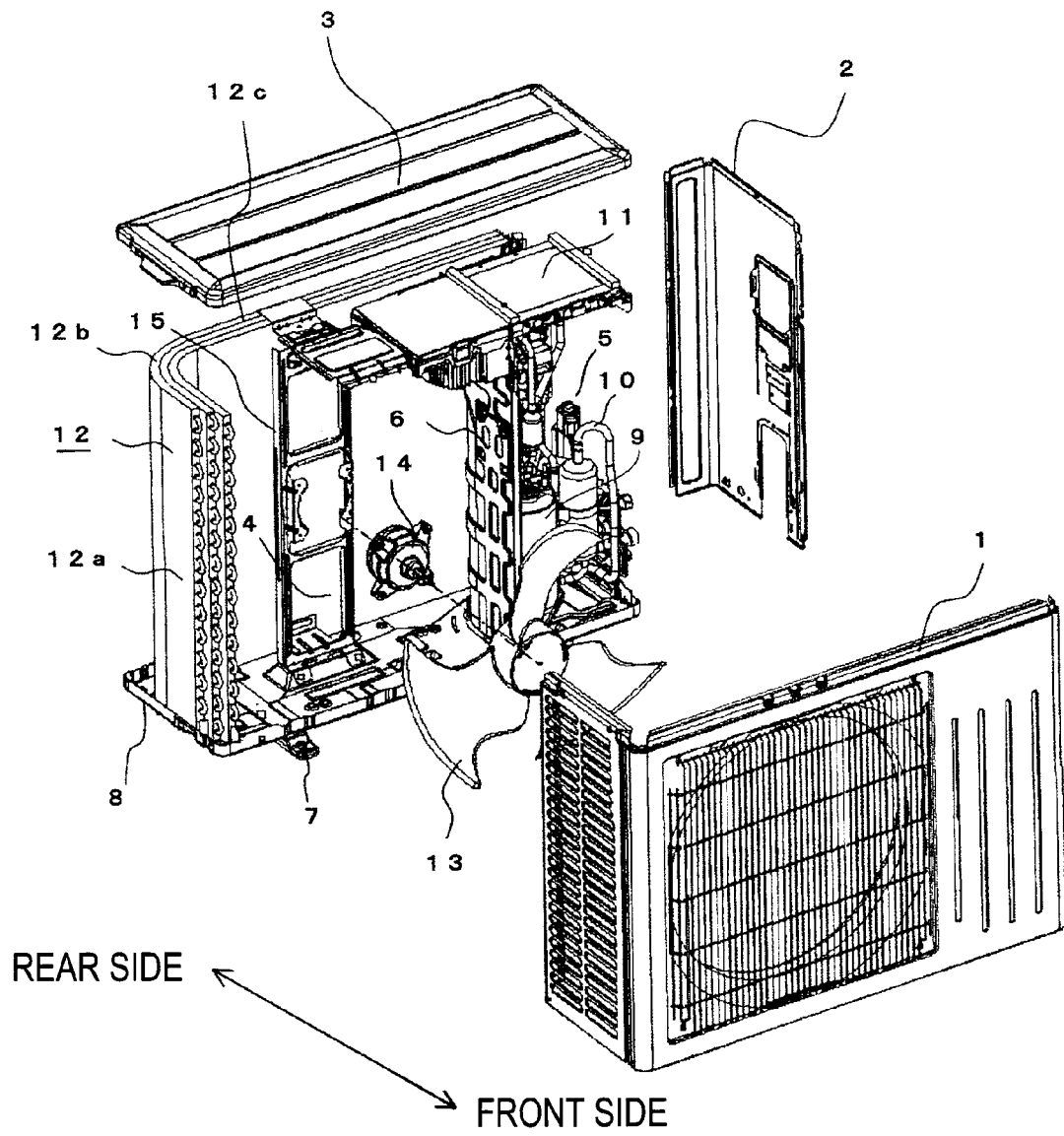


FIG.2

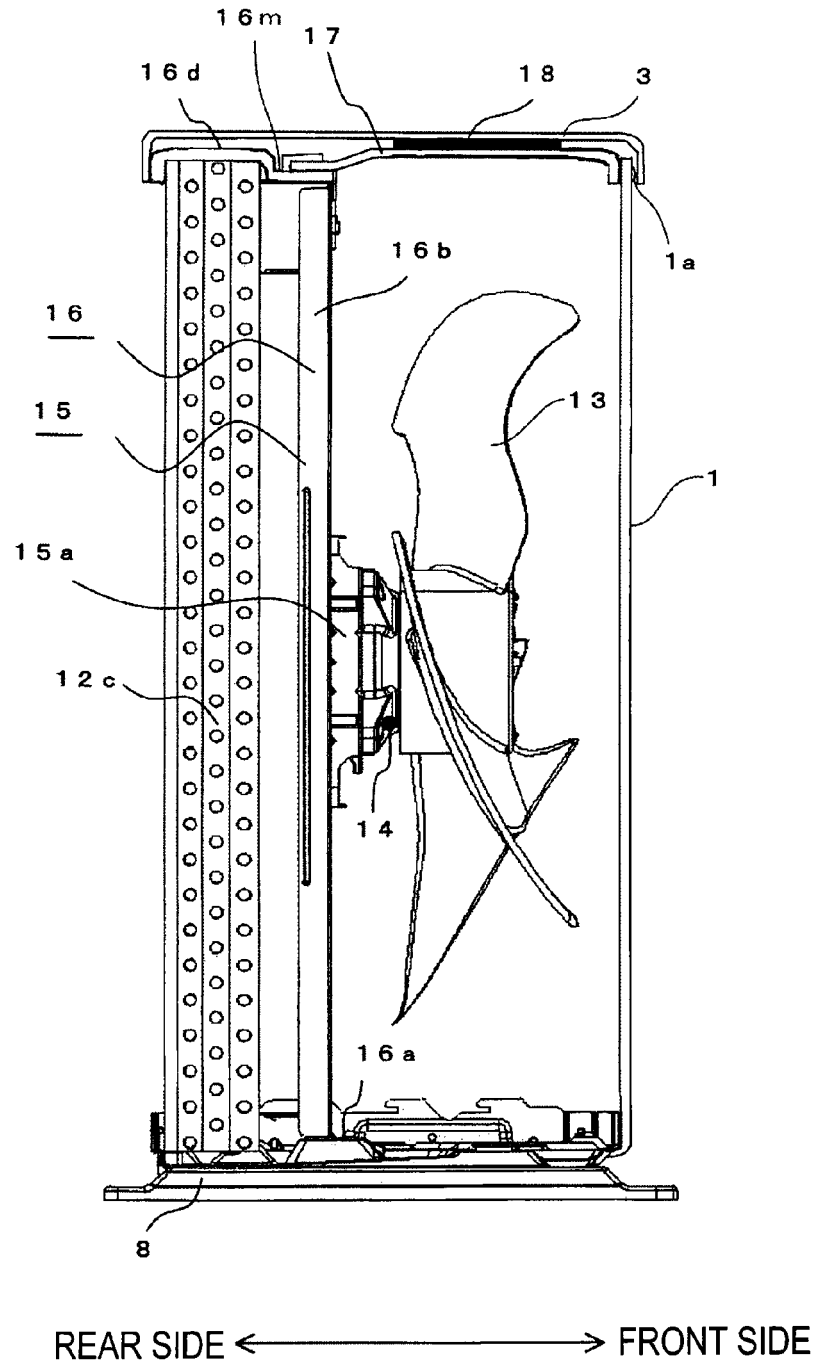


FIG.3

