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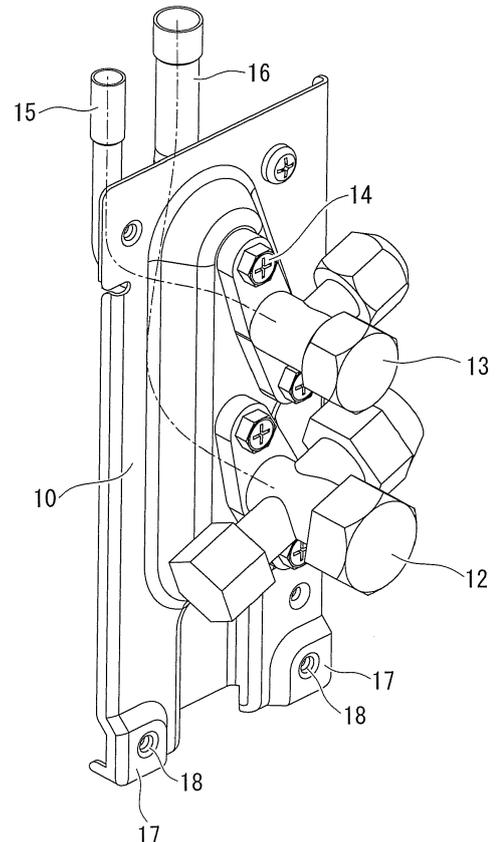
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(54) **Air conditioner outdoor unit**

(57) In this air conditioner outdoor unit in which a flange portion is provided on a periphery of a baseplate so as to extend vertically upward from the periphery, and an operating-valve bracket (10) is fixed to the flange portion, a pair of dish-shaped projection portions 17, having a predetermined distance therebetween, are provided at one of fastening sites on the operating-valve bracket (10) which are to be fixed to the flange portion and fastening sites on the flange portion which are to be fixed to the operating-valve bracket, so as to project from a side surface thereof toward a side surface of the other by a certain dimension; a certain space is formed between the side surfaces of the operating-valve bracket (10) and the flange portion by the dish-shaped projection portions (17); and the operating-valve bracket (10) is fixed to the flange portion.

FIG. 3



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Description

Technical Field

[0001] The present invention relates to an air conditioner outdoor unit in which an operating-valve bracket is installed on a baseplate of the outdoor unit.

{Background Art}

[0002] In an air conditioner outdoor unit, an operating-valve bracket that is provided with operating valves to which refrigerant pipes are connected is installed inside a machine chamber in the outdoor unit so as to be exposed to the outside from a side panel. As disclosed in PTL 1, this operating-valve bracket is fixed to a flange portion that is provided on the periphery of a baseplate of the outdoor unit so as to extend vertically upward. Furthermore, in order to allow access to the operating valves from the outside, the operating-valve bracket is installed such that the operating valves are exposed to the outside from the side panel.

[0003] As the operating valves, two valves, specifically, a gas-side operating valve and a liquid-side operating valve, are vertically arranged in a slanted direction, and a gas-side refrigerant pipe and a liquid-side refrigerant pipe that are connected to an indoor unit can be connected to these operating valves. The operating valves and the outer surface of the operating-valve bracket are covered with a service cover (also referred to as side cover) that is detachably attached to a side panel of the outdoor unit.

Citation List}

Patent Literature

[0004] {PTL 1} Japanese Unexamined Patent Application, Publication No. H10-259932

Summary of Invention

Technical Problem

[0005] In the above-described outdoor unit, the gas-side operating valve and the liquid-side operating valve are provided on the operating-valve bracket. When a low-pressure refrigerant is circulated through the operating valves, the operating-valve bracket is cooled together with the operating valves, and dew condensation water is produced on the surfaces thereof. The dew condensation water flows downward along the surface of the operating-valve bracket and, in some cases, splashes or leaks out from a portion where the operating-valve bracket is installed to the outside of the baseplate beyond the flange portion provided at the periphery of the base plate, whereas the dew condensation water flowing downward should normally be recovered in the baseplate with the

flange portion which extends upward at the periphery thereof.

[0006] This occurs because the side surface of the operating-valve bracket is fixed by being fastened to the inner surface of the flange portion by means of screws, and thus the dew condensation water flowing downward on the surface of the operating-valve bracket flows out beyond the flange portion. When a large quantity of dew condensation water is produced, the quantity of dew condensation water splashing or leaking out is increased, which may lead to trouble depending on how or where the outdoor unit is installed.

