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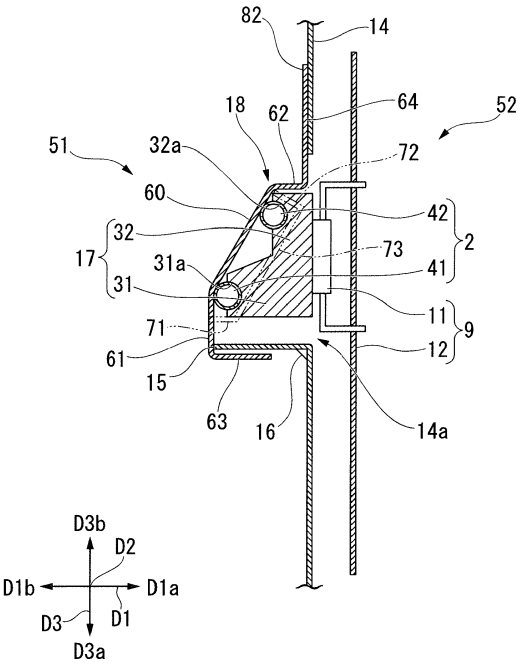
(54) OUTDOOR UNIT OF AIR CONDITIONER, AND AIR CONDITIONER

(57) An outdoor unit (1b) of an air conditioner (1) includes a casing (14), a refrigerant pipe (2) disposed to form a gap with the casing (14) at the rear side (D1b) of the casing (14) and through which a refrigerant (R) flows, a pipe presser portion (18) installed at the rear side (D1b) of the casing (14) and configured to hold by surrounding the refrigerant pipe (2) from the front side (D1a), the rear side (D1b), and lateral sides, a heat transfer member (17) which is detachably installed at the refrigerant pipe (2) to be capable of coming in contact with the refrigerant pipe (2) from the front side (D1a), electronic components (11) fixed to the heat transfer member (17) from the front side (D1a) and configured to control an operation, and a substrate (12) configured to support the electronic components (11) at the front side (D1a).

FIG. 3



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Description

BACKGROUND OF THE INVENTION

Field of the Invention

[0001] The present invention relates to an outdoor unit of an air conditioner, and an air conditioner including the outdoor unit.

Description of Related Art

[0002] Air conditioners controlling indoor air are known in the related art. Such air conditioners each have an indoor unit and an outdoor unit.

[0003] A controller having a circuit substrate on which heat-generating electronic components such as an active converter, a diode module, and a power transistor constituting an inverter are implemented is mounted on an outdoor unit. In recent years, there have been demands for improvement of cooling performance with respect to a controller with increases in the capacities of inverters and power devices. Thus, a refrigerant cooling method using a refrigerant is employed as a method of cooling the controller instead of an air cooling method of cooling by installing a cooling fan.

[0004] Japanese Unexamined Patent Application, First Publication No. 2011-99577A discloses an outdoor unit using such a refrigerant cooling method. A refrigerant pipe serving as a cooling member is attached to the outdoor unit from a close side of a lateral surface of an electric component box serving as a cooled portion.

SUMMARY OF THE INVENTION

[0005] However, in the structure disclosed in Japanese Unexamined Patent Application, First Publication No. 2011-99577A, when extraction of electronic components or a base from an electric component box is attempted in, for example, maintenance or the like, a refrigerant pipe interferes and workability deteriorates. In other words, such tasks should be performed without deforming the refrigerant pipe, which takes time and effort.

[0006] The present invention provides an outdoor unit of an air conditioner, and an air conditioner in which electronic components and a substrate can be easily removed and attached.

[0007] An outdoor unit of an air conditioner according to a first aspect of the present invention is an outdoor unit which compresses a refrigerant, performs heat exchange between the refrigerant and external air, and discharges heat-exchanged external air from a rear side toward a front side, the outdoor unit of the air conditioner including: a casing; a refrigerant pipe disposed to form a gap with the casing at the rear side of the casing and through which the refrigerant flows; a pipe presser portion installed at the rear side of the casing and configured to hold by surrounding the refrigerant pipe from the front side, the rear side, and lateral sides; a heat transfer member detachably installed at the refrigerant pipe to be capable of coming in contact with the refrigerant pipe from the front side; electronic components fixed to the heat transfer member from the front side and configured to control an operation; and a substrate configured to support the electronic components at the front side.

[0008] According to the outdoor unit, the substrate, the electronic components, the heat transfer member, and the refrigerant pipe are disposed to be arranged from the front side toward the rear side. In addition, the substrate, the electronic components, and the heat transfer member are integrally formed. Thus, the substrate, the electronic components, and the heat transfer member can be removed from the casing from the front side at the same time at the time of, for example, maintenance, remarkably improving workability. The refrigerant pipe does not interfere with the removal and thus deformation or damage of the refrigerant pipe can be avoided. Here, since the refrigerant pipe is surrounded by the pipe presser portion installed at the rear side of the casing, movement of the refrigerant pipe with respect to the casing is restricted. When the substrate, the electronic components, and the heat transfer member are removed from the front side, a shift in the position of the refrigerant pipe can be prevented. Therefore, when the substrate, the electronic components, and the heat transfer member are attached to the casing again after the maintenance, the heat transfer member can be brought into contact with a predetermined position of the refrigerant pipe, and heat of the electronic components can be dissipated by the refrigerant via the heat transfer member.

[0009] According to a second aspect of the present invention, in the first aspect, the pipe presser portion may be detachably installed at the casing as a separate member from the casing.

[0010] As described above, as the pipe presser portion is installed at the casing as the separate member, the refrigerant pipe is easily removed from or attached to the casing, and maintenance of the refrigerant pipe is also possible. In addition, when the refrigerant pipe is attached, an installation position of the refrigerant pipe to the casing can also be adjusted.

[0011] According to a third aspect of the present invention, in the second aspect, the casing may be provided with slit opened at the rear side, and the pipe presser portion may have projected portion insertable into the slits.

[0012] As described above, as the projected portions are installed at the pipe presser portion installed as the separate member from the casing, and the projected portions are inserted into the slits of the casing, positioning of the pipe presser portion with respect to the casing can be performed. Therefore, when the pipe presser portion is attached to the casing from the front side of the casing, even if the pipe presser portion is not visible when a task is performed, the projected portions can be inserted into the slits by sliding the pipe presser portion, and the pipe

presser portion can be fixed temporarily to an accurate position of the casing. The pipe presser portion can be attached to the casing using the bolts in this state. Therefore, workability of the attachment of the refrigerant pipe can be improved.