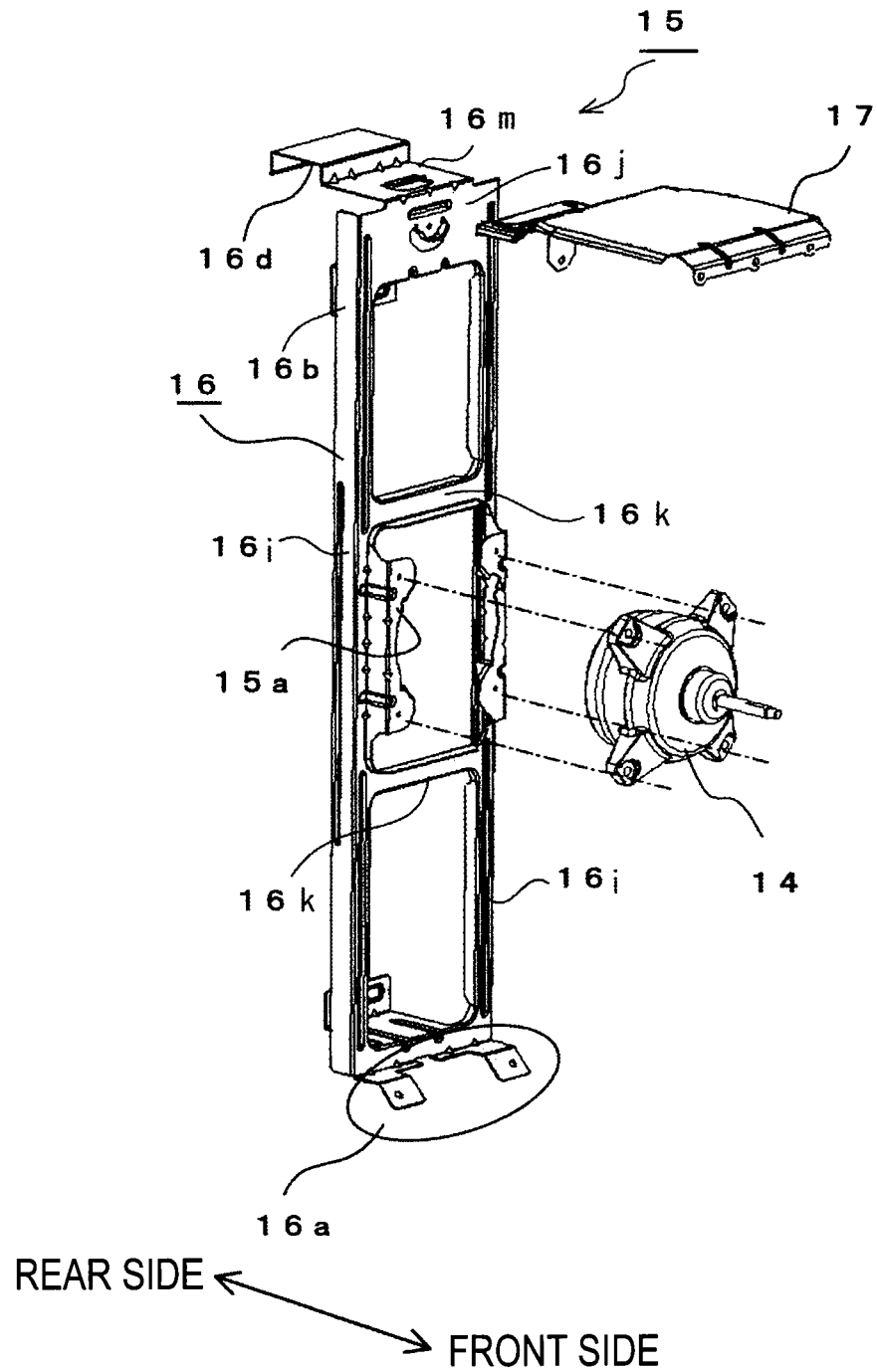


FIG.4

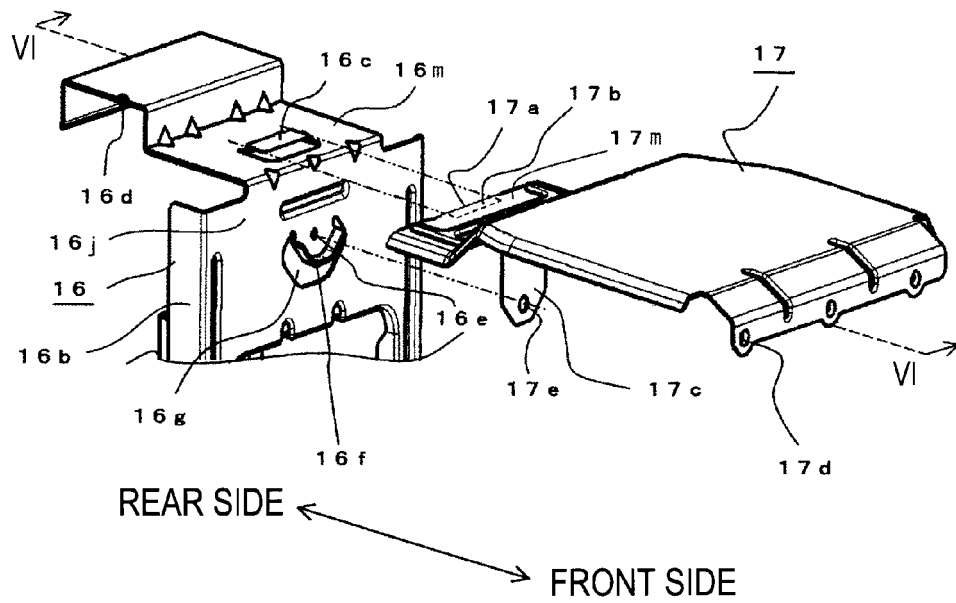


FIG.5A

