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(54) **COMPRESSOR AND REFRIGERATION CYCLE APPARATUS**

VERDICHTER UND KÜHLKREISVORRICHTUNG

COMPRESSEUR ET DISPOSITIF À CYCLE DE RÉFRIGÉRATION

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EP 4 119 796 B1

Description

TECHNICAL FIELD

[0001] Embodiments of the present invention relates to a compressor and a refrigeration cycle apparatus.

BACKGROUND

[0002] A known compressor includes a compression mechanism and an electric motor for driving the compression mechanism. The motor of such a conventional compressor is provided with a plurality of systems, for example, two systems of three-phase windings. Thus, the conventional compressor is provided with two systems of lead wires and two systems of sealed terminals. Each sealed terminal is electrically connected to the corresponding three-phase winding via its own lead wire.

[0003] These two systems of sealed terminals are connected to at least six power lines inside the compressor and are connected to at least six power lines outside the compressor. The wirings of these many power lines are complicated, and if excessive bending stress is applied to the power lines, the durability of the power lines may be reduced.

[0004] For this reason, the conventional compressor is provided with the first sealing terminal and the second sealing terminal. These sealed terminals are provided with three pins to be electrically connected to the motor, configured in the same shape, and arranged side by side in an airtight container. The three pins of the first sealed terminal and the three pins of the second sealed terminal are arranged asymmetrically with respect to the straight line that passes through the center of the discharge tube of the compressor and the midpoint between the first sealing terminal and the second sealing terminal.

PRIOR ART Document

PATENT DOCUMENT

[0005] Prior art is disclosed in JP 2009-191 822 A and JP 2012-082776 A. Documents merely constituting technical background are disclosed in WO 2019/030841 A1, JP 2013 024 050 A, WO 2019-021423 A1 and JP 2019 035394 A.

SUMMARY

PROBLEMS TO BE SOLVED BY INVENTION

[0006] When the displacement volume is enlarged for improving the performance of the compressor, the compression load increases. In order to meet the increase in this compression load, the motor requires more electric current. Such an increase in current raises the temperature of the terminals connecting the power lines to the sealed terminals at the time of energization. It is difficult for the Faston terminals adopted in the conventional compressor to cope with such a temperature rise at the time of energization.

[0007] When terminals to be fastened with screws by bringing large plate-shaped terminals into surface contact are adopted instead of the Faston terminals, the temperature rise of the terminals connecting the power lines to the sealed terminals can be suppressed.

[0008] In order to connect the above-described plate-shaped terminals and the sealed terminals, a terminal block for fastening screws is required. When a plurality of sealed terminals are provided as in the conventional compressor, a terminal block is provided for each sealed terminal. In other words, a plurality of terminal blocks are arranged side by side in the same manner as the sealed terminals.

[0009] However, in the arrangement relationship of the pair of sealed terminals of the conventional compressor, it is difficult to arrange the pair of terminal blocks side by side without interfering with each other. Further, it is considered that workability at the time of fastening screws to the respective terminals is extremely low or the work of fastening screws to the respective terminals is difficult.

[0010] Accordingly, the present invention provides a compressor and a refrigeration cycle apparatus, each of which can securely screw sealed terminals and power-line terminals with a terminal block being installed, connect power lines to the sealed terminals without applying excessive bending stress to the power lines, and also efficiently connect the power lines at the time of manufacture.

MEANS FOR SOLVING PROBLEM

[0011] In order to solve the above-mentioned problem, a compressor according to one embodiment of the present

invention includes: an airtight container; a compression mechanism that is accommodated in the airtight container and compresses a refrigerant introduced into the airtight container; a motor including a cylindrical stator fixed to an inner surface of the airtight container and a rotor disposed inside the stator to generate rotational driving force of the compression mechanism; and a pair of sealed terminals arranged in the airtight container. Each of the sealed terminals has three plate-shaped terminals that are disposed outside the airtight container and are electrically connected to the motor. One surface of each of the three plate-shaped terminals is aligned with each side of a triangle and faces each of other two plate-shaped terminal on the one surface in such a manner that three virtual planes each containing the one surface form the triangle across the three plate-shaped terminals. One of corners of the triangle formed by the three plate-shaped terminals of one of the sealed terminals faces one of corners of the triangle formed by the three plate-shaped terminals of another of the sealed terminals.

[0012] Furthermore, the compressor according to one embodiment of the present invention preferably includes a pair of terminal blocks provided for respective sealed terminals. One of the terminal blocks preferably holds three power lines connected to respective plate-shaped terminals of a corresponding sealed terminal in such a manner that the three power lines are wired to be separated away from another of the terminal block.

[0013] Each of the sealed terminals of the compressor according to one embodiment of the present invention preferably has three second plate-shaped terminals that are disposed inside the airtight container and are electrically connected to the motor. Preferably, in each of the sealed terminals, front and back surfaces of one of the three second plate-shaped terminals are aligned with a first virtual line that is one of three virtual lines substantially trisecting a circle centered on a center of gravity of the triangle in a fan shape, while front and back surfaces of other two of the three second plate-shaped terminals are substantially orthogonal to second virtual lines being other two of the three virtual lines, and first virtual lines of respective sealed terminals intersect each other at a position farther than a centerline of the airtight container when viewed from the pair of sealed terminals.

[0014] A refrigeration cycle apparatus according to another embodiment of the present invention includes: the compressor, a radiator, an expansion device, a heat absorber, and refrigerant piping that connects the compressor, the radiator, the expansion device, and the heat absorber and circulates the refrigerant.

Effects of Invention

[0015] According to embodiments of the present invention, a compressor and a refrigeration cycle apparatus can be provided, in which sealed terminals and power-line terminals can be securely screwed to each other with a terminal block being installed, power lines can be connected to the sealed terminals without applying excessive bending stress to the power lines, and the power lines can be efficiently connected at the time of manufacture.

BRIEF DESCRIPTION OF DRAWINGS

[0016]

Fig. 1 is a schematic diagram of a refrigerating cycle apparatus and a compressor according to one embodiment of the present invention.

Fig. 2 is a schematic view of sealed terminals of the compressor according to the embodiment of the present invention as viewed from above.

Fig. 3 is a schematic view of the sealed terminals of the compressor according to the embodiment of the present invention as viewed from below.

Fig. 4 is a schematic view of the sealed terminals and a terminal block of the compressor according to the embodiment of the present invention as viewed from above.

Fig. 5 is a longitudinal cross-sectional view of the sealed terminal and the terminal block of the compressor according to the embodiment of the present invention.

Fig. 6 is a plan view of the terminal block of the compressor according to the embodiment of the present invention.

DETAILED DESCRIPTION

[0017] A description will now be given of embodiments of a compressor and a refrigeration cycle apparatus according to the present invention by referring to Fig. 1 to Fig. 6. The same reference signs are given to identical or equivalent components in each figure.

[0018] Fig. 1 is a schematic diagram of a refrigerating cycle apparatus and a compressor according to one embodiment of the present invention.

[0019] As shown in Fig. 1, the refrigeration cycle apparatus 1 according to the present embodiment is, for example, an air conditioner. The refrigeration cycle apparatus 1 includes a sealed rotary compressor 2 (hereinafter, simply referred

to as the compressor 2), a radiator 3, an expansion device 5, a heat absorber 6, an accumulator 7, and refrigerant piping 8. The refrigerant piping 8 connects the compressor 2, the radiator 3, the expansion device 5, the heat absorber 6, and the accumulator 7 in sequence so as to circulate a refrigerant. The radiator 3 is also called a condenser. The heat absorber 6 is also called an evaporator.