[0013] An air conditioner according to a fourth aspect of the present invention including: the outdoor unit according to any one of the first to third aspects; and an indoor unit connected to the outdoor unit and configured to supply air-conditioned air to the interior of a room.

[0014] According to the air conditioner described above, as the outdoor unit is provided, the substrate, the electronic components, and the heat transfer member can be removed from the casing from the front side at the time of, for example, maintenance, remarkably improving workability. In addition, when the substrate, the electronic components, and the heat transfer member are removed from the front side, the pipe presser portion can suppress a shift in the position of the refrigerant pipe. Therefore, when the substrate, the electronic components, and the heat transfer member are attached to the casing again after the maintenance, the heat transfer member can be brought into contact with a predetermined position of the refrigerant pipe.

Effect of the Invention

[0015] According to the outdoor unit of the air conditioner, and the air conditioner, even when the cooling structure using the refrigerant pipe is provided, the electronic components and the substrate can be easily removed and attached.

BRIEF DESCRIPTION OF THE DRAWINGS

[0016]

FIG. 1 is a view showing a refrigeration cycle of an air conditioner according to an embodiment of the present invention.

FIG. 2 is a perspective view schematically showing an outdoor unit of the air conditioner according to the embodiment of the present invention.

FIG. 3 is a side view of the outdoor unit of the air conditioner according to the embodiment of the present invention, the view showing a state in which a substrate, electronic components, a heat transfer member, and a refrigerant pipe are attached to a casing.

FIG. 4 is a perspective view showing a pipe presser metal, the refrigerant pipe, and the casing in the outdoor unit of the air conditioner according to the embodiment of the present invention.

FIG. 5 is a perspective view showing the pipe presser metal, the refrigerant pipe, and the casing in the outdoor unit of the air conditioner according to the embodiment of the present invention when seen in a direction of an arrow X of FIG. 4.

FIG. 6 is a side view showing a state in which the substrate, the electronic components, and the heat transfer member are removed from the outdoor unit of the air conditioner according to the embodiment of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

[0017] An air conditioner 1 according to an embodiment of the present invention will be described below.

(Overall configuration of air conditioner)

[0018] As shown in FIG. 1, the air conditioner 1 of the embodiment includes a refrigerant pipe 2 through which a refrigerant R flows, and a compressor 3, a four way selector valve 4, an outdoor heat exchanger 5, an electronic expansion valve (EEV) 6, an indoor heat exchanger 7, an accumulator 8, and a controller 9 configured to control an operation of a refrigeration cycle of a closed cycle in which the refrigerant R circulates, which are connected to each other through the refrigerant pipe 2 to form the refrigeration cycle.

[0019] The compressor 3 compresses the gaseous refrigerant R.

[0020] The outdoor heat exchanger 5 performs heat exchange between the refrigerant R and outdoor air (external air) A. An outdoor fan 20 configured to send the outdoor air A to the outdoor heat exchanger 5 is installed near the outdoor heat exchanger 5.

[0021] The indoor heat exchanger 7 performs heat exchange between the refrigerant R and indoor air A. An indoor fan 21 configured to send the indoor air A to the outdoor heat exchanger 5 is installed near the indoor heat exchanger 7.

[0022] The four way selector valve 4 is disposed between the compressor 3 and the outdoor heat exchanger 5 and between the compressor 3 and the indoor heat exchanger 7, and switches a circulation direction in the refrigeration cycle of the refrigerant R.

[0023] The electronic expansion valve 6 is disposed between the outdoor heat exchanger 5 and the indoor heat exchanger 7 and adiabatically expands the refrigerant R.

[0024] The accumulator 8 is disposed between the four way selector valve 4 and an inlet of the compressor 3, performs gas and liquid separation on the refrigerant R, and supplies only a gas to the compressor 3.

[0025] The controller 9, for example, has an inverter configured to control the number of revolutions of the compressor 3 mounted therein, has a function to switche the four way selector valve 4 according to an operation mode (a heating operation or a cooling operation), and has functions to control the numbers of revolutions of the outdoor fan 20 and the indoor fan 21 and an opening degree of the electronic expansion valve 6.

[0026] In other words, the controller 9 includes various electronic components 11 configured to control opera-

tions of a refrigeration cycle of an active converter, a diode module, a power transistor or the like, which constitute the inverter controlling the number of revolutions of the compressor 3 and a substrate (circuit substrate) 12 configured to fix and support the electronic components 11.

[0027] The indoor heat exchanger 7, the indoor fan 21, and a part of the refrigerant pipe 2 are accommodated in a casing (not shown) of an indoor unit 1a. The indoor unit 1a supplies air-conditioned air A to the interior of the room.

[0028] The compressor 3, the four way selector valve 4, the outdoor heat exchanger 5, the outdoor fan 20, the electronic expansion valve (EEV) 6, the accumulator 8, the controller 9, and a part of the refrigerant pipe 2 arc accommodated in a casing 14 of the outdoor unit 1b shown in FIG. 2. The outdoor unit 1b performs heat exchange between the refrigerant R and the external air (outdoor air A) and discharges the heat-exchanged air A from a rear side D1b of a depth direction D1 toward a front side D1a.

(Configuration of outdoor unit)

[0029] In other words, the outdoor unit 1b includes the compressor 3, the four way selector valve 4, the outdoor heat exchanger 5, the outdoor fan 20, the electronic expansion valve (EEV) 6, the accumulator 8, the substrate 12 and the electronic components 11 in the controller 9, the part of the refrigerant pipe 2, and the casing 14 configured to accommodate the above-mentioned components.

[0030] In addition, the outdoor unit 1b includes a heat transfer member 17 interposed between the refrigerant pipe 2 and the electronic components 11 of the controller 9 and a pipe presser metal (pipe presser portion) 18 configured to fix the refrigerant pipe 2 to the casing 14.

[0031] The casing 14 has a rectangular parallelepiped-shaped exterior and includes a partition (not shown) configured to fix the compressor 3, the four way selector valve 4, the outdoor heat exchanger 5, the outdoor fan 20, the electronic expansion valve (EEV) 6, the accumulator 8, the controller 9, and the refrigerant pipe 2 therein.

[0032] Hereinafter, a description will be given under the assumption that the casing 14 is the partition to which the controller 9 is attached.