[0007] The present invention has been made in view of such circumstances, and an object thereof is to provide an air conditioner outdoor unit capable of reliably recovering, in the baseplate, dew condensation water that is produced through dew condensation on the surfaces of the operating-valve bracket and on the operating valves and that flows downward on the surfaces.

Solution to Problem

[0008] In order to make an improvement in the above-mentioned circumstances, the air conditioner outdoor unit of the present invention employs the following solutions. Specifically, according to a first aspect, the present invention provides an air conditioner outdoor unit in which a flange portion is provided on a periphery of a baseplate so as to extend vertically upward from the periphery, and an operating-valve bracket is fixedly attached to the flange portion, the air conditioner outdoor unit comprising a pair of dish-shaped projection portions provided on one of a side surface of the operating-valve bracket at fastening sites which are fixed to the flange portion and a side surface of the flange portion at fastening sites which are fixed to the operating-valve bracket so that the dish-shaped projection portions project toward the side surface of the other by a certain dimension, the pair of dish-shaped projection portions having a predetermined distance therebetween, wherein the operating-valve bracket is fixed to the flange portion such that a space is formed between the side surface of the operating-valve bracket and the side surface of the flange portion by the dish-shaped projection portions.

[0009] According to the first aspect of the present invention, in the air conditioner outdoor unit in which the operating-valve bracket is fixed to the flange portion provided on the periphery of the baseplate, the pair of dish-shaped projection portions, having the predetermined space therebetween, are provided on one of the side surface of the operating-valve bracket at fastening sites which are to be fixed to the flange portion and the side surface of the flange portion at fastening sites which are to be fixed to the operating-valve bracket, so as to project toward the side surface of the other by a fixed dimension, and the operating-valve bracket is fixed to the flange portion such that the certain space is formed between the side surface of the operating-valve bracket and the side

surface of the flange portion by the dish-shaped projection portions. Thus, the operating-valve bracket can be fixed to the flange portion on the periphery of the baseplate, such that a space corresponding to the projection dimension of the dish-shaped projection portions is formed between the side surface of the flange portion on the periphery of the baseplate and the side surface of the operating-valve bracket, which is fixed to the flange portion. Then, dew condensation water that is produced through dew condensation occurring on the surface of the operating-valve bracket when the operating-valve bracket is cooled by the operating valves and that drips down can be recovered in the baseplate via that space. Therefore, the dew condensation water produced through dew condensation on the surface of the operating-valve bracket can be reliably recovered in the baseplate and discharged, thus making it possible to prevent a situation in which the dew condensation water splashes or leaks out to the outside from the side surface on which the operating valves are provided.

[0010] Furthermore, according to a second aspect of the present invention, in the above-described air conditioner outdoor unit, the pair of dish-shaped projection portions are provided at lower portions on an outer surface of the operating-valve bracket so as to have the predetermined distance therebetween.

[0011] According to the second aspect of the present invention, the pair of dish-shaped projection portions, having a predetermined distance therebetween, are provided at lower portions on the outer surface of the operating-valve bracket. Thus, by fixing the operating-valve bracket, which is provided with the pair of dish-shaped projection portions projecting from the outer surface thereof toward the flange portion by the certain dimension at the fastening sites which are to be fixed to the flange portion, to the flange portion via the dish-shaped projection portions, the space corresponding to the projection dimension of the dish-shaped projection portions can be formed between the side surfaces of the flange portion and the operating-valve bracket. Therefore, dew condensation water produced through dew condensation on the surface of the operating-valve bracket can be recovered in the baseplate via the space, thus making it possible to reliably prevent the dew condensation water from splashing or leaking out to the outside from the side surface on which the operating valves are provided.

[0012] Furthermore, according to a third aspect of the present invention, in one of the above-described air conditioner outdoor units, a portion of the flange portion between the pair of fastening sites at which the operating-valve bracket is fastened bulges outward by a certain dimension.

[0013] According to the third aspect of the present invention, a portion of the flange portion between the pair of fastening sites at which the operating-valve bracket is fastened bulges outward by the certain dimension. Thus, the space formed between the side surface of the flange portion and the side surface of the operating-valve bracket

can be made to correspond to the sum of the projection dimension of the dish-shaped projection portions and the outward-bulging dimension of the flange portion. Therefore, the space for guiding dew condensation water produced through dew condensation on the surface of the operating-valve bracket to the inside of the baseplate can be made even larger, thus facilitating the recovery of the dew condensation water in the baseplate.

[0014] Furthermore, according to a fourth aspect of the present invention, in the above-described air conditioner outdoor unit, the pair of dish-shaped projection portions are provided on an inner surface of the flange portion so as to have the predetermined distance therebetween.