[0020] The compressor 2 sucks up the refrigerant having passes through the heat absorber 6 via the refrigerant piping 8, compresses the refrigerant, and discharges the high-temperature and high-pressure refrigerant to the radiator 3 through the refrigerant piping 8.

[0021] The compressor 2 includes: a cylindrical airtight container 11 disposed vertically; an open-winding type electric motor 12 (hereinafter, simply referred to as the motor 12) housed in the upper half of the airtight container 11; a compression mechanism 13 housed in the lower half of the airtight container 11; a rotating shaft 15 that transmits the rotational driving force of the motor 12 to the compression mechanism 13; a main bearing 16 that rotatably supports the rotating shaft 15; and an auxiliary bearing 17 that rotatably supports the rotating shaft 15 in cooperation with the main bearing 16.

[0022] The centerline of the vertically disposed airtight container 11 extends in the vertical (i.e., up-and-down) direction. The airtight container 11 includes: a cylindrical body 11a extending in the vertical direction; an end plate 11b that blocks the upper end portion of the body 11a; and an end plate 11c that blocks the lower end portion of the body 11a.

[0023] The end plate 11b on the upper side of the airtight container 11 is connected to a discharge pipe 8a for discharging the refrigerant to the outside of the airtight container 11. The discharge pipe 8a is connected to the refrigerant piping 8. The upper end plate 11b of the airtight container 11 is provided with: a pair of sealed terminals 18 and 19 that lead the power supplied to the motor 12 from the outside to the inside of the airtight container 11; and a pair of terminal blocks 22 and 23. The respective terminal blocks 22 and 23 are provided on the sealed terminals 18 and 19. A plurality of power lines 25, which are electrically connected to the respective sealed terminals 18 and 19 so as to supply power, are fixed to each of the terminal blocks 22 and 23. The power lines 25 are so-called lead wires.

[0024] The motor 12 generates the driving force that rotates the compression mechanism 13. The motor 12 is disposed above the compression mechanism 13. The motor 12 includes: a cylindrical stator 31 fixed to the inner surface of the airtight container 11; a rotor 32 that is disposed inside the stator 31 and generates the rotational driving force of the compression mechanism 13; and a plurality of lead wires 33 that are drawn from the stator 31 and electrically connected to the pair of sealed terminals 18 and 19.

[0025] The rotor 32 includes: a rotor iron core 35 having a magnet accommodating hole (not shown); and a permanent magnet (not shown) accommodated in the magnet accommodating hole. The rotor 32 is fixed to the rotating shaft 15. The rotation centerline C of the rotor 32 and the rotating shaft 15 substantially matches the centerline of the stator 31. In addition, the rotation centerline C of the rotor 32 and the rotating shaft 15 substantially matches the centerline of airtight container 11.

[0026] The plurality of lead wires 33 are power lines that supply power to the stator 31 through the sealed terminals 18 and 19. The plurality of lead wires 33 are wired depending on the type of the motor 12. In the present embodiment, six lead wires 33 are wired.

[0027] The motor 12 may be a motor having a plurality of systems, for example, three-phase windings of two systems like a motor of the conventional compressor, in addition to the mode of the open winding motor.

[0028] The rotating shaft 15 connects the motor 12 and the compression mechanism 13. The rotating shaft 15 transmits the rotational driving force generated by the motor 12 to the compression mechanism 13.

[0029] The intermediate portion 15a of the rotating shaft 15 connects the motor 12 and the compression mechanism 13, and is rotatably supported by the main bearing 16. The lower end portion 15b of the rotating shaft 15 is rotatably supported by the auxiliary bearing 17. The main bearing 16 and the auxiliary bearing 17 are also part of the compression mechanism 13. In other words, the rotating shaft 15 penetrates the compression mechanism 13.

[0030] Further, the rotating shaft 15 is provided with a plurality of, for example, three eccentric portions 36 between the intermediate portion 15a supported by the main bearing 16 and the lower end portion 15b supported by the auxiliary bearing 17. Each eccentric portions 36 is a disk or cylinder, center of which does not match the rotation centerlines of the rotating shaft 15.

[0031] The compression mechanism 13 compresses the refrigerant introduced into the airtight container 11. When the motor 12 rotationally drives the rotating shaft 15, the compression mechanism 13 sucks in the gaseous refrigerant from the refrigerant piping 8 so as to compress the refrigerant, and discharges the compressed high-temperature and high-pressure refrigerant into the airtight container 11.

[0032] The compression mechanism 13 is a rotary type with a plurality of cylinders, for example, three cylinders. The compression mechanism 13 includes: a plurality of cylinders 42, each of which has a circular cylinder chamber 41; and a plurality of annular rollers 43 that are disposed in the respective cylinder chambers 41. Note that the compression mechanism 13 may be a single-cylinder rotary type.

[0033] In the following, the cylinder 42 closest to the motor 12 is defined as the first cylinder 42A, the cylinder 42 farthest from the motor 12 is defined as the third cylinder 42C, and the cylinder 42 disposed between the first cylinder 42A and the third cylinder 42C is defined as the second cylinder 42B.

[0034] The compression mechanism 13 includes: the main bearing 16 that closes the top surface of the first cylinder 42A; a first partition plate 45A that closes the bottom surface of the first cylinder 42A and the top surface of the second cylinder 42B; a second partition plate 45B that closes the bottom surface of the second cylinder 42B and the top surface of the third cylinder 42C; and the auxiliary bearing 17 that closes the bottom surface of the third cylinder 42C.

[0035] In other words, the top surface of the first cylinder 42A is closed with the main bearing 16. The bottom surface of the first cylinder 42A is closed with the first partition plate 45A. The top surface of the second cylinder 42B is closed with the first partition plate 45A. The bottom surface of the second cylinder 42B is closed with the second partition plate 45B. The top surface of the third cylinder 42C is closed with the second partition plate 45B. The bottom surface of the third cylinder 42C is closed with the auxiliary bearing 17.

[0036] That is, the first cylinder 42A is sandwiched between the main bearing 16 and the first partition plate 45A. The second cylinder 42B is sandwiched between the first partition plate 45A and the second partition plate 45B. The third cylinder 42C is sandwiched between the second partition plate 45B and the auxiliary bearing 17.

[0037] The main bearing 16 and the first partition plate 45A are fixed in a lump to the second cylinder 42B with a fastening member 46 such as a bolt. That is, the main bearing 16 and the first partition plate 45A are fastened together to the second cylinder 42B with the fastening member 46. The main bearing 16 is provided with: a first discharge valve mechanism 51A that discharges the refrigerant compressed in the cylinder chamber 41 of the first cylinder 42A; and a first discharge muffler 52 that covers the first discharge valve mechanism 51A. When the pressure difference between the pressure in the cylinder chamber 41 of the first cylinder 42A and the pressure in the first discharge muffler 52 reaches a predetermined value due to the compression action of the compression mechanism 13, the first discharge valve mechanism 51A opens a discharge port (not shown) so as to discharge the compressed refrigerant into the first discharge muffler 52.