[0033] As shown in FIG. 3, an opening 14a through which the front side D1a is in communication with the rear side D1b is formed at positions of the casing 14 corresponding to positions at which the electronic components 11 of the controller 9 are disposed.

[0034] The refrigerant pipe 2 is arranged at the rear side D1b of the electronic components 11 of the controller 9 and the rear side D1b of the casing 14 at a position at which the controller 9 is installed in the refrigeration cycle while forming a gap with the casing 14.

[0035] As shown in FIGS. 4 and 5, with regard to the refrigerant pipe 2 in the embodiment, the refrigerant pipe 2 extends from a lower side D2b toward an upper side D2a, curves, and extends toward the lower side D2b. In other words, the refrigerant pipe 2 includes a first part 41 and a second part 42 which extend in parallel with an upward/downward direction D2 and a curved portion 43 connected to the first and second parts.

[0036] The heat transfer member 17 is a metal block made of aluminum or the like and is detachably installed at the refrigerant pipe 2 to be connectable with the refrigerant pipe 2 from the front side D1a.

[0037] In the embodiment, as shown in FIG. 3, the heat transfer member 17 includes a first protrusion 31 extending toward the rear side D1b of the depth direction D1at one side D3a of a width direction (horizontal direction) D3 perpendicular to the depth direction D1 directed from the front side D1a to the rear side D1b and the upward/downward direction D2, and a second protrusion 32 extending from a portion of the front side D1a in the first protrusion 31 to the other side D3b of the width direction D3. In other words, the heat transfer member 17 has substantially an L shape when seen from the upward/downward direction D2.

[0038] A first concave portion 31a recessed toward the front side D1a is formed on a surface facing the rear side D1b of the first protrusion 31 in the upward/downward direction D2. An inner surface of the first concave portion 31 a has a semicircular shape when seen from the upward/downward direction D2 to be capable of coming in contact with approximately half of a circumference of an outer circumferential surface of the first part 41 of the refrigerant pipe 2.

[0039] A second concave portion 32a recessed toward the front side D1a is formed on a surface facing the rear side D1b of the second protrusion 32 in the upward/downward direction D2 as in the first protrusion 31. An inner surface of the second concave portion 32a has a semicircular shape when seen from the upward/downward direction D2 to be capable of coming in contact with approximately half of a circumference of an outer circumferential surface of the second part 42 of the refrigerant pipe 2.

[0040] The heat transfer member 17 is disposed at the rear side D1b of the casing 14 through the opening 14a of the casing 14, and the refrigerant pipe 2 is in contact with the inner surface of the first concave portion 31 a and the inner surface of the second concave portion 32a. Thereby, the first part 41 of the refrigerant pipe 2 disposed at the one side D3a of the width direction D3 is located at the rear side D1b of the second part 42, and the refrigerant pipe 2 is installed to be inclined with respect to the width direction D3.

[0041] As described above, the electronic components 11 of the controller 9 control the operation of the air conditioner 1 and are fixed to the heat transfer member 17 using bolts or the like (not shown) from the front side D1a.

[0042] The substrate 12 fixes the electronic components 11 to support the electronic components 11 at the front side D1a. Although not shown, the various electron-

ic components above including the electronic components 11 are supported on the substrate 12.

(Configuration of pipe presser metal)

[0043] The pipe presser metal 18 is installed at the rear side D1b in the casing 14, holds by surrounding the refrigerant pipe 2 from the front side D1a, the rear side D1b, and lateral sides, and restricts relative movement of the refrigerant pipe 2 with respect to the casing 14. The pipe presser metal 18 is detachably installed on the casing 14 as a separate member from the casing 14.

[0044] Here, the lateral sides are the one side D3a and the other side D3b of the width direction D3.

[0045] To be more specific, as shown in FIGS. 3 to 5, the pipe presser metal 18 includes a main body 51 configured to surround the refrigerant pipe 2 from the rear side D1b, a clip portion 52 which is integrally formed with the main body 51 and is configured to surround the refrigerant pipe 2 from the front side D1a and the lateral sides, and an attachment portion 53 which is integrally formed with the main body 51 and is attached to the casing 14. The pipe presser metal 18 is formed by, for example, sheet-metal processing.

[0046] The main body 51 includes an inclined plate portion 60 disposed along an inclination of the refrigerant pipe 2 while attached to the casing 14, a first bent plate portion 61 continuing to the inclined plate portion 60 and extending in the width direction D3, a second bent plate portion 62 continuing to the inclined plate portion 60 and extending to the front side D1a of the depth direction D1, a third bent plate portion 63 continuing to the first bent plate portion 61 and extending to the front side D1a of the depth direction D1, and a fourth bent plate portion 64 continuing to the second bent plate portion 62 and extending along the casing 14 in the width direction D3.

[0047] The inclined plate portion 60 has a plate shape which is inclined from the rear side D1b to the front side D1a as going from the other side D3b to the one side D3a of the width direction D3 in accordance with the inclination of the refrigerant pipe 2. The outer circumferential surface of the refrigerant pipe 2 is in contact with the inclined plate portion 60 from the front side D1a while the electronic components 11 and the substrate 12 are attached to the casing 14.

[0048] The first bent plate portion 61 has a plate shape which extends to the one side D3a of the width direction D3 to be bent from an edge of the one side D3a of the width direction D3 in the inclined plate portion 60 and continues to the inclined plate portion 60.

[0049] The second bent plate portion 62 extends to the front side D1a toward the opening 14a in the depth direction D1to be bent from the edge of the other side D3b of the width direction D3 in the inclined plate portion 60.

[0050] The third bent plate portion 63 extends to the front side D1a of the depth direction D1 to be bent from the edge of the one side D3a of the width direction D3 in the first bent plate portion 61.

[0051] Here, a support plate portion 15 which extends toward the rear side D1b from the edge of the one side D3a of the width direction D3 in the opening 14a is formed at the casing 14. The support plate portion 15 faces the third bent plate portion 63 to form a gap with the third bent plate portion 63 at the other side D3b of the width direction D3 and supports the first bent plate portion 61 to be in contact with the first bent plate portion 61 from the front side D1a.

[0052] As shown in FIG. 4, reinforcement ribs 16 are installed between the support plate portion 15 and the edge of the opening 14a of the casing 14 at intervals in the upward/downward direction D2.