[0015] According to the fourth aspect of the present invention, the pair of dish-shaped projection portions, having the predetermined distance therebetween, are provided on the inner surface of the flange portion. Thus, the pair of dish-shaped projection portions are provided at the fastening sites on the flange portion so as to project from the inner surface thereof toward the operating-valve bracket by the certain dimension, and the operating-valve bracket is fixed to the flange portion via the dish-shaped projection portions, thereby making it possible to form a space corresponding to the projection dimension of the dish-shaped projection portions, between the side surfaces of the flange portion and the operating-valve bracket. Therefore, dew condensation water produced through dew condensation on the surface of the operating-valve bracket can be recovered in the baseplate via the space, and the dew condensation water can be reliably prevented from splashing or leaking out to the outside of the side surface on which the operating valves are provided.

Advantageous Effects of Invention

[0016] According to the present invention, it is possible to fix the operating-valve bracket to the flange portion on the periphery of the baseplate, forming a space corresponding to the projection dimension of the dish-shaped projection portions, between the side surface of the flange portion on the periphery of the baseplate and the side surface of the operating-valve bracket fixed to the flange portion. Furthermore, dew condensation water that is produced through dew condensation occurring on the surface of the operating-valve bracket when the operating-valve bracket is cooled by operating valves and that drips down can be recovered in the baseplate via the space. Thus, the dew condensation water produced through dew condensation on the surface of the operating-valve bracket can be reliably recovered in the baseplate and discharged, thus making it possible to prevent a situation in which the dew condensation water splashes or leaks out to the outside from the side surface on which the operating valves are provided.

Brief Description of Drawings

[0017]

{Fig. 1} Fig. 1 is a perspective view showing an air conditioner outdoor unit with a service panel removed from the outdoor unit according to a first embodiment of the present invention.

{Fig. 2} Fig. 2 is a perspective view showing a state in which an operating-valve bracket has been installed on a baseplate of the outdoor unit shown in Fig. 1.

{Fig. 3} Fig. 3 is a perspective view of the operating-valve bracket shown in Fig. 2.

{Fig. 4} Fig. 4 is a longitudinal sectional view of an installation portion where the operating-valve bracket shown in Fig. 2 is installed.

{Fig. 5} Fig. 5 is a partial perspective view of an operating-valve bracket and a flange portion on a baseplate according to another embodiment of the present invention.

{Description of Embodiments}

[0018] Embodiments of the present invention will be described below with reference to the drawings.

[First Embodiment]

[0019] A first embodiment of the present invention will be described below with reference to Figs. 1 to 4.

Fig. 1 is a perspective view showing an air conditioner outdoor unit with a service panel removed from the outdoor unit according to the embodiment of the present invention. Fig. 2 is a perspective view showing a state in which an operating-valve bracket has been installed on a baseplate. Fig. 3 is a perspective view of the operating-valve bracket. Fig. 4 is a longitudinal sectional view of an installation portion where the operating-valve bracket is installed.

An air conditioner outdoor unit 1 has a chassis 2 comprising a baseplate 3 that is provided with a plurality of mounting legs 4 on a bottom surface thereof, a front panel 5 that is provided with an outlet grille 6 and that is installed on the baseplate 3, right and left side panels 7, 8, and a top panel 9.

[0020] The rear side of the chassis 2 is almost wholly open, and a plate-fin-tube outdoor heat exchanger is installed in alignment with the opening. As is known, the inside of the chassis 2 is separated into a heat exchanger chamber and a machine chamber by a partition plate. The heat exchanger chamber includes the above-described outdoor heat exchanger and an air-blowing fan that makes outside air circulate through the outdoor heat exchanger and that blows it out to the front outside from the outlet grille 6. The machine chamber includes a compressor, a four-way switching valve, a control box, an operating-valve bracket 10, and a terminal block 11 to which a power line and a communication line are connected.

[0021] As shown in Fig. 1, the operating-valve bracket 10 and the terminal block 11 are installed so as to be

exposed to the outside from the side panel 7, and the outer surface side thereof is covered with a service cover (also referred to as side cover) (not shown) that is detachably attached to the side panel 7 of the outdoor unit 1.

[0022] As shown in Fig. 2, the baseplate 3 of the chassis 2 is a horizontally elongated rectangular steel plate, portions for installing the outdoor heat exchanger, the air-blowing fan, and the compressor are formed thereon, and a flange portion 3A that extends vertically upward and has a predetermined height is formed on the periphery thereof. The operating-valve bracket 10 is fixed to a portion of the flange portion 3A located at the right side of the baseplate 3, via fastening means, such as screws.