[0038] The second partition plate 45B is provided with: a second discharge valve mechanism 51B that discharges the refrigerant compressed in the cylinder chamber 41 of the second cylinder 42B; and a discharge chamber 53. The main bearing 16, the first cylinder 42A, the first partition plate 45A, and the second cylinder 42B forms a first hole (not shown) that spatially connects the discharge chamber 53 of the second partition plate 45B to the inside of the first discharge muffler 52. When the pressure difference between the pressure in the cylinder chamber 41 of the second cylinder 42B and the pressure in the discharge chamber 53 reaches a predetermined value due to the compression action of the compression mechanism 13, the second discharge valve mechanism 51B opens a discharge port (not shown) so as to discharge the compressed refrigerant into the discharge chamber 53. The refrigerant discharged into the discharge chamber 53 is discharged into the first discharge muffler 52 through the first hole. The refrigerant discharged into the first discharge muffler 52 through the first hole joins the refrigerant compressed by the first cylinder 42A.

[0039] The auxiliary bearing 17, the third cylinder 42C, and the second partition plate 45B are integrally fixed to the second cylinder 42B with a fastening member 55 such as a bolt. That is, the auxiliary bearing 17, the third cylinder 42C, and the second partition plate 45B are fastened together to the second cylinder 42B with the fastening member 55. The auxiliary bearing 17 is provided with: a third discharge valve mechanism 51C that discharges the refrigerant compressed in the cylinder chamber 41 of the third cylinder 42C; and a second discharge muffler 56 that covers the third discharge valve mechanism 51C. The main bearing 16, the first cylinder 42A, the first partition plate 45A, the second cylinder 42B, the second partition plate 45B, and the third cylinder 42C forms a second hole 57 that spatially connects the inside of the second discharge muffler 56 to the inside of the first discharge muffler 52. When the pressure difference between the pressure in the cylinder chamber 41 of the third cylinder 42C and the pressure in the second discharge muffler 56 reaches a predetermined value due to the compression action of the compression mechanism 13, third discharge valve mechanism 51C opens a discharge port (not shown) so as to discharge the compressed refrigerant into the second discharge muffler 56. The refrigerant discharged into the second discharge muffler 56 is discharged through the second hole 57 into the first discharge muffler 52. The refrigerant discharged into the first discharge muffler 52 joins the refrigerant compressed by the first cylinder 42A and the refrigerant compressed by the second cylinder 42B.

[0040] The first discharge muffler 52 has a discharge hole (not shown) that spatially connects the inside and outside of the first discharge muffler 52. The compressed refrigerant discharged into the first discharge muffler 52 is discharged into the airtight container 11 through the discharge hole.

[0041] Note that the first hole may be part of the second hole 57. Further, the discharge chamber 53 of the second partition plate 45B may be spatially connected to the second discharge muffler 56. That is, the first hole may be spatially connected to the second discharge muffler 56.

[0042] The first cylinder 42A is fixed to a frame 58 with a fastening member 59 such as a bolt, and this frame is fixed to the airtight container 11 by welding, for example, by spot welding at a plurality of points. In other words, the frame 58 supports the rotor 32, the compression mechanism 13, and the rotating shaft 15 of the motor 12 to the airtight container 11 via the first cylinder 42A. It is preferred that the center of gravity of the rotor 32, the compression mechanism 13, and the rotating shaft 15 of the motor 12 in the height direction of the airtight container 11 is located within the thickness of the frame 58 (i.e., dimension of the compressor 2 in the height direction).

[0043] A plurality of suction pipes 61 are connected to the cylinder chambers 41 of the respective cylinders 42 through

the airtight container 11. Each cylinder 42 has a suction hole that is spatially connected to each suction pipe 61 and reaches the cylinder chamber 41. The first suction pipe 61A is connected to the cylinder chamber 41 of the first cylinder 42A. The second suction pipe 61B is connected to the cylinder chamber 41 of the second cylinder 42B. The third suction pipe 61C is connected to the cylinder chamber 41 of the third cylinder 42C. The number of the plurality of suction pipes 61 may be the same as the number of the plurality of cylinders 42 as in the present embodiment or may be smaller than the number of the plurality of cylinders 42 by being shared by the two cylinders 42. For example, the second suction pipe 61B may be connected to the second partition plate 45B. The second partition plate 45B is provided with a refrigerant passage (not shown) that is connected to the second partition plate 45B and branches into the cylinder chamber 41 of the second cylinder 42B and the cylinder chamber 41 of the third cylinder 42C so as to be connected to both cylinder chambers 41.

[0044] The bottom portion of the airtight container 11 is filled with lubricant 62. Most of the compression mechanism 13 is in the lubricant 62 stored in the airtight container 11.

[0045] The accumulator 7 prevents the liquid refrigerant, which has not been completely gasified by the heat absorber 6, from being sucked into the compressor 2.

[0046] Next, the sealed terminals 18 and 19 will be described.

[0047] Fig. 2 is a schematic view of the sealed terminals of the compressor according to the embodiment of the present invention as viewed from above.

[0048] Fig. 3 is a schematic view of the sealed terminals of the compressor according to the embodiment of the present invention as viewed from below.

[0049] Fig. 4 is a schematic view of the sealed terminals and the terminal block of the compressor according to the embodiment of the present invention as viewed from above.

[0050] Fig. 5 is a longitudinal cross-sectional view of the sealed terminal and the terminal block of the compressor according to the embodiment of the present invention.

[0051] As shown in Fig. 2 to Fig. 5, the pair of sealed terminals 18 and 19 of the compressor 2 according to the present embodiment are arranged side by side on the dome-shaped end plate 11b of the airtight container 11.

[0052] First, the sealed terminal 18 will be described. The other sealed terminal 19 has substantially the same structure and shape as the sealed terminal 18. Accordingly, the description of the other sealed terminal 19 is omitted. For the sake of simplicity, the sealed terminal 18 is hereinafter referred to as the first sealed terminal 18, and the other sealed terminal 19 is hereinafter referred to as the second sealed terminal 19.

[0053] The first sealed terminal 18 includes: a substantially disk-shaped main body 71; three pins 72 that penetrate the front and back of the main body 71; three first plate-shaped terminals 75 that are provided on the respective pins 72 and are located outside the airtight container 11; and three second plate-shaped terminals 76 that are provided on the respective pins 72 and are disposed inside the airtight container 11.

[0054] Fig. 2 and Fig. 3 are diagrams of the sealed terminals 18 and 19 when viewed from the extending direction of the pins 72 of the pair of sealed terminals 18 and 19. Fig. 2 and Fig. 3 show the sealed terminals 18 and 19 from the direction tilted with respect to the planar view of the compressor 2.

[0055] The main body 71 holds the three pins 72 and the three first plate-shaped terminals 75 such that they are isolated from each other. The three pins 72 and the three first plate-shaped terminals 75 are electrically connected to the motor 12.

[0056] The three pins 72 are arranged at the respective vertexes of the equilateral triangle d, center of gravity of which is the center point O of the disk-shaped main body 71. In other words, the three pins 72 are arranged around the center point O at every 120 degree of the center angle. Each virtual line passing through each pin 72 from the center point O are defined as a line segment L1. That is, the three line segments L1 substantially trisect the circle in a fan shape.

[0057] The respective first plate-shaped terminals 75 are connected to the power lines 25. Each of the first plate-shaped terminals 75 has a front surface 75f as one surface and a back surface 75r as the other surface. The front surface 75f and the back surface 75r are in a front-to-back relationship of the first plate-shaped terminal 75. The front surface 75f of each first plate-shaped terminal 75 is joined to the corresponding pin 72.