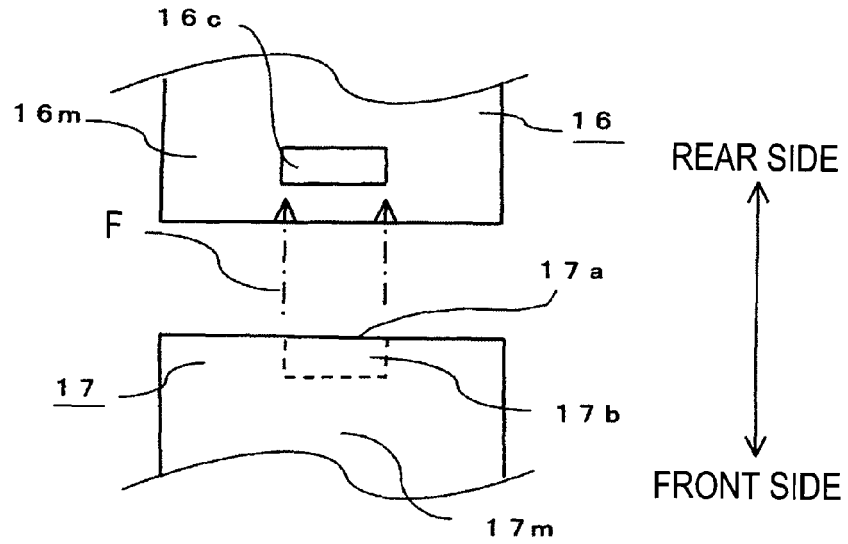


FIG.5B

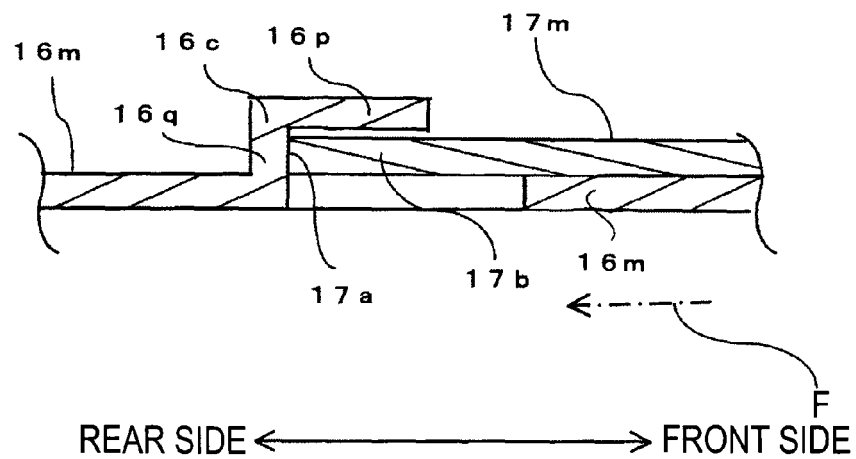


FIG.6

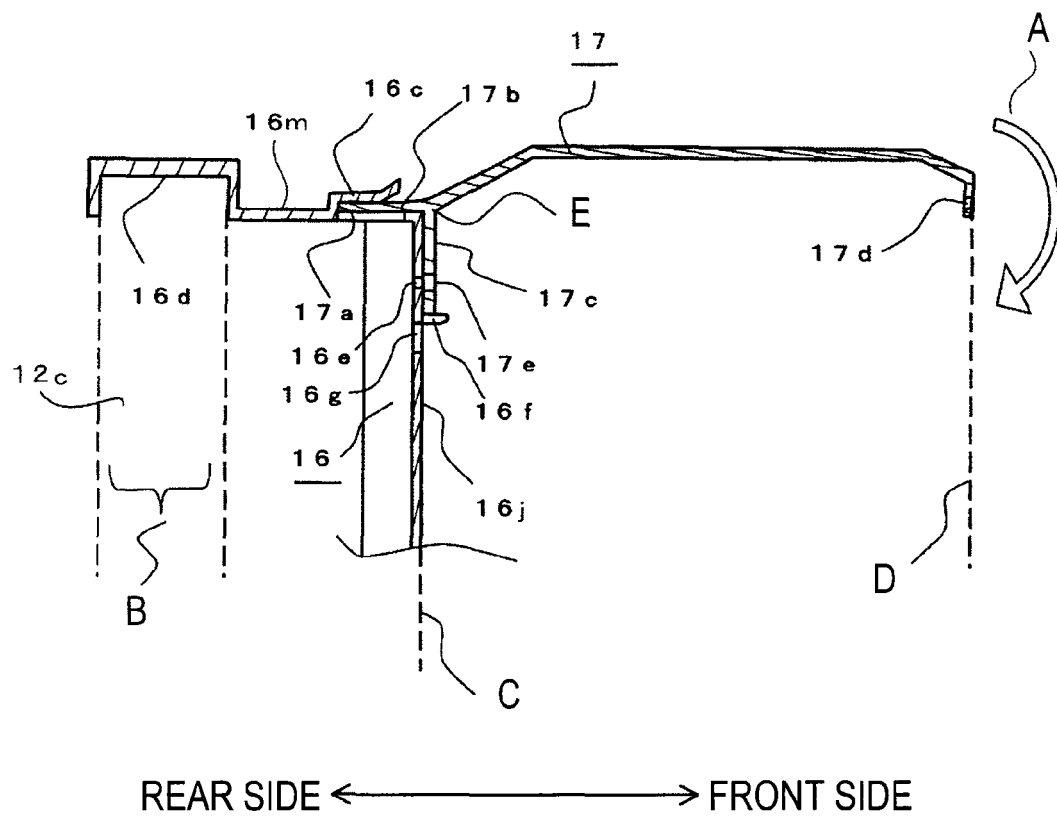