[0023] The operating-valve bracket 10 is a vertically elongated rectangular steel part. Two operating valves 12 and 13, specifically, a gas-side operating valve (operating valve) 12 and a liquid-side operating valve (operating valve) 13, to which a gas-side refrigerant pipe and a liquid-side refrigerant pipe that are connected to an indoor unit can be respectively connected. The valves are fixed to the operating-valve bracket 10 by means of screws 14 so that the operating valves 12 and 13 are vertically arranged in a slanted direction. The gas-side operating valve 12 and the liquid-side operating valve 13 are provided with refrigerant connection pipes 16 and 15 to be connected to components of the outdoor unit 1.

[0024] Furthermore, as shown in Fig. 3, in order to fasten the operating-valve bracket 10 to the flange portion 3A of the baseplate 3 by means of screws, a pair of dish-shaped projection portions 17 that are provided with a predetermined distance therebetween and that project toward the flange portion 3A by a certain dimension are formed integrally with the operating-valve bracket 10, and the projection portions are provided at fastening sites to be fixed to the flange portion 3A, which are located at right and left lower portions on the outer surface of the operating-valve bracket 10. The pair of dish-shaped projection portions 17 have fastening holes 18 for fastening screws.

[0025] In this way, by providing the pair of dish-shaped projection portions 17, which project toward the flange portion 3A by the certain dimension, at the fastening sites on the operating-valve bracket 10 which are to be fixed to the flange portion 3A, and by fixing the operating-valve bracket 10 to an inner surface of the flange portion 3A, as shown in Fig. 4, a space S having the certain dimension is formed between an outer surface of the operating-valve bracket 10 and the inner surface of the flange portion 3A. Thus, dew condensation water that is produced through dew condensation occurring on the surfaces of the operating-valve bracket 10, the gas-side operating valve 12, and the liquid-side operating valve 13 and that flows downward along the surface of the operating-valve bracket 10 can be recovered in the baseplate 3 via the space S.

[0026] With the above-described structure, the following advantageous effects are achieved according to this embodiment.

When the air conditioner is operated, and thus a low-pressure refrigerant circulates through the gas-side operating valve 12 and the liquid-side operating valve 13, the operating valves 12, 13 and the operating-valve bracket 10 on which the operating valves 12, 13 are provided are cooled, and water contained in the air may be changed to dew condensation water on the surfaces thereof. Although the dew condensation water flows downward along the surface of the operating-valve bracket 10, it is necessary to recover it completely in the baseplate 3.

[0027] Because the outdoor unit 1 is usually located outside, even if drainage water produced in the outdoor unit 1 is directly discharged to the outside, this causes little problem. However, depending on how or where the outdoor unit 1 is located, for example, in a case in which the outdoor unit 1 is suspended from a balcony, in some cases it is necessary to avoid a situation in which drainage water splashes or leaks out to the outside from unspecified locations. In such cases, a discharge hole is generally provided at a specified location on the baseplate 3, and drainage water is discharged therefrom.

[0028] However, in this embodiment, the space S corresponding to the projection dimension of the dish-shaped projection portions 17, which are provided on the operating-valve bracket 10, can be formed between the side surface of the flange portion 3A on the periphery of the baseplate 3 and the side surface of the operating-valve bracket 10 to be fixed to the flange portion 3A, and the operating-valve bracket 10 can be fixed to the flange portion 3A on the periphery of the baseplate 3. Thus, dew condensation water that is produced through dew condensation occurring on the surface of the operating-valve bracket 10 when the operating-valve bracket 10 is cooled by the gas-side operating valve 12 and the liquid-side operating valve 13 and that drips down can be recovered in the baseplate 3 via the space S. Therefore, dew condensation water produced through dew condensation on the surface of the operating-valve bracket 10 can be reliably recovered in the baseplate 3, thus making it possible to prevent a situation in which the dew condensation water splashes or leaks out to the outside from the side surface on which the operating valves 12, 13 are provided.

[0029] Furthermore, the pair of the dish-shaped projection portions 17, having a predetermined distance therebetween, are provided at lower portions on the outer surface of the operating-valve bracket 10. Thus, by fixing the operating-valve bracket 10, which is provided with the pair of dish-shaped projection portions 17 projecting from the outer surface thereof toward the flange portion 3A by a certain dimension at the fastening sites which are to be fixed to the flange portion 3A, to the flange portion 3A via the dish-shaped projection portions 17, the space S corresponding to the projection dimension of the dish-shaped projection portions 17 can be formed between the side surfaces of the flange portion 3A and the operating-valve bracket 10. Therefore, dew conden-

sation water produced through dew condensation on the surface of the operating-valve bracket 10 can be recovered in the baseplate 3 via the space S, and the dew condensation water can be reliably prevented from splashing or leaking out to the outside from the side surface on which the operating valves 12, 13 are provided.