[0058] As shown in Fig. 2, the front surface 75f of each first plate-shaped terminal 75 is aligned with each side of a triangle D and faces the respective front surfaces 75f of the other two first plate-shaped terminals 75 such that virtual planes containing the respective front surfaces 75f form the triangle D across the three first plate-shaped terminals 75. In other words, the three first plate-shaped terminals 75 are arranged in the respective sides of the triangle D such that the front surfaces 75f of the respective three first plate-shaped terminals 75 face each other.

[0059] The front surface 75f and back surface 75r of each first plate-shaped terminal 75 are substantially orthogonal to the corresponding line segment L1. The "corresponding line segment L1" is the line segment L1 passing through the pin 72 to which each first plate-shaped terminal 75 is joined, and is the line segment L1 that penetrates the front and back of each first plate-shaped terminal 75. That is, each first plate-shaped terminal 75 is arranged at the center of the corresponding side of the triangle D.

[0060] The triangle D contains the second triangle d formed by the three pins 72. Each vertex of the second triangle

d touches the midpoint of the corresponding side of the triangle D or is in closest contact with the midpoint of the corresponding side of the triangle D.

[0061] The three first plate-shaped terminals 75 are arranged so as to form a hexagon as a whole when the ends of the adjacent first plate-shaped terminals 75 are connected by a virtual straight line. In this hexagon, the opposite side of one first plate-shaped terminal 75 is the virtual straight line connecting the ends of the other two first plate-shaped terminals 75.

[0062] The second plate-shaped terminals 76 are connected to the respective lead wires 33. Each second plate-shaped terminal 76 has a front surface 76f as one surface and a back surface 76r as the other surface. The front surface 76f and the back surface 76r are in a front-and-back relationship of the second plate-shaped terminal 76. The front surface 76f of each second plate-shaped terminals 76 is joined to the corresponding pin 72.

[0063] As shown in Fig. 3, the front surface 76f and the back surface 76r of one second plate-shaped terminal 76a extend along the first virtual line L1a, which is one of the line segments L1. The front surface 76f and the back surface 76r of the second plate-shaped terminal 76b are substantially orthogonal to the second virtual line L1b as the corresponding line segment L1, and the front surface 76f and the back surface 76r of the second plate-shaped terminal 76c are substantially orthogonal to the second virtual line L1c as the corresponding line segment L1. In other words, the second plate-shaped terminal 76a extends along the virtual plane VP2a that bisects the acute angle formed by the virtual plane VP2b containing the second plate-shaped terminal 76b and the virtual plane VP2c containing the second plate-shaped terminals 76c.

[0064] Next, the relationship between the pair of sealed terminals 18 and 19 will be described.

[0065] The pair of sealed terminals 18 and 19 face each other so as to interpose a plane P that contains the midpoint of the pair of sealed terminals 18 and 19 and the centerline of the airtight container 11.

[0066] One corner Co of the triangle (D1 or D2) formed by the three first plate-shaped terminals 75 of one of the sealed terminals 18 and 19 faces one corner Co of the triangle (D1 or D2) formed by the three first plate-shaped terminals 75 of the other of the sealed terminals 18 or 19. That is, one corner Co of the triangle D1 formed by the three first plate-shaped terminals 75 of the first sealed terminal 18 faces one corner Co of the triangle D2 formed by the three first plate-shaped terminals 75 of the second sealed terminal 19. Namely, one corner Co of the triangle D2 formed by the three first plate-shaped terminals 75 of the second sealed terminal 19 faces one corner Co of the triangle D1 formed by the three first plate-shaped terminals 75 of the first sealed terminal 18.

[0067] The pair of corners Co facing each other in the pair of triangles D1 and D2 may be separated from each other without overlapping as shown in Fig. 2 or may be at the same position.

[0068] Thus, one side of the second triangle d formed by the three pins 72 of one of the sealed terminals 18 and 19 faces one side of the second triangle d formed by the three pins 72 of the other of the sealed terminals 18 or 19. That is, one side of the second triangle d formed by the three pins 72 of the first sealed terminal 18 faces one side of the second triangle d formed by the three pins 72 of the second sealed terminal 19. Namely, one side of the second triangle d formed by the three pins 72 of the second sealed terminal 19 faces one side of the second triangle d formed by the three pins 72 of the first sealed terminal 18.

[0069] The respective first virtual lines L1a of the pair of sealed terminals 18 and 19 intersect each other at the point farther than the centerline of the airtight container 11 when viewed from the pair of sealed terminals 18 and 19. In other words, the second plate-shaped terminal 76a that has the front surface 76f and the back surface 76r extending along the first virtual line L1a is provided on the pin 72a that is closest to the centerline of the airtight container 11 among the pins 72 of each of the sealed terminals 18 and 19.

[0070] It is preferred that the pair of sealed terminals 18 and 19 are plane-symmetric with respect to the plane P as the plane of symmetry. The pair of sealed terminals 18 and 19 may be asymmetric as long as one corner Co of the triangle D1 and one corner Co of the triangle D2 are disposed so as to face each other. In this case, the pair of sealed terminals 18 and 19 are desirably disposed in such a manner that the opposite sides of the respective corners Co of the sealed terminals 18 and 19 are parallel to each other.

[0071] Next, the pair of terminal blocks 22 and 23 provided in the respective sealed terminals 18 and 19 will be described.

[0072] Fig. 6 is a plan view of the terminal block of the compressor according to the embodiment of the present invention.

[0073] First, the terminal block 22 will be described. The other terminal block 23 has substantially the same structure and shape as the terminal block 22. Thus, the description of the other terminal block 23 is omitted. For the sake of simplicity, the terminal block 22 is hereinafter referred to as the first terminal block 22, and the other terminal block 23 is hereinafter referred to as the second terminal block 23. The first terminal block 22 is provided in the first sealed terminal 18, and the second terminal block 23 is provided in the second sealed terminal 19.

[0074] The first terminal block 22 has a T-shape when viewed from the extending direction of the three pins 72 of the first sealed terminal 18, and has thickness in the extending direction of the three pins 72. The first terminal block 22 includes: three terminal disposition holes 81; three plate-shaped terminal receivers 82; and three wiring holders 83.

[0075] Two terminal disposition holes 81, two plate-shaped terminal receivers 82, and two wiring holders 83 are disposed on the horizontal bar 85 of the T-shaped first terminal block 22. The remaining one terminal disposition hole

81, the remaining one plate-shaped terminal receiver 82, and the remaining one wiring holder 83 are disposed on the vertical bar 86 of the T-shaped first terminal block 22.

[0076] Each terminal disposition hole 81 has a shape through which each first plate-shaped terminal 75 and each pin 72 of the first sealed terminal 18 can be inserted. The respective terminal disposition holes 81 are a series of holes through which the pin 72 and the first plate-shaped terminal 75 can be integrally inserted.

[0077] The two terminal disposition holes 81 on the horizontal bar 85 of the first terminal block 22 are disposed at the respective ends of the horizontal bar 85, and the one terminal disposition hole 81 on the vertical bar 86 of the first terminal block 22 is disposed at the boundary portion between the horizontal bar 85 and the vertical bar 86. The boundary portion between the horizontal bar 85 and the vertical bar 86 is the connection portion between the horizontal bar 85 and the vertical bar 86, and is the root of the vertical bar 86. These three terminal disposition holes 81 are arranged so as to form the shape of the triangle D corresponding to the three pins 72 and the three first plate-shaped terminals 75 of the first sealed terminal 18. In addition, these three terminal disposition holes 81 are arranged so as to form a hexagon as a whole when the ends of adjacent terminal disposition holes 81 are connected by virtual straight lines.