FIG.7

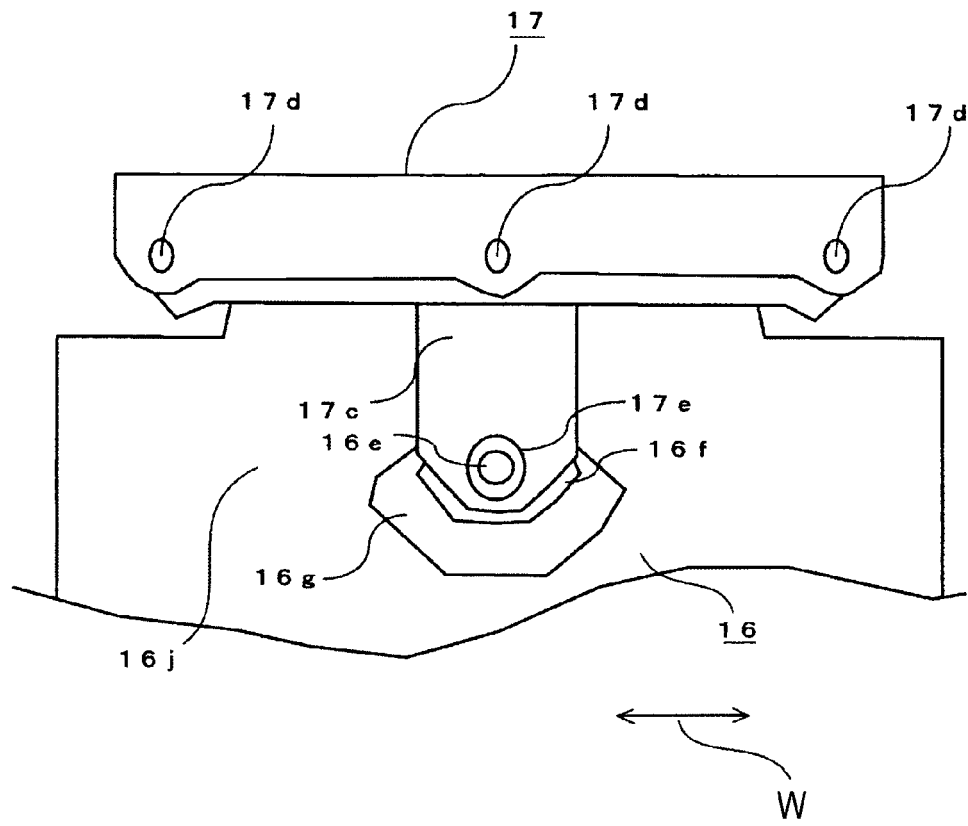


FIG.8A

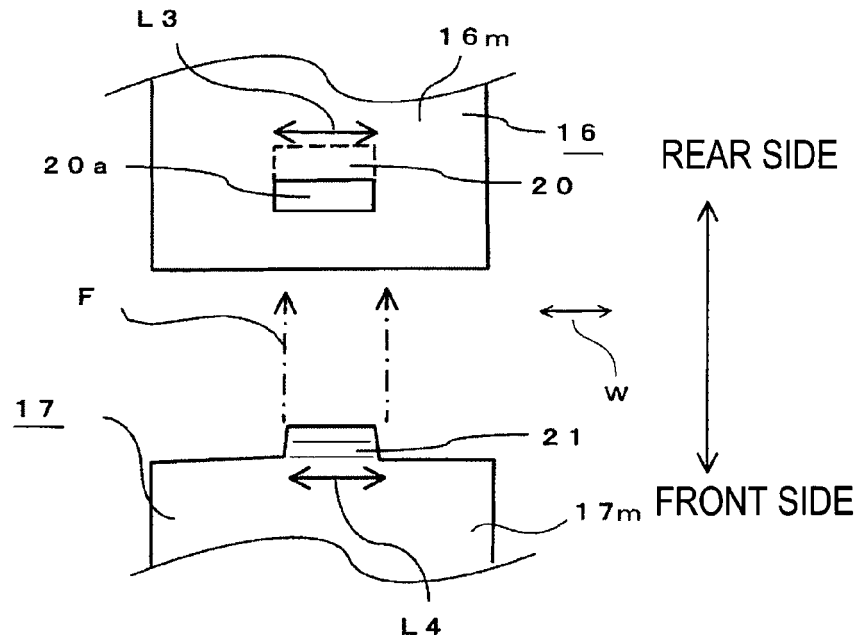