[0053] As shown in FIG. 4, the third bent plate portion 63 is installed in a dimension in which the third bent plate portion 63 protrudes further to the upper side D2a than the support plate portion 15. A gap S is formed between the third bent plate portion 63 and the support plate portion 15. The third bent plate portion 63 has a smaller dimension in the depth direction D1than the support plate portion 15. Cutouts 63a cut in rectangular shapes from the edge of the front side D1a toward the rear side D1b are formed in the third bent plate portion 63. The cutouts 63a are formed at two places at intervals in the upward/downward direction D2.

[0054] The fourth bent plate portion 64 has a plate shape which extends to the upper side D2a to be bent from the edge of the front side D1a of the second bent plate portion 62. The fourth bent plate portion 64 is in contact with a surface of the casing 14 from the front side D1a and extends further up to the upper side D2a than a border of the opening 14a.

[0055] The clip portion 52 is disposed at the upper side D2a of the heat transfer member 17 and is installed above the main body 51.

[0056] The clip portion 52 includes a first lateral plate portion 71 disposed at the one side D3a of the first part 41 of the refrigerant pipe 2, a second lateral plate portion 72 disposed at the other side D3b of the second part 42 of the refrigerant pipe 2, and a front plate portion 73 disposed at the front side D1a of the refrigerant pipe 2 and configured to connect the first lateral plate portion 71 and the second lateral plate portion 72.

[0057] The first lateral plate portion 71 extends in parallel with the support plate portion 15 and the third bent plate portion 63 from a halfway position of the width direction D3 in the first bent plate portion 61 of the main body 51 toward the front side D1a. The first lateral plate portion 71 is not in contact with the refrigerant pipe 2 when the heat transfer member 17 is attached to and in contact with the refrigerant pipe 2.

[0058] The front plate portion 73 extends in parallel with the inclined plate portion 60 toward the other side D3b to be bent from the edge of the front side D1a in the first lateral plate portion 71. The front plate portion 73 is not in contact with the refrigerant pipe 2 when the heat transfer member 17 is attached to and in contact with the refrigerant pipe 2.

[0059] The second lateral plate portion 72 extends up to a position which is not in contact with the inclined plate portion 60 in a direction which is perpendicular to the inclined plate portion 60 toward the rear side D1b to be bent from the edge of the other side D3b in the front plate portion 73. The second lateral plate portion 72 is not in contact with the refrigerant pipe 2 when the heat transfer member 17 is attached to and in contact with the refrigerant pipe 2.

[0060] The attachment portion 53 includes first attachment pieces (projected portions) 81 installed at the third bent plate portion 63, and second attachment pieces 82 and a third attachment piece 83 installed at the fourth bent plate portion 64.

[0061] The first attachment pieces 81 are formed at the cutouts 63a of the third bent plate portion 63. The first attachment pieces 81 are rectangular plate-shaped members which protrude along a support portion to the lower side D2b from an upper inner surface in each of the cutouts 63a. The first attachment pieces 81 swell from the support plate portion 15 to the one side D3a and are configured to be insertable from slits 15b into support plate pockets 15a in which the slits 15b extending in the depth direction D1are formed at the upper side D2a.

[0062] The second attachment pieces 82 are plate-shaped members installed to protrude to the other side D3b along the surface of the casing 14 from the fourth bent plate portion 64. The second attachment pieces 82 are installed at two places at intervals in the upward/downward direction D2. Bolts 90 are inserted from the rear side D1b to pass through the second attachment pieces 82 and the casing 14 and fix the second attachment pieces 82 and the casing 14.

[0063] The third attachment piece 83 includes a first projected plate portion 85 which protrudes to the other side D3b along the surface of the casing 14 from the fourth bent plate portion 64 and a second projected plate portion (projected portion) 86 which extends to be bent to the lower side D2b from the first projected plate portion 85 along the surface of the casing 14 disposed between the two second attachment pieces 82.

The second projected plate portion 86 swells from the surface of the casing 14 to the rear side D1b and is configured to be insertable from a slit 14c into a casing pocket 14b in which the slit 14c extending in the width direction D3 is formed at the upper side D2a.

[0064] As described above, the refrigerant pipe 2 can be held by the main body 51 and the clip portion 52 from the front side D1a, the rear side D1b, and the lateral sides while the pipe presser metal 18 is attached to the casing 14 by the attachment portion 53. This holding is not conceptually limited to only a case in which there is no relative movement at all between the refrigerant pipe 2 and the pipe presser metal 18 but may include slight relative movement.

(Effects of air conditioner)

[0065] According to the air conditioner 1 of the embodiment described above, the outdoor unit 1b includes the substrate 12, the electronic components 11, the heat transfer member 17, and the refrigerant pipe 2, which are disposed to be arranged from the front side D1a toward the rear side D1b. The substrate 12, the electronic components 11, and the heat transfer member 17 are integrally formed to be fixed to each other. Thus, for example, as shown in FIG. 6, the substrate 12, the electronic components 11, and the heat transfer member 17 can be removed from the casing 14 from the front side D1a at the time of maintenance. In addition, the refrigerant pipe 2 does not interfere with the removal and thus deformation or damage of the refrigerant pipe 2 can be avoided.

[0066] Here, the refrigerant pipe 2 is held by the pipe presser metal 18 installed at the rear side D1b of the casing 14. In other words, the refrigerant pipe 2 is held by the main body 51 and the clip portion 52 of the pipe presser metal 18 from the rear side D1b, the front side D1a, and both lateral sides. For this reason, movement of the refrigerant pipe 2 with respect to the casing 14 is restricted. Therefore, when the substrate 12, the electronic components 11, and the heat transfer member 17 are removed from the front side D1a for the purpose of maintenance or the like, a shift in the position of the refrigerant pipe 2 can be suppressed.

[0067] When the substrate 12, the electronic components 11, and the heat transfer member 17 are attached to the casing 14 again after the maintenance, the heat transfer member 17 can be brought into contact with the refrigerant pipe 2 so that the refrigerant pipe 2 enters a predetermined position, i.e., the first concave portion 31 a and the second concave portion 32a. In this case, even when the refrigerant pipe 2 is pressed by the heat transfer member 17, the movement of the refrigerant pipe 2 can be restricted by the inclined plate portion 60 from the rear side D1b, the heat transfer member 17 can be brought into contact with the predetermined position of the refrigerant pipe 2, and heat of the electronic components can be dissipated by a refrigerant via the heat transfer member 17.