[0078] The respective plate-shaped terminal receivers 82 are disposed side by side to the terminal disposition holes 81. The respective plate-shaped terminal receivers 82 are disposed outside the virtual triangle D, where the three terminal disposition holes 81 are disposed, or are disposed outside the virtual hexagon formed by the three terminal disposition holes 81.

[0079] Each plate-shaped terminal receivers 82 is a concave recess having a shape by which the first plate-shaped terminal 75 inserted into the terminal disposition hole 81 can be bent toward the outside of the triangle D. Each plate-shaped terminal receivers 82 has a seating surface that is inserted into the terminal disposition hole 81 and seats the first plate-shaped terminal 75 bent towards the outside of the triangle D. Nuts 91 are embedded in the plate-shaped terminal receivers 82. A fastening member 92, for example a screw, is fastened to each nut 91. This fastening member 92 electrically connects a plate-shaped terminal 93 provided at the end of the power line 25 to the first plate-shaped terminal 75, and fastens the first plate-shaped terminal 75 bent by the plate-shaped terminal receiver 82 and the terminal 93 of the power line 25 together so as to fix them to the first terminal block 22.

[0080] Each first plate-shaped terminal 75 before being bent protrudes from the tip of the corresponding pin 72 in the extending direction of the pin 72. Each first plate-shaped terminal 75 has an elongated hole 95 in this protruding portion. The seating position of each first plate-shaped terminal 75 to be bent by the plate-shaped terminal receiver 82 and seated on the seat surface is not always constant. Thus, the elongated hole 95 of each first plate-shaped terminal 75 absorbs the variation in seating position of the first plate-shaped terminal 75 such that the fastening member 92 is smoothly fastened to the nut 91.

[0081] Each wiring holder 83 is a groove extending in the extending direction of the vertical bar 86 of the T-shaped first terminal block 22. That is, each wiring holder 83 is a groove extending downward in the T-shape formed by the first terminal block 22. The respective wiring holders 83 is connected in series to the plate-shaped terminal receivers 82. Each wiring holder 83 holds the power line 25, which is connected to the first plate-shaped terminal 75 by each plate-shaped terminal receiver 82, such that the power line 25 is wired in the extending direction of the vertical bar 86 of the T-shaped first terminal block 22. That is, the wiring holder 83 of the vertical bar 86 of the first terminal block 22 extends in the bending direction of the first plate-shaped terminal 75 bent on the corresponding plate-shaped terminal receiver 82. The wiring holders 83 of the horizontal bar 85 of the first terminal block 22 intersect with the bending direction of the first plate-shaped terminal 75 bent on the corresponding plate-shaped terminal receivers 82, and extend in parallel to the extending direction of the wiring holder 83 of the vertical bar 86 of the first terminal block 22.

[0082] Next, the relationship between the pair of terminal blocks 22 and 23 will be described.

[0083] The pair of terminal blocks 22 and 23 face each other so as to interpose the plane P that contains the midpoint of the pair of sealed terminals 18 and 19 and the centerline of the airtight container 11.

[0084] One of the terminal blocks 22 and 23 holds the three power lines 25 connected to the respective first plate-shaped terminals 75 of the corresponding sealed terminals (18 or 19) such that these three power lines 25 are wired to be separated away from the other of the terminal blocks 22 and 23. That is, the first terminal block 22 holds the three power lines 25 connected to the respective first plate-shaped terminals 75 of the first sealed terminal 18 such that these three power lines 25 are wired to be separated away from the second terminal block 23. Similarly, the second terminal block 23 holds the three power lines 25 connected to the respective first plate-shaped terminals 75 of the second sealed terminal 19 such that these three power lines 25 are wired to be separated away from the first terminal block 22.

[0085] In other words, the pair of T-shaped terminal blocks 22 and 23 are provided on the pair of sealed terminals 18 and 19 such that the respective horizontal bars 85 of the terminal blocks 22 and 23 face each other. That is, the respective vertical bars 86 of the pair of terminal blocks 22 and 23 extend in the direction away from each other. Since the wiring holders 83 of each of the terminal blocks 22 and 23 extend in parallel to the extending direction of the vertical bar 86 of the corresponding terminal block, one of the terminal blocks 22 and 23 holds the three power lines 25 connected to the respective first plate-shaped terminals 75 of the corresponding sealed terminals (18 or 19) in the direction away from the other of the terminal blocks 22 or 23.

[0086] As described above, the compressor 2 and the refrigeration cycle apparatus 1 according to the present embodiment is configured such that one of the corners of the triangle D formed by the three first plate-shaped terminals 75 of one of the sealed terminals 18 and 19 faces one of the corners of the triangles D formed by the three first plate-shaped terminals 75 of the other of the sealed terminals 18 and 19.

[0087] Thus, the compressor 2 and the refrigeration cycle apparatus 1 enable the three first plate-shaped terminals 75 to be bent toward the outside of the triangle D in one of the sealed terminals 18 and 19 without interference. In other words, the compressor 2 and the refrigeration cycle apparatus 1 enable the three first plate-shaped terminals 75 to be bent toward the outside of the triangle D without interference and to readily connect the power lines 25 having the plate-shaped terminals 93.

[0088] In the compressor 2 and the refrigeration cycle apparatus 1, the three bent first plate-shaped terminals 75 of one of the sealed terminals 18 and 19 and the three bent first plate-shaped terminals 75 of the other of the sealed terminals 18 and 19 can be arranged as close to each other as possible without interfering with each other. These three first plate-shaped terminals 75 are radially arranged at every 120 degrees in a bent state. Under this state, in view of the pair of sealed terminals 18 and 19 adjacent to each other, the arrangement relationship of the pair of sealed terminals 18 and 19 according to the present embodiment is an excellent mounting form in which the pair of sealed terminals 18 and 19 are closest to each other and the power lines 25 can be readily wired.

[0089] Thus, the compressor 2 and the refrigeration cycle apparatus 1 can readily connect the power lines 25 having the larger plate-shaped terminals 93 to the pair of sealed terminals 18 and 19. In other words, the compressor 2 and refrigeration cycle apparatus 1 can readily adopt a larger terminal having a large contact area for each terminal 93 that connects the power line 25 to the pair of sealed terminals 18 and 19, and can readily supply a large current to the motor 12 while avoiding temperature rise of each terminal 93.

[0090] In addition, the compressor 2 and the refrigeration cycle apparatus 1 enable bending of the first plate-shaped terminals 75 of the sealed terminals 18 and 19, and can provide the terminal blocks 22 and 23 so as to securely screw the sealed terminals 18 and 19 and the terminals 93 of the power lines 25.

[0091] Further, the compressor 2 and the refrigeration cycle apparatus 1 enable bending of the first plate-shaped terminals 75 of the sealed terminals 18 and 19, and can provide the terminal blocks 22 and 23 so as to readily fasten the screws, which fasten the sealed terminals 18 and 19 and the terminals 93 of the power lines 25 together, from the same direction. This increases the degree of freedom of the wiring paths of the power lines 25 and enables connection of the power lines 25 to the sealed terminals 18 and 19 without applying excessive bending stress to the power line 25.