Other Embodiments

[0030] Next, other embodiments of the present invention will be described below.

(1) In the above-described first embodiment, the pair of dish-shaped projection portions 17, having a predetermined distance therebetween, are provided at the lower portions on the outer surface of the operating-valve bracket 10; however, a pair of similar dish-shaped projection portions that project toward the operating-valve bracket 10 by a certain dimension may be provided at the fastening sites on the flange portion 3A of the baseplate 3 which are to be fixed to the operating-valve bracket 10.

[0031] With this structure, by fixing the operating-valve bracket 10 to the flange portion 3A via these dish-shaped projection portions, the space S corresponding to the projection dimension of the dish-shaped projection portions can be formed between the side surfaces of the flange portion 3A and the operating-valve bracket 10. Therefore, dew condensation water produced through dew condensation on the surface of the operating-valve bracket 10 can be recovered in the baseplate 3 via the space S, and the dew condensation water can be prevented from splashing or leaking out to the outside from the side surface on which the operating valves 12, 13 are provided.

(2) In the above-described embodiments, although the dish-shaped projection portions 17 are provided at the fastening sites on the operating-valve bracket 10 or on the flange portion 3A, in addition to this, as shown in Fig. 5, a bulging portion 19 that bulges outward by a certain dimension may be provided at a place between the pair of fastening sites on the flange portion 3A which are to be fixed to the operating-valve bracket 10, to increase the space S.

[0032] With this structure, the space S formed between the side surface of the flange portion 3A and the side surface of the operating-valve bracket 10 can be made to correspond to the sum of the projection dimension of the dish-shaped projection portions 17 and the outward-bulging dimension of the flange portion 3A. Thus, the space S for guiding dew condensation water produced through dew condensation on the surface of the operating-valve bracket 10 to the inside of the baseplate 3 can be made even larger, thus facilitating the recovery of the dew condensation water in the baseplate 3.

[0033] Note that the present invention is not limited to

the inventions according to the above-described embodiments and can be appropriately modified without departing from the scope of the present invention. For example, in the above-described embodiments, although a description has been given of an example in which the operating-valve bracket 10 is fixed to the flange portion 3A with screws, screws are not necessarily used for fixing the bracket, and, another means, for example, welding, can be used.

Furthermore, the shape of the operating-valve bracket 10 and the specific structure of the gas-side operating valve 12 and the liquid-side operating valve 13 are not limited to those of the above-described embodiments, and various modifications can be adopted.

Reference Signs List

[0034]

1	outdoor unit	20
3	baseplate	
3A	flange portion	
7	side panel	
10	operating-valve bracket	
12	gas-side operating valve (operating valve)	25
13	liquid-side operating valve (operating valve)	
17	dish-shaped projection portions	
18	fastening holes	
19	bulging portion	
S	space	30

Claims

1. An air conditioner outdoor unit (1) in which a flange portion (3A) is provided on a periphery of a baseplate (3) so as to extend vertically upward from the periphery, and an operating-valve bracket (10) is fixed to the flange portion (3A), the air conditioner outdoor unit (1) comprising a pair of dish-shaped projection portions (17) provided on one of a side surface of the operating-valve bracket (10) at fastening sites which are fixed to the flange portion (3A) and a side surface of the flange portion (3A) at fastening sites which are fixed to the operating-valve bracket (10) so that the dish-shaped projection portions (17) project toward the side surface of the other by a certain dimension, the pair of dish-shaped projection portions (17) having a predetermined distance therebetween, wherein the operating-valve bracket (10) is fixed to the flange portion (3A) such that a space (5) is formed between the side surface of the operating-valve bracket (10) and the side surface of the flange portion (3A) by the dish-shaped projection portions (17).
2. The air conditioner outdoor unit (1) according to claim 1, wherein the pair of dish-shaped projection

portions (17) are provided at lower portions on an outer surface of the operating-valve bracket (10) so as to have the predetermined distance therebetween.

3. The air conditioner outdoor unit (1) according to claim 1 or 2, wherein a portion of the flange portion (3A) between the pair of fastening sites at which the operating-valve bracket (10) is fastened bulges outward by a certain dimension.
4. The air conditioner outdoor unit (1) according to claim 1, wherein the pair of dish-shaped projection portions (17) are provided on an inner surface of the flange portion (3A) so as to have the predetermined distance therebetween.