[0068] Therefore, even when the air conditioner 1 of the embodiment has a cooling structure using the refrigerant pipe 2, the electronic components 11 and the substrate 12 can be easily removed and can be easily attached, and thus remarkably improving workability at the time of maintenance.

[0069] The pipe presser metal 18 is installed at the casing 14 as the separate member, and thereby the refrigerant pipe 2 is easily removed from or attached to the casing 14, and maintenance of the refrigerant pipe 2 is also possible. An installation position of the refrigerant pipe 2 to the casing 14 can also be adjusted when the refrigerant pipe 2 is attached.

[0070] The first attachment pieces 81 is installed at the third bent plate portion 63 of the pipe presser metal 18,

and the first attachment pieces 81 are inserted into the support plate pockets 15a from the upper side D2a. The second projected plate portion 86 is installed at the fourth bent plate portion 64, and the second projected plate portion 86 is inserted into the casing pocket 14b from the upper side D2a. Therefore, positioning of the pipe presser metal 18 with respect to the casing 14 can be performed.

[0071] When the pipe presser metal 18 is attached to the casing 14 from the front side D1a of the casing 14, since the view of an operator is blocked by the casing 14, it is not possible for them to view the pipe presser metal when performing a task.

[0072] Even in such a case, the first attachment pieces 81 are inserted into the support plate pockets 15a by sliding the pipe presser metal 18 from the upper side D2a, and the pipe presser metal 18 can be fixed temporarily to an accurate position of the casing 14 by inserting the second projected plate portion 86 into the casing pocket 14b. The pipe presser metal 18 can be attached to the casing 14 using the bolts 90 from the front side D1a in this state. Therefore, workability of the attachment of the refrigerant pipe 2 can be improved.

[0073] Although embodiments of the present invention have been described in detail, minor changes in design are also possible without departing from the technical idea of the present invention.

[0074] For example, the pipe presser metal 18 may not be the separate member from the casing 14 and may be formed as a part of the casing 14.

[0075] Formation directions and formation positions of the first attachment pieces 81 and the second projected portion 86 of the pipe presser metal 18 are not limited to the above-mentioned cases. In other words, the pipe presser metal 18 may be attached to the casing 14 by sliding the pipe presser metal 18 from a direction other than the upper side D2a.

[0076] In addition, the first attachment pieces 81 and the second projected portions 86 of the pipe presser metal 18, and the support plate pockets 15a and the casing pocket 14b may not necessarily be installed. In other words, the pipe presser metal 18 is not required to be attached to the casing 14 by sliding the pipe presser metal 18 and may be attached only by the bolts.

Industrial Applicability

[0077] According to the outdoor unit of the air conditioner, and the air conditioner, even when the cooling structure using the refrigerant pipe is provided, the electronic components and the substrate can easily be removed and attached.

Claims

1. An outdoor unit of an air conditioner, which compresses a refrigerant, performs heat exchange between the refrigerant and external air, and discharges heat-exchanged external air from a rear side toward a front side, the outdoor unit of the air conditioner comprising:

   a casing;
   a refrigerant pipe disposed to form a gap with the casing at the rear side of the casing and through which the refrigerant flows;
   a pipe presser portion installed at the rear side of the casing and configured to hold by surrounding the refrigerant pipe from the front side, the rear side, and lateral sides;
   a heat transfer member detachably installed at the refrigerant pipe to be capable of coming in contact with the refrigerant pipe from the front side;
   electronic components fixed to the heat transfer member from the front side and configured to control an operation; and
   a substrate configured to support the electronic components at the front side.

2. The outdoor unit of the air conditioner according to claim 1, wherein the pipe presser portion is detachably installed at the casing as a separate member from the casing.

3. The outdoor unit of the air conditioner according to claim 2, wherein the casing is formed with slit opened at the rear side, and the pipe presser portion has projected portion insertable into the slits.

4. An air conditioner comprising:

   the outdoor unit according to any one of claims 1 to 3; and
   an indoor unit connected to the outdoor unit and configured to supply air-conditioned air to the interior of a room.