[0092] Moreover, the compressor 2 and the refrigeration cycle apparatus 1 according to the present embodiment include the pair of terminal blocks 22 and 23 provided in the respective sealed terminals 18 and 19. One of the terminal blocks 22 and 23 holds the three power lines 25 connected to the respective first plate-shaped terminals 75 of the corresponding sealed terminals 18 and 19 such that these three power lines 25 are wired to be separated away from the other of the terminal blocks 22 and 23. Hence, the compressor 2 and the refrigeration cycle apparatus 1 enables connection of the power lines 25 to the sealed terminals 18 and 19 without applying excessive bending stress to the power lines 25, and can wire the power lines 25 without exerting excessive stress on the power lines 25 and avoid mutual interference between the power lines 25.

[0093] Furthermore, the compressor 2 and the refrigeration cycle apparatus 1 according to the present embodiment includes the second plate-shaped terminals 76 arranged in such a manner that the first virtual lines L1a intersect each other at a position farther than the centerline of the airtight container 11 when viewed from the pair of sealed terminals 18 and 19. Thus, the compressor 2 and the refrigeration cycle apparatus 1 can wire the lead wires 33 of the motor 12 in the space inside the airtight container 11 under the state where excessive stress does not act on the lead wires 33. Additionally, the compressor 2 and the refrigeration cycle apparatus 1 can connect the lead wires 33 of the motor 12 to the second plate-shaped terminals 76 without making the lead wires 33 touch the inner wall surface of the airtight container 11. This protects the lead wires 33 from the thermal effects at the time of welding the end plate 11b of the airtight container 11 to the body 11a and reduces the risk of disconnection.

[0094] The terminals provided at the ends of the lead wires 33 are exposed to the refrigerant flowing in the compressor 2. Hence, the temperature of the terminals depends on the temperature of the refrigerant in the compressor 2. That is, the temperature of the terminals provided at the ends of the lead wires 33 does not rise abnormally at the time of energization even when a larger current is supplied to the motor as the compression load increases. Thus, the terminals provided at the ends of the lead wires 33 of the motor 12 may be plate-shaped terminals similar to the terminals 93 provided at the ends of the power lines 25 or may be the Faston terminals used in the conventional compressor.

[0095] According to the refrigeration cycle apparatus 1 and the compressor 2 of the present embodiment, the sealed terminals 18 and 19 and the terminals 93 of the power lines 25 can be securely screwed to each other by installing the terminal blocks 22 and 23, the power lines 25 can be connected to the sealed terminals 18 and 19 without applying excessive bending stress to the power lines 25, and the power lines 25 can be efficiently connected at the time of manufacture.

[0096] The subject matter of the invention is defined by the independent claim. While certain embodiments have been

described, these embodiments have been presented by way of example only, and are not intended to limit the scope of the invention. Indeed, the novel embodiments described herein may be embodied in a variety of other forms; furthermore, various omissions, substitutions and changes in the form of the embodiments described herein may be made without departing from the scope of the invention as defined by the appended claims.

Reference Signs List

[0097]

1	refrigeration cycle apparatus
2	compressor
3	radiator
5	expansion device
6	heat absorber
7	accumulator
8	refrigerant piping
8a	discharge pipe
11	airtight container
11a	body
11b, 11c	end plate
12	motor
13	compression mechanism
15	rotating shaft
15a	intermediate portion
15b	lower end portion
16	main bearing
17	auxiliary bearing
18	sealed terminal(first sealed terminal)
19	sealed terminal(second sealed terminal)
22	terminal block (first terminal block)
23	terminal block (second terminal block)
25	power line
31	stator
32	rotor
33	lead wire
35	rotor iron core
36	eccentric portion
41	cylinder chamber
42	cylinder
42A	first cylinder
42B	second cylinder
42C	third cylinder
43	roller
45A	first partition plate
45B	second partition plate
46	fastening member
51A	first discharge valve mechanism
51B	second discharge valve mechanism
51C	third discharge valve mechanism
52	first discharge muffler
53	discharge chamber
55	fastening member
56	second discharge muffler
57	second hole
58	frame
59	fastening member
61	suction pipe
61A	first suction pipe

61B	second suction pipe
61C	third suction pipe
62	lubricant
71	main body
72	pin
75	first plate-shaped terminal
75f	front surface
75r	back surface
76, 76a, 76b, 76c	second plate-shaped terminal
76f	front surface
76r	back surface
81	terminal disposition hole
82	plate-shaped terminal receiver
83	wiring holder
85	horizontal bar
86	vertical bar
91	nut
92	fastening member
93	terminal
95	elongated hole

Claims

1. A compressor (2) comprising:

an airtight container (11);
a compression mechanism (13) that is accommodated in the airtight container (11) and compresses a refrigerant introduced into the airtight container (11);
a motor (12) including a cylindrical stator (31) and a rotor (32) that is disposed inside the stator (31) and generates rotational driving force of the compression mechanism (13), the stator (31) being fixed to an inner surface of the airtight container (11); and
a pair of sealed terminals (18, 19) arranged in the airtight container (11), wherein
each of the sealed terminals (18, 19) has three plate-shaped terminals (75) that are disposed outside the airtight container (11) and are electrically connected to the motor (12); **characterized in that**
one surface of each of the three plate-shaped terminals (75) is aligned with each side of a triangle and faces each of other two plate-shaped terminal on the one surface in such a manner that three virtual planes each containing the one surface form the triangle across the three plate-shaped terminals (75); and
one of corners of the triangle formed by the three plate-shaped terminals (75) of one of the sealed terminals (18, 19) faces one of corners of the triangle formed by the three plate-shaped terminals (75) of another of the sealed terminals (18, 19).

2. The compressor (2) according to claim 1, further comprising a pair of terminal blocks provided for respective sealed terminals,
wherein one of the terminal blocks holds three power lines (25) connected to respective plate-shaped terminals (75) of a corresponding sealed terminal (18; 19) in such a manner that the three power lines (25) are wired to be separated away from another of the terminal block (22).

3. The compressor (2) according to claim 1 or claim 2, wherein:

each of the sealed terminals (18, 19) has three second plate-shaped terminals that are disposed inside the airtight container and are electrically connected to the motor (12);
in each of the sealed terminals (18, 19), front and back surfaces of one of the three second plate-shaped terminals extend along a first virtual line that is one of three virtual lines substantially trisecting a circle centered on a center of gravity of the triangle in a fan shape, while front and back surfaces of other two of the three second plate-shaped terminals are substantially orthogonal to second virtual lines, which are other two of the three virtual lines; and
first virtual lines (L1a) of respective sealed terminals (18, 19) intersect each other at a position farther than a

centerline of the airtight container (11) when viewed from the pair of sealed terminals (18, 19).

4. A refrigeration cycle apparatus comprising:

the compressor (2) according to any one of claim 1 to claim 3;
a radiator (3);
an expansion device (5);
a heat absorber (6); and
refrigerant piping (8) that connects the compressor (2), the radiator (3), the expansion device (5), and the heat absorber (6) and circulates the refrigerant.