FIG. 1

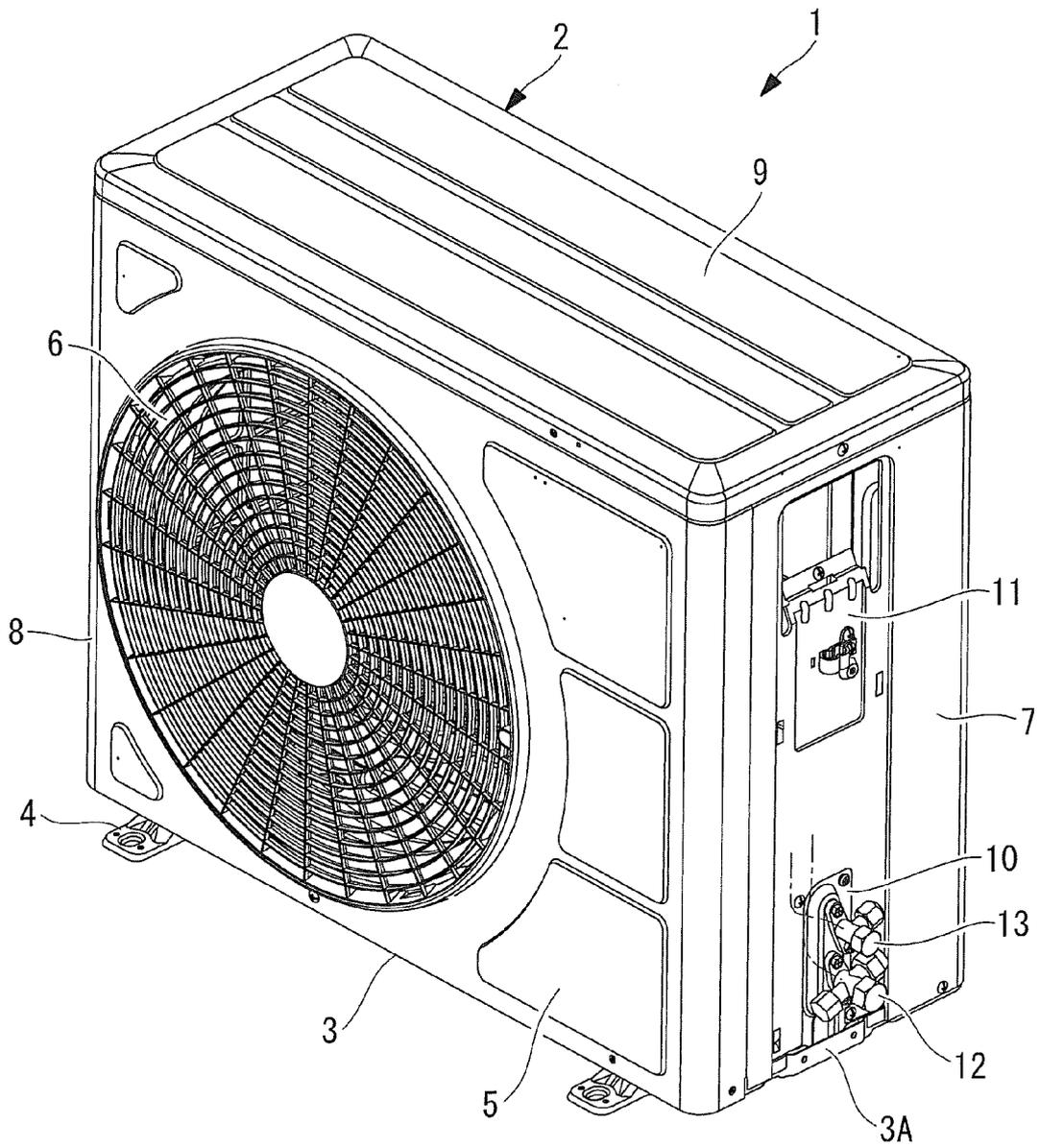


FIG. 2

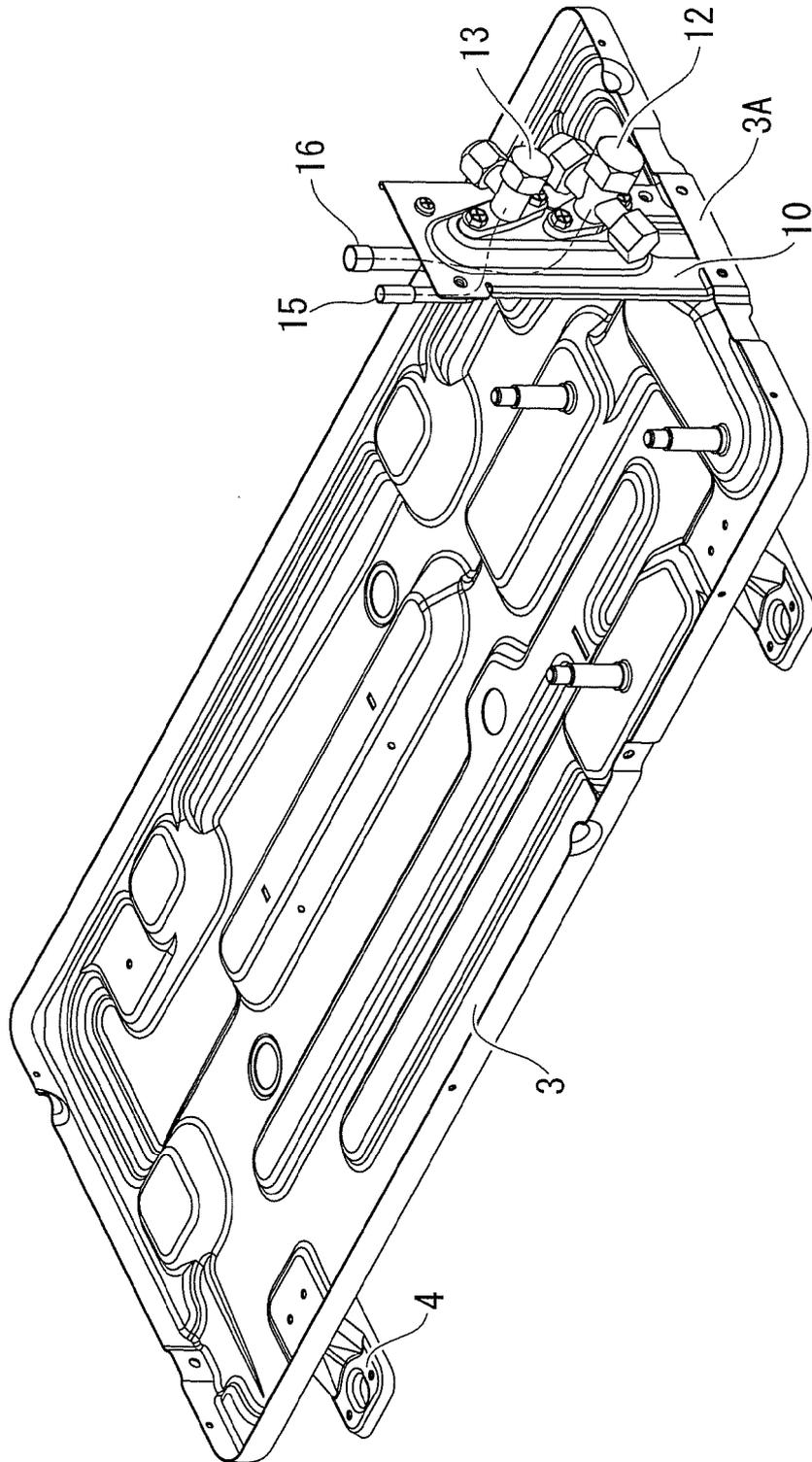


FIG. 3