FIG.8B

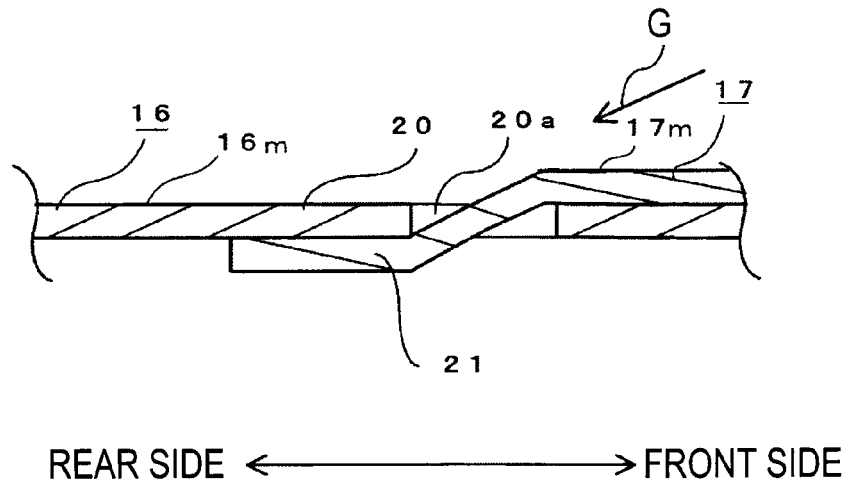


FIG.9

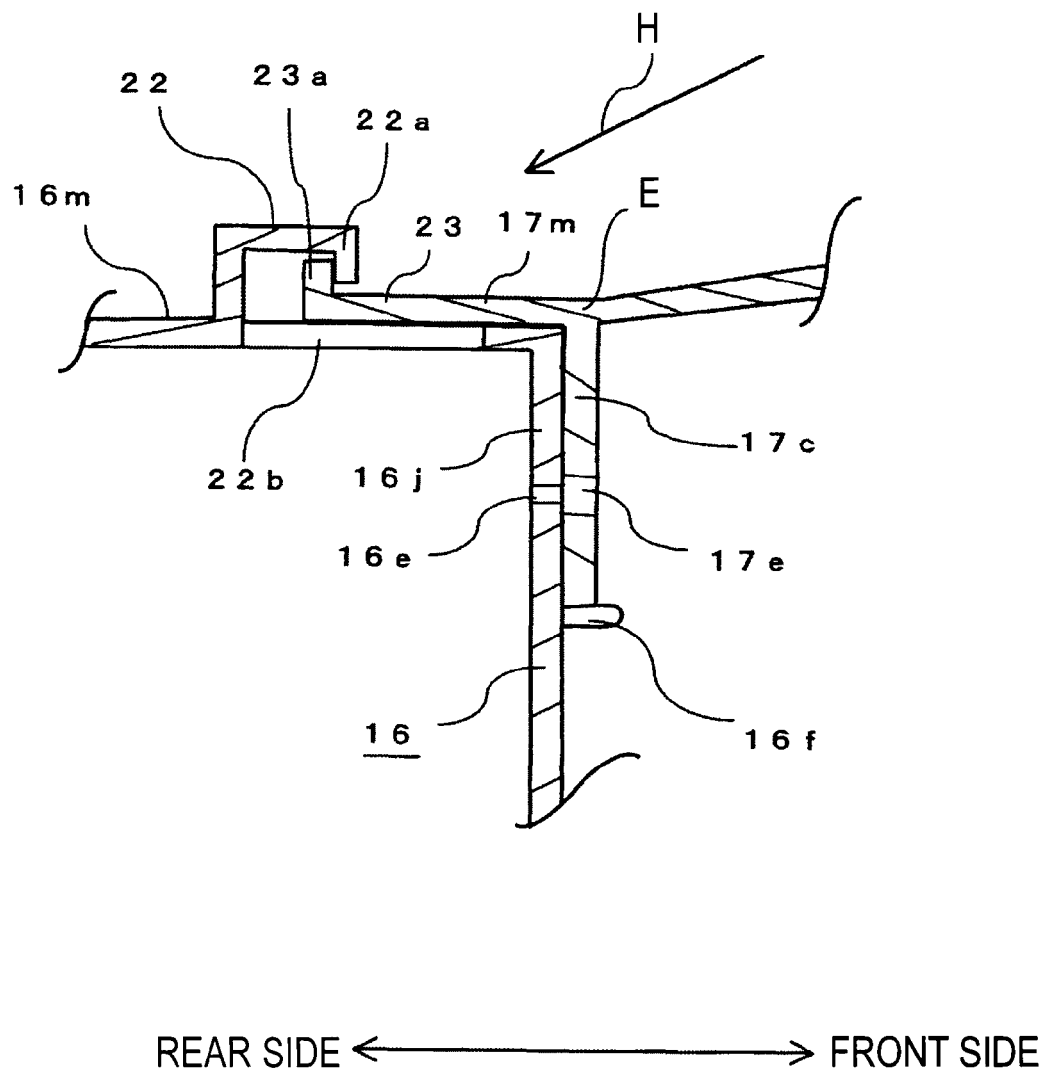