FIG. 1

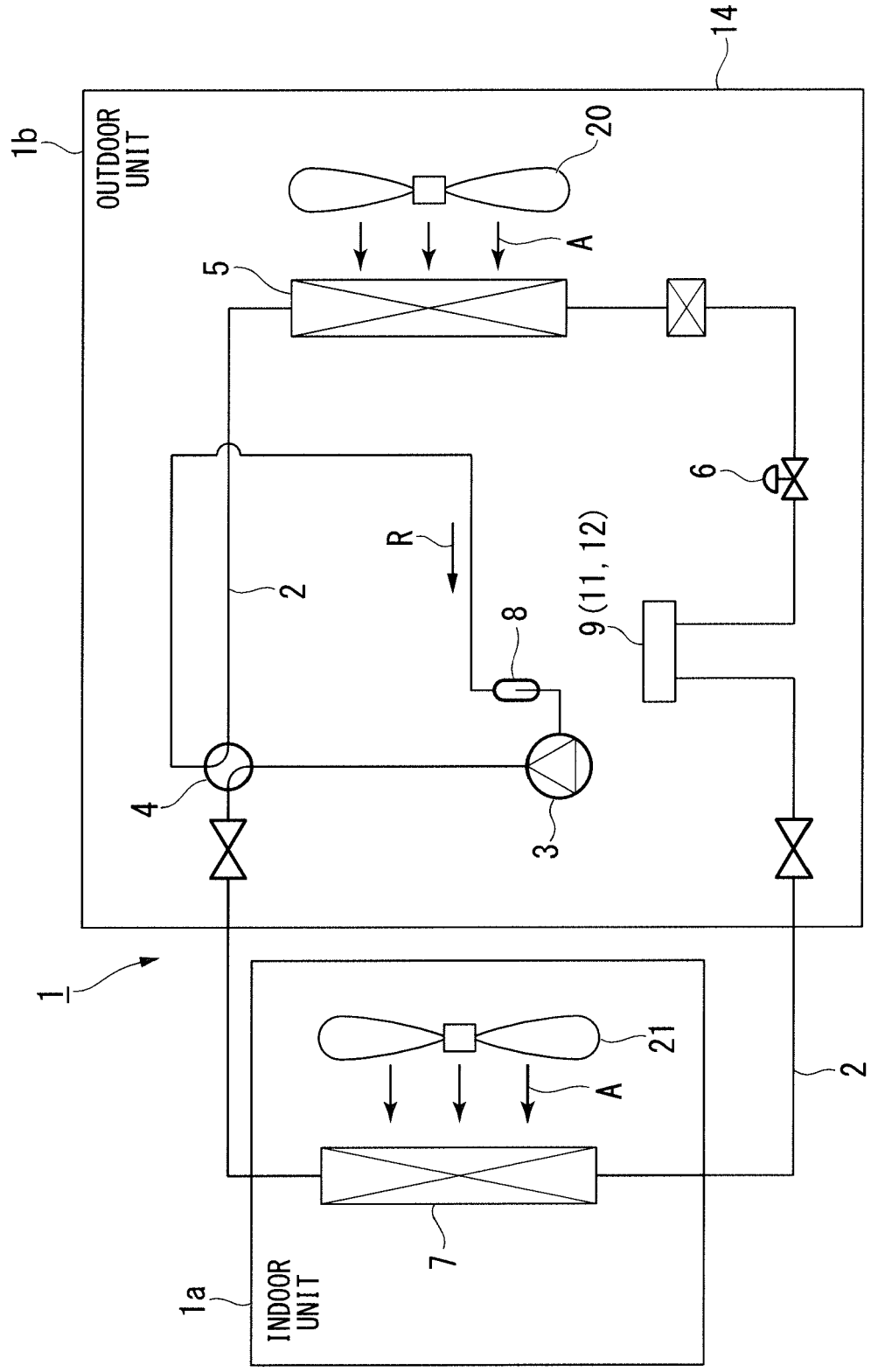


FIG. 2

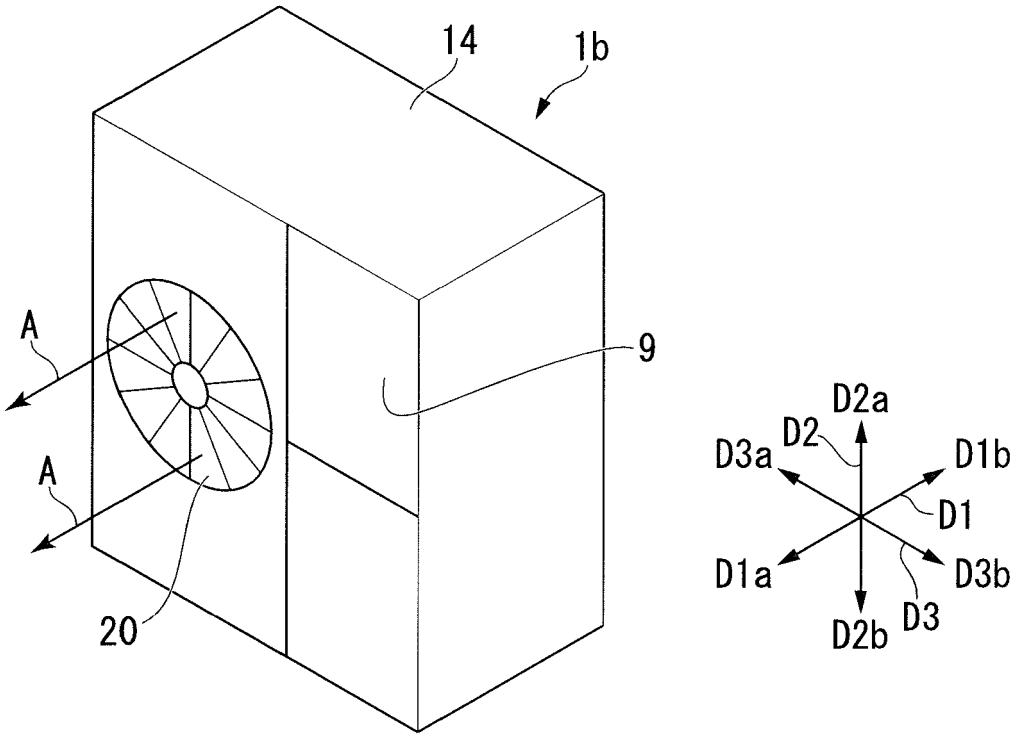
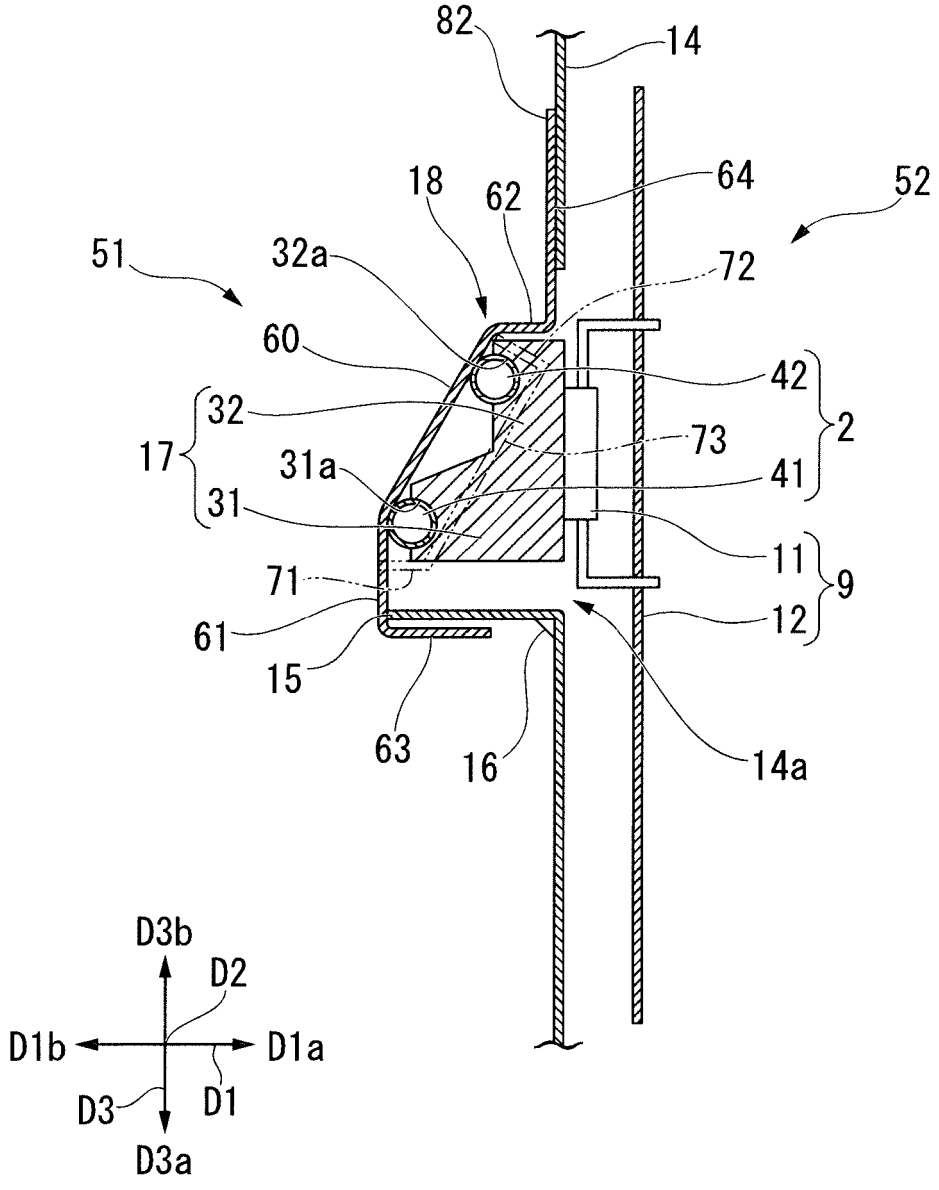