Patentansprüche

1. Ein Kompressor (2), bestehend aus:

einem luftdicht verschlossenen Behälter (11);
einen Kompressionsmechanismus (13), der in dem luftdichten Behälter (11) angeordnet ist und ein in den luftdichten Behälter (11) eingeführtes Kältemittel komprimiert;
einen Motor (12) mit einem zylindrischen Stator (31) und einem Rotor (32), der innerhalb des Stators (31) angeordnet ist und eine Drehantriebskraft des Kompressionsmechanismus (13) erzeugt, wobei der Stator (31) an einer Innenfläche des luftdichten Behälters (11) befestigt ist; und
ein Paar versiegelter Anschlüsse (18, 19), die in dem luftdichten Behälter (11) angeordnet sind, wobei
jeder der abgedichteten Anschlüsse (18, 19) drei plattenförmige Anschlüsse (75) aufweist, die außerhalb des luftdichten Behälters (11) angeordnet sind und elektrisch mit dem Motor (12) verbunden sind; **dadurch gekennzeichnet, dass**
eine Fläche von jedem der drei plattenförmigen Anschlüsse (75) ausgerichtet ist mit jeder Seite eines Dreiecks und jedem der beiden anderen plattenförmigen Anschlüsse auf der einen Fläche so gegenüberliegt, dass drei virtuelle Ebenen, die jeweils die eine Fläche enthalten, das Dreieck über die drei plattenförmigen Anschlüsse (75) bilden; und
eine der Ecken des Dreiecks, das von den drei plattenförmigen Anschlüssen (75) eines der abgedichteten Anschlüsse (18, 19) gebildet wird, einer der Ecken des Dreiecks gegenüberliegt, das von den drei plattenförmigen Anschlüssen (75) eines anderen der abgedichteten Anschlüsse (18, 19) gebildet wird.

2. Der Kompressor (2) nach Anspruch 1, der ferner ein Paar von Anschlussblöcken für entsprechende abgedichtete Anschlüsse umfasst,
wobei einer der Anschlussblöcke drei Stromleitungen (25) enthält, die mit jeweiligen plattenförmigen Anschlüssen (75) eines entsprechenden abgedichteten Anschlusses (18; 19) so verbunden sind, dass die drei Stromleitungen (25) so verdrahtet sind, dass sie weg von einem anderen Anschlussblock (22) getrennt werden.

3. Der Kompressor (2) nach Anspruch 1 oder Anspruch 2, wobei:

jeder der abgedichteten Anschlüsse (18, 19) drei zweite plattenförmige Anschlüsse aufweist, die im Inneren des luftdichten Behälters angeordnet und elektrisch mit dem Motor (12) verbunden sind;
in jedem der abgedichteten Anschlüsse (18, 19) sich Vorder- und Rückseiten eines der drei zweiten plattenförmigen Anschlüsse entlang einer ersten virtuellen Linie erstrecken, die eine von drei virtuellen Linien ist, die im Wesentlichen einen Kreis schneiden, der auf einem Schwerpunkt des Dreiecks in einer Fächerform zentriert ist, während Vorder- und Rückseiten der anderen zwei der drei zweiten plattenförmigen Anschlüsse im Wesentlichen orthogonal zu zweiten virtuellen Linien sind, die die anderen zwei der drei virtuellen Linien sind; und
erste virtuelle Linien (L1a) jeweiliger abgedichteter Anschlüsse (18, 19) einander an einer Position schneiden, die weiter als eine Mittellinie des luftdichten Behälters (11) liegt, wenn man von das Paar abgedichteter Anschlüsse (18, 19) betrachtet.

4. Ein Kühlkreislaufgerät, bestehend aus:

den Kompressor (2) nach einem der Ansprüche 1 bis 3;
einen Heizkörper (3);
eine Expansionsvorrichtung (5);

einen Wärmeabsorber (6); und
Kältemittelleitungen (8), die den Kompressor (2), der Heizkörper (3), das Expansionsvorrichtung (5) und den Wärmeabsorber (6) miteinander verbinden und das Kältemittel zirkulieren lassen.

Revendications

1. Compresseur (2) comprenant :

un conteneur étanche à l'air (11) ;
un mécanisme de compression (13) qui est logé dans le conteneur étanche à l'air (11) et qui comprime un réfrigérant introduit jusque dans le conteneur étanche à l'air (11) ;
un moteur (12) incluant un stator cylindrique (31) et un rotor (32) qui est disposé à l'intérieur du stator (31) et qui génère une force d'entrainement de rotation du mécanisme de compression (13), le stator (31) étant fixé à une surface intérieure du conteneur étanche à l'air (11) ; et
une paire de bornes hermétiques (18, 19) qui sont agencées dans le conteneur étanche à l'air (11), dans lequel chacune des bornes hermétiques (18, 19) a trois bornes en forme de plaque (75) qui sont disposées à l'extérieur du conteneur étanche à l'air (11) et qui sont connectées électriquement au moteur (12) ;
caractérisé en ce que
une surface de chacune des trois bornes en forme de plaque (75) est alignée avec chaque côté d'un triangle et fait face à chacune des deux autres bornes en forme de plaque sur ladite une surface de telle sorte que trois plans virtuels contenant chacun ladite une surface forment le triangle à travers les trois bornes en forme de plaque (75) ; et
l'un des coins du triangle formé par les trois bornes en forme de plaque (75) de l'une des bornes hermétiques (18, 19) fait face à l'un des coins du triangle formé par les trois bornes en forme de plaque (75) d'une autre des bornes hermétiques (18, 19).

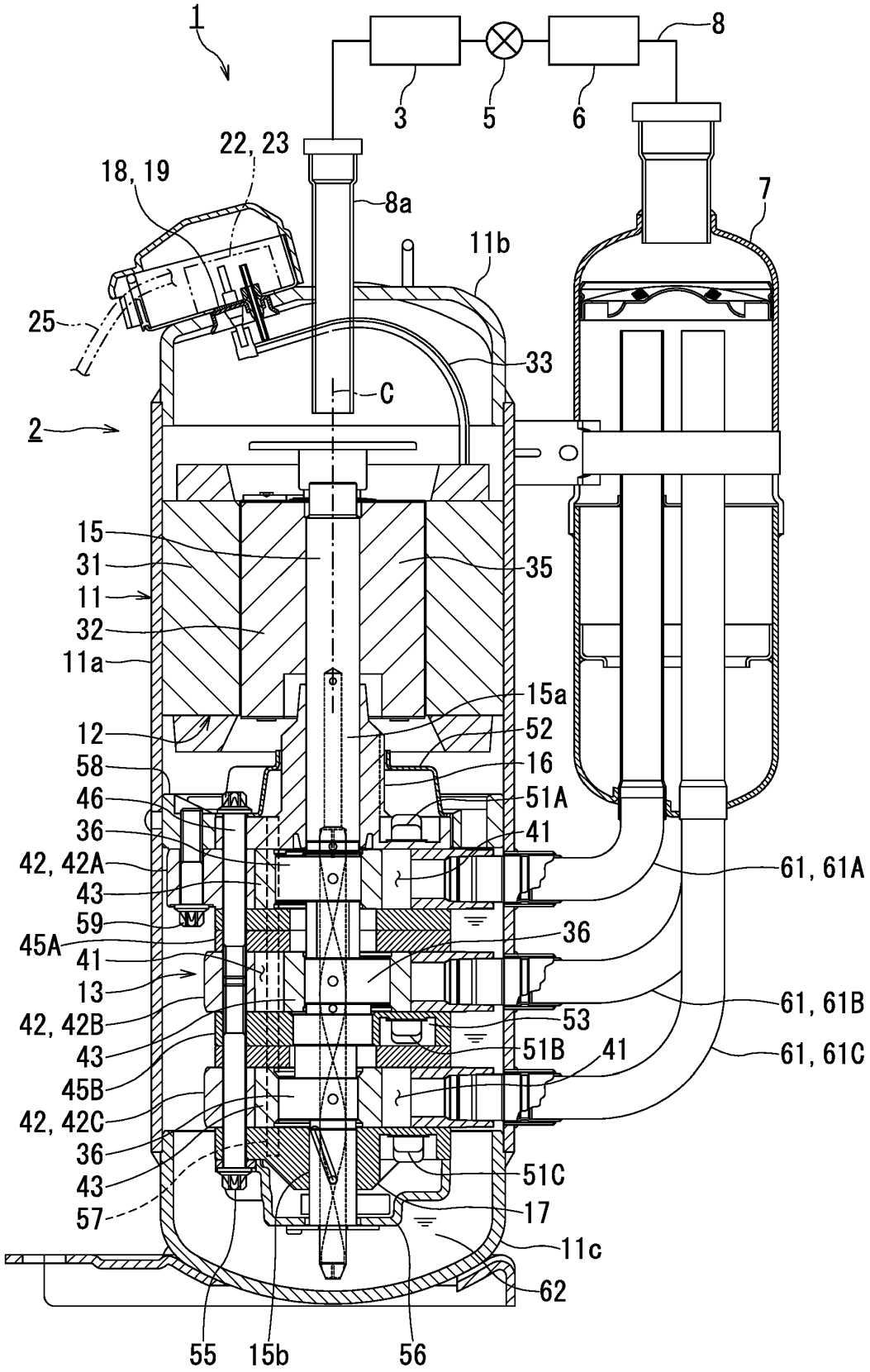
2. Compresseur (2) selon la revendication 1, comprenant en outre une paire de blocs formant bornes prévus pour les bornes hermétiques respectives,
dans lequel l'un des blocs formant bornes retient trois lignes de puissance (25) connectées aux bornes en forme de plaque respectives (75) d'une borne hermétique correspondante (18, 19) de telle manière que les trois lignes de puissance (25) sont câblées pour être séparées en éloignement les unes des autres du bloc formant borne (22).