FIG.10

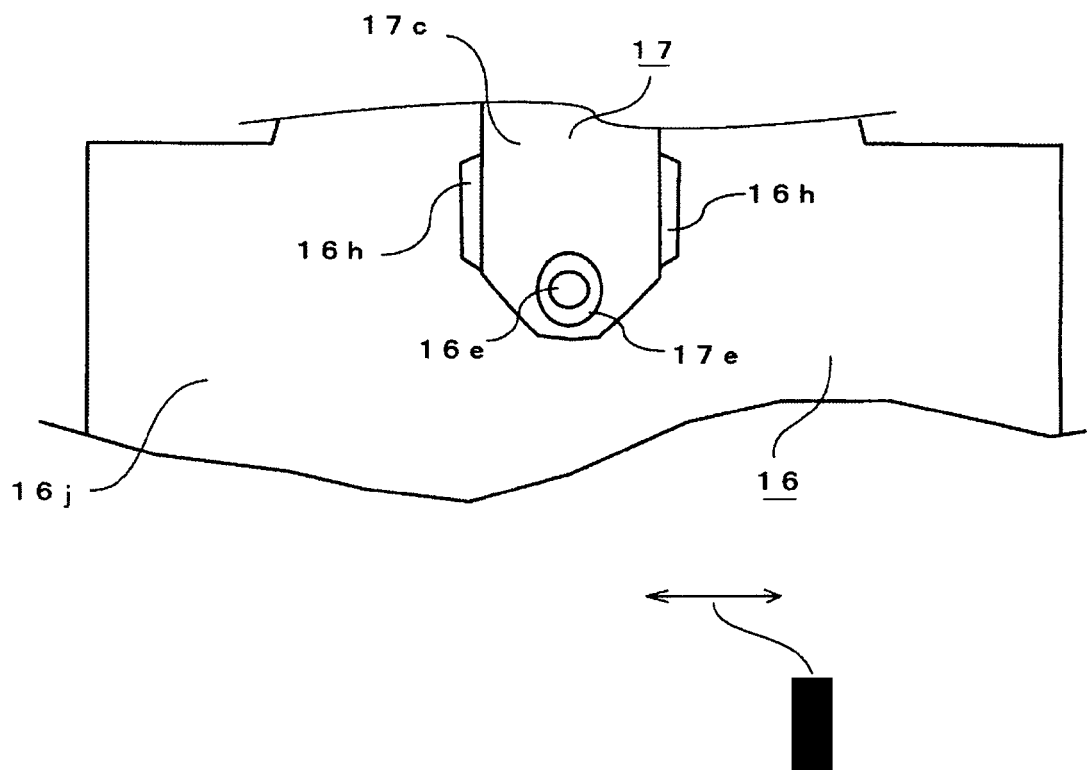


FIG.11

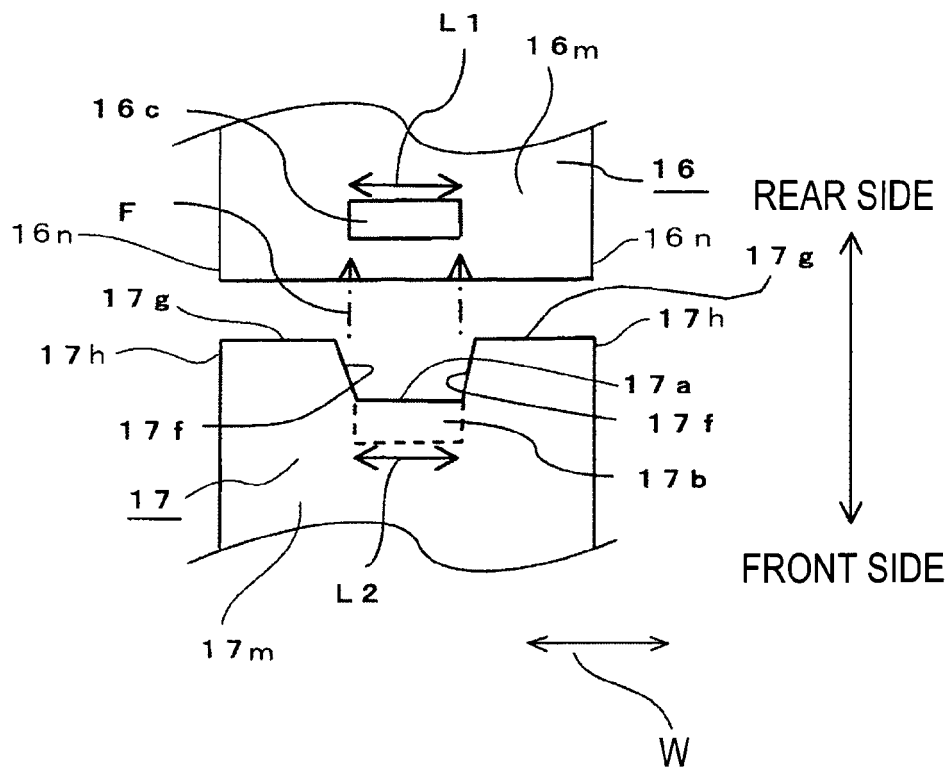


FIG.12