FIG. 3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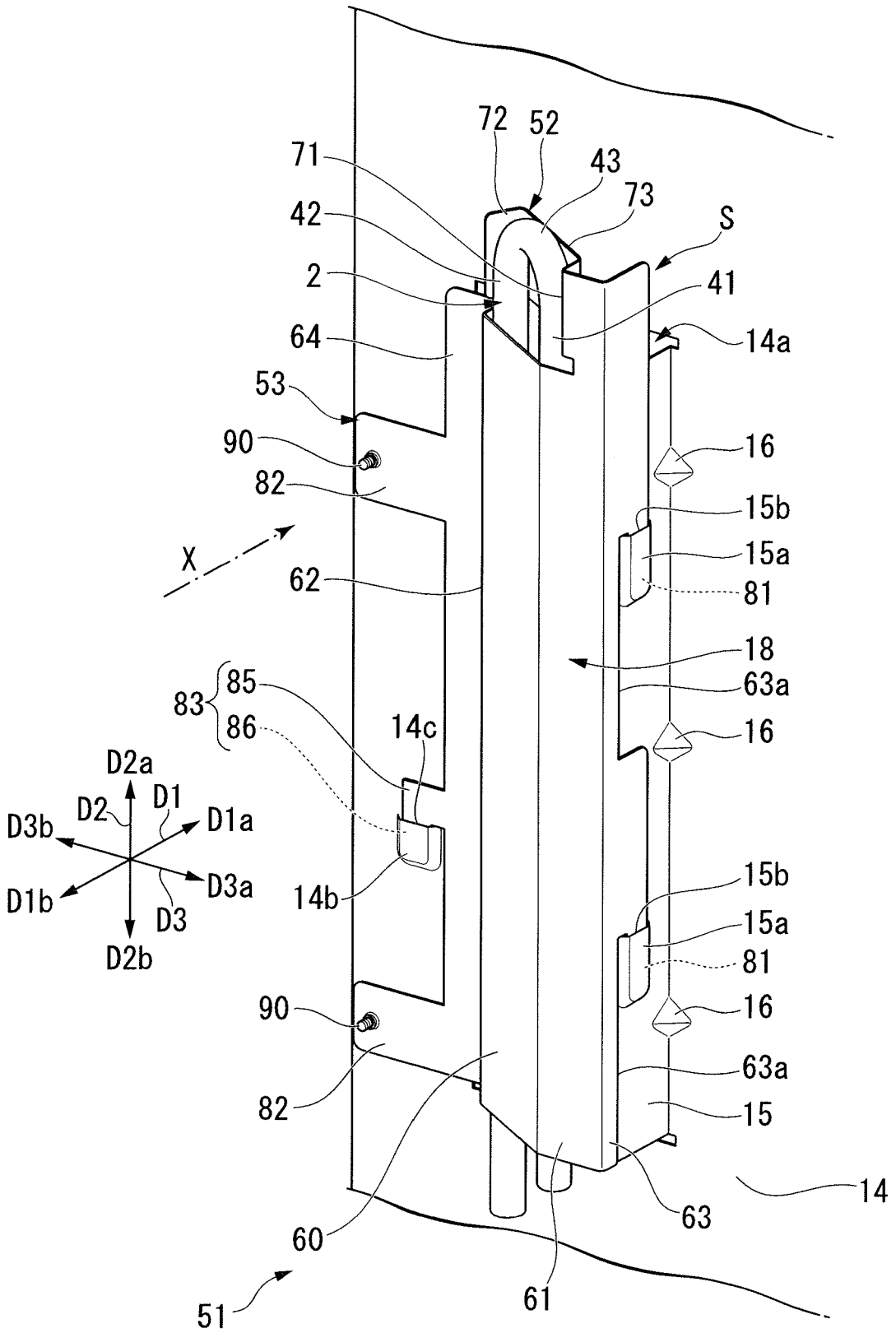
D2
D1b
D1a
D3
D1
D3a