3. Compresseur (2) selon la revendication 1 ou 2, dans lequel :

chacune des bornes hermétiques (18, 19) a trois secondes bornes en forme de plaque qui sont disposées à l'intérieur du conteneur étanche à l'air et qui sont connectées électriquement au moteur (12) ;
dans chacune des bornes hermétiques (18, 19), des surfaces avant et arrière de l'une des trois secondes bornes en forme de plaque s'étendent le long d'une première ligne virtuelle qui est l'une de trois lignes virtuelles coupant sensiblement un cercle centré sur un centre de gravité du triangle en forme d'éventail, tandis que des surfaces avant et arrière de deux autres des trois secondes bornes en forme de plaque sont sensiblement orthogonales à de secondes lignes virtuelles, qui sont deux autres des trois lignes virtuelles ; et
des premières lignes virtuelles (L1a) de bornes hermétiques respectives (18, 19) se recoupent les unes les autres à une position plus éloignée qu'une ligne centrale du conteneur étanche à l'air (11) lorsqu'elles sont vues depuis la paire de bornes hermétiques (18, 19).

4. Appareil à cycle de réfrigération comprenant :

le compresseur (2) selon l'une quelconque des revendications 1 à 3 ;
un radiateur (3) ;
un dispositif d'expansion (5) ;
un absorbeur de chaleur (6) ; et
une tubulure à réfrigérant (8) qui connecte le compresseur (2), le radiateur (3), le dispositif d'expansion (5) et l'absorbeur de chaleur (6), et fait circuler le réfrigérant.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3
5
6
8
22, 23
18, 19
8a
7
11b
25
33
C
2
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11a
35
15a
12
52
58
16
46
51A
36
41
42, 42A
61, 61A
43
59
36
45A
41
13
61, 61B
42, 42B
53
43
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51C
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57
11c
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55
15b
56

FIG. 1

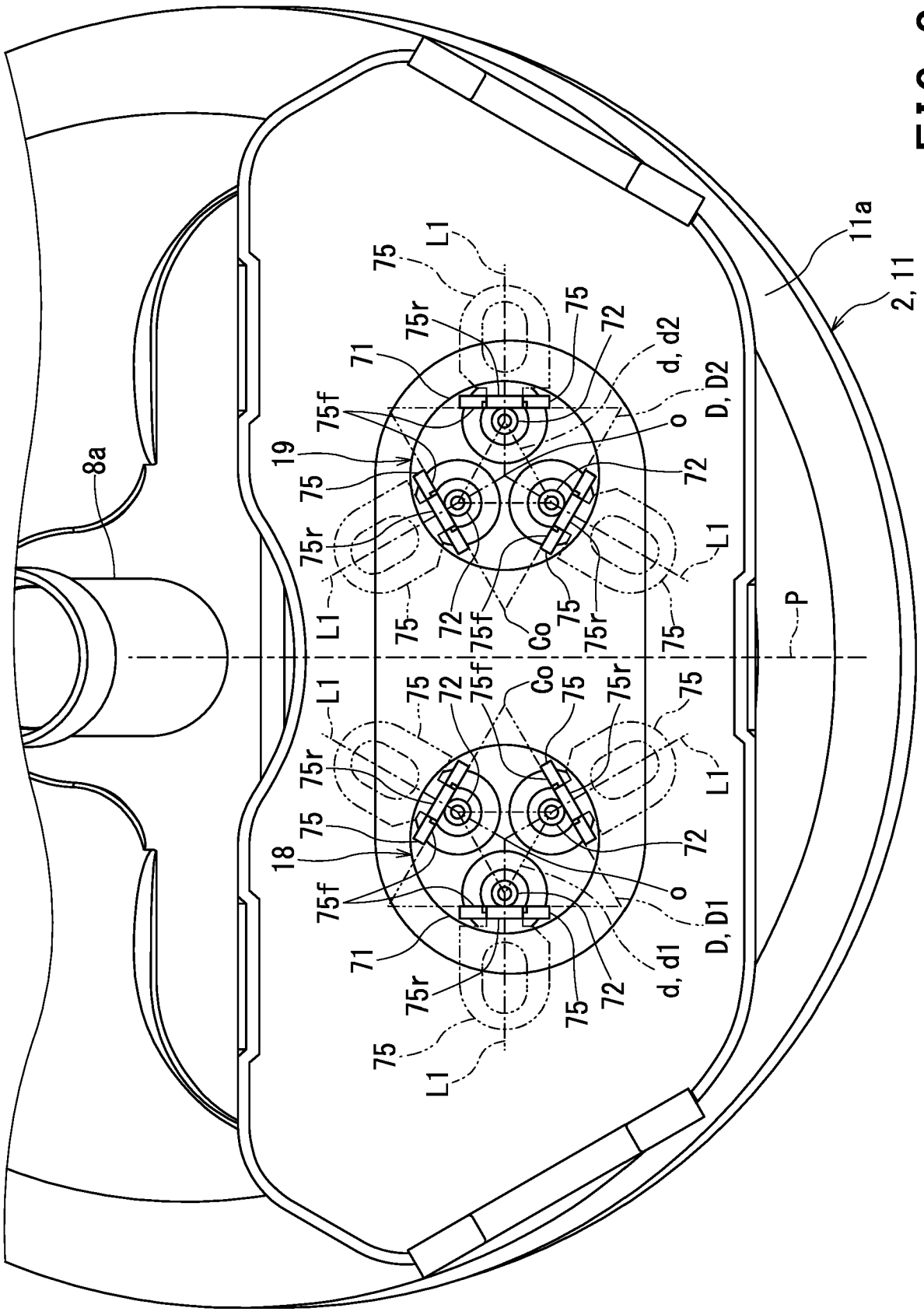