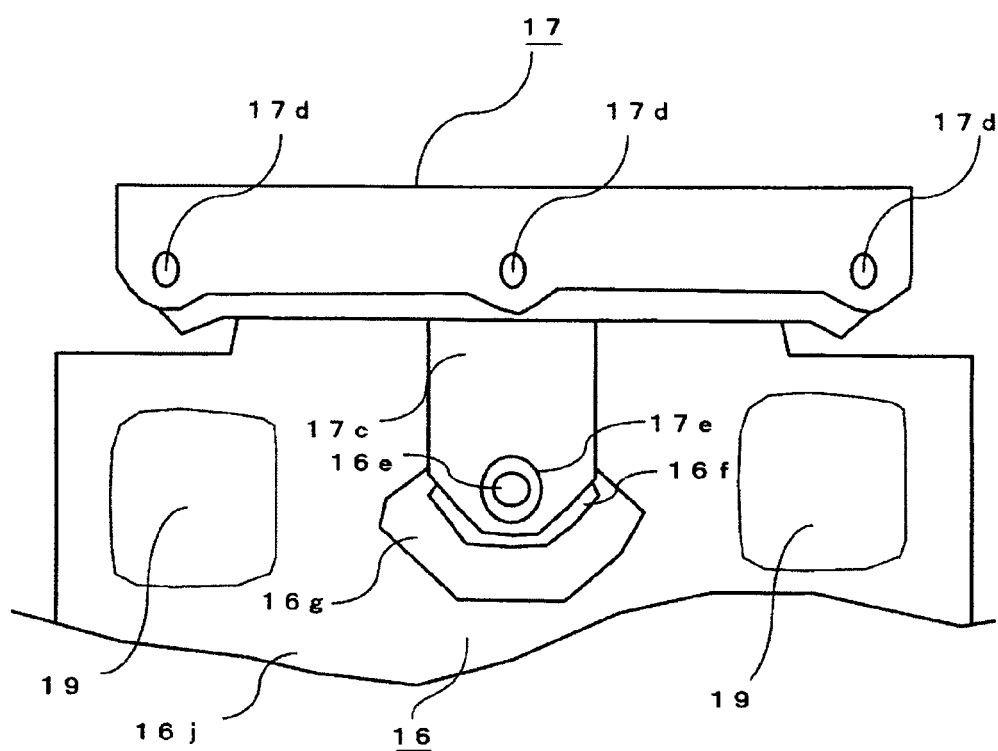
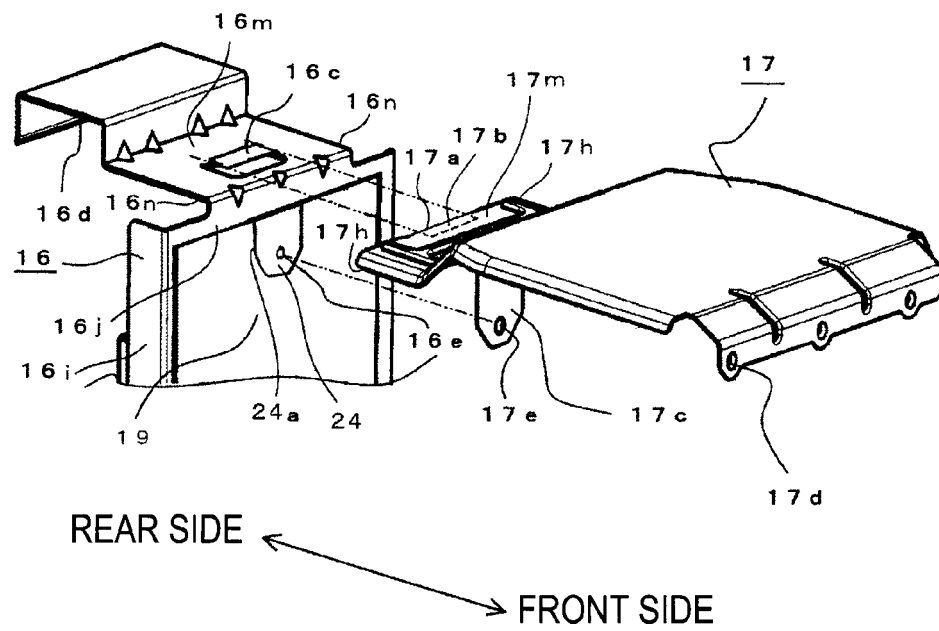


FIG.13



REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- JP 2011038657 A [0006] [0009]
- JP UMYH03032901 B [0006] [0010]