FIG. 4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D2
D1
D3b
D1a
D1b
D3a
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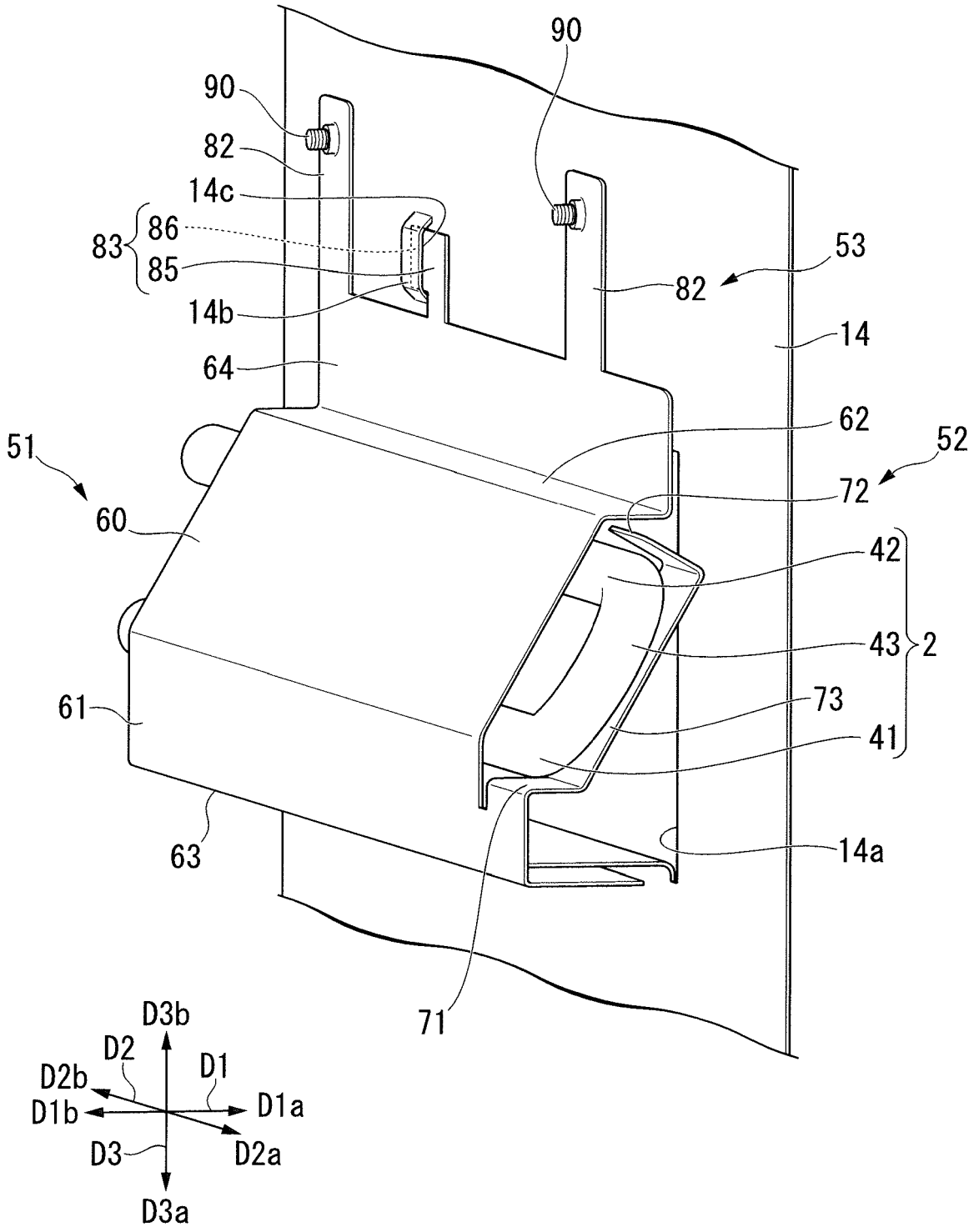
FIG. 5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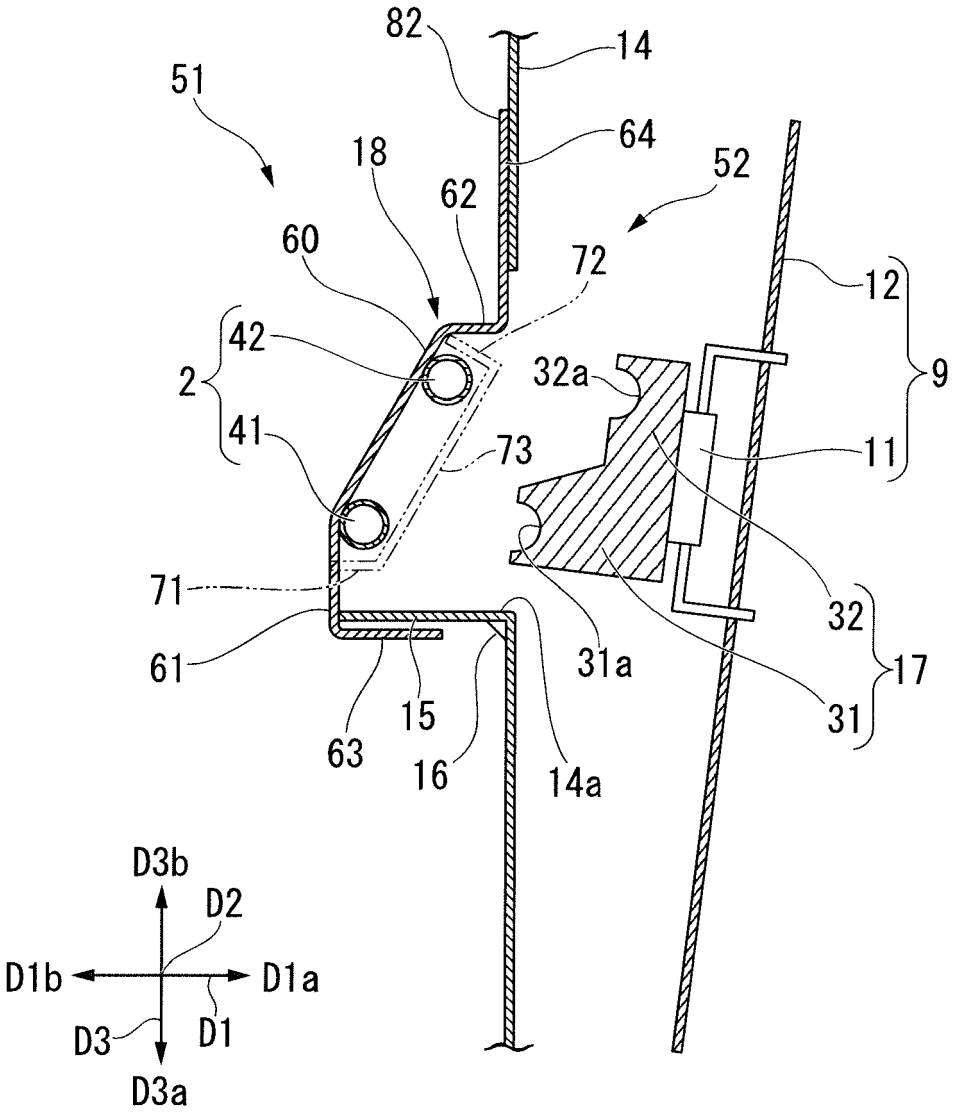
D3
D2a
D3a

FIG. 6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D3b
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D1b
D1a
D3
D1
D3a

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EUROPEAN SEARCH REPORT

Application Number
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Place of search	Date of completion of the search	Examiner
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