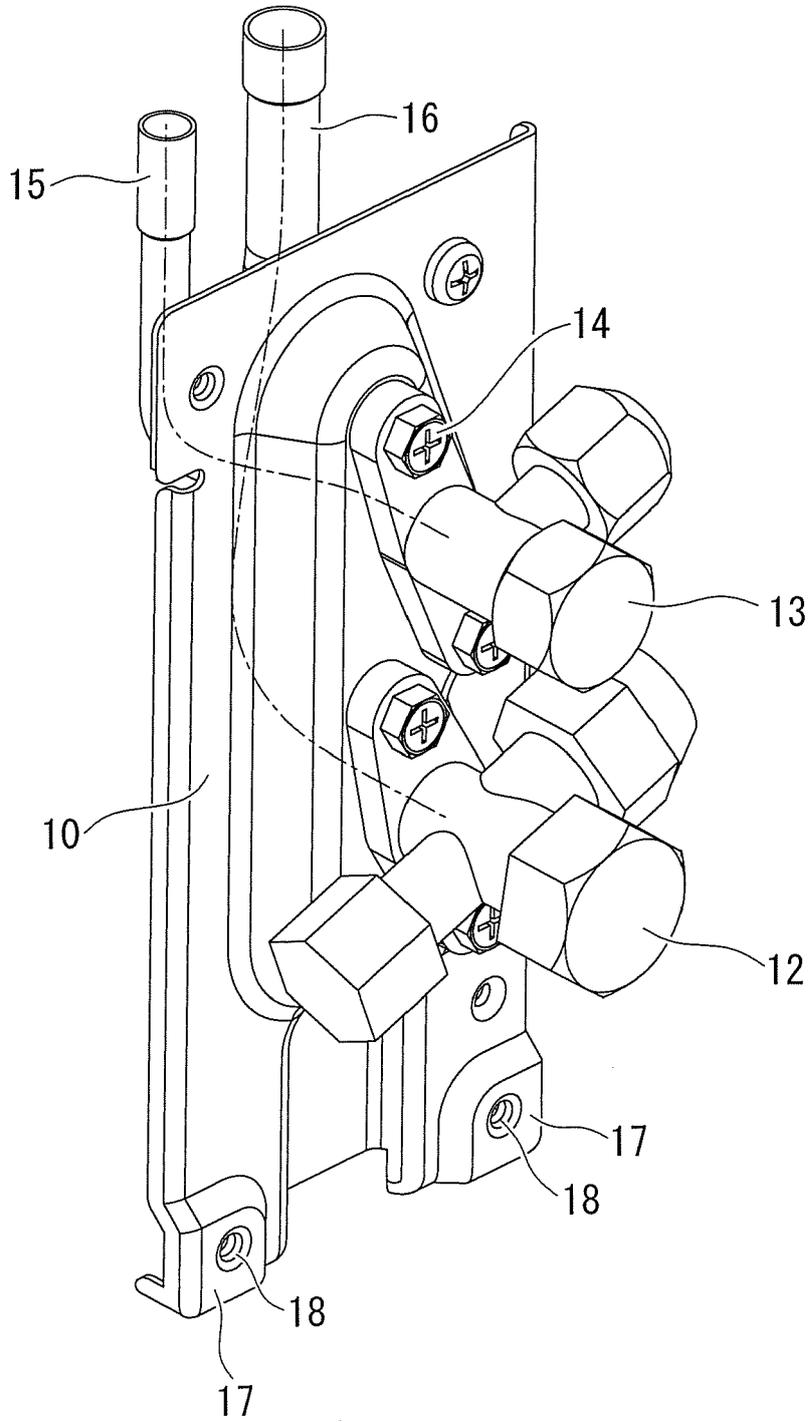


FIG. 4

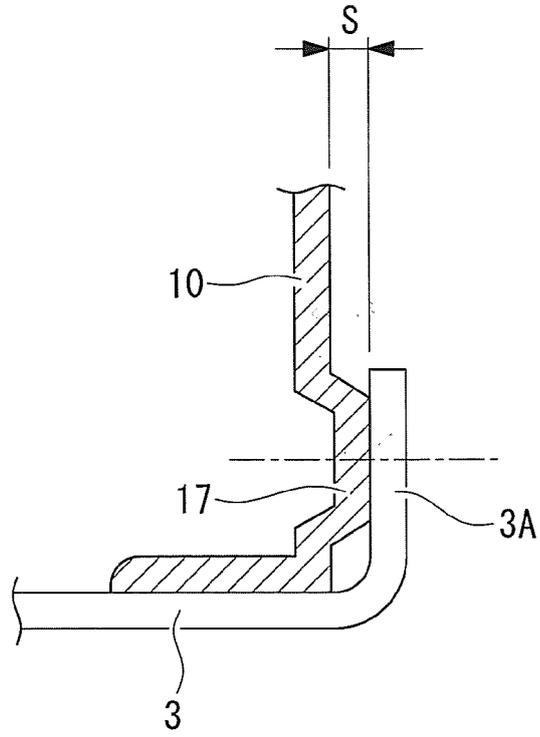
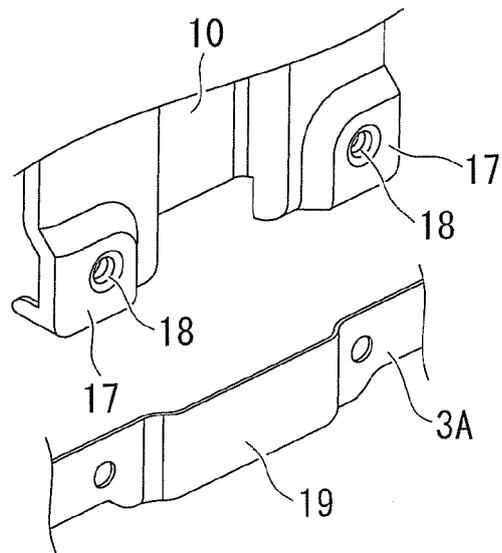


FIG. 5



REFERENCES CITED IN THE DESCRIPTION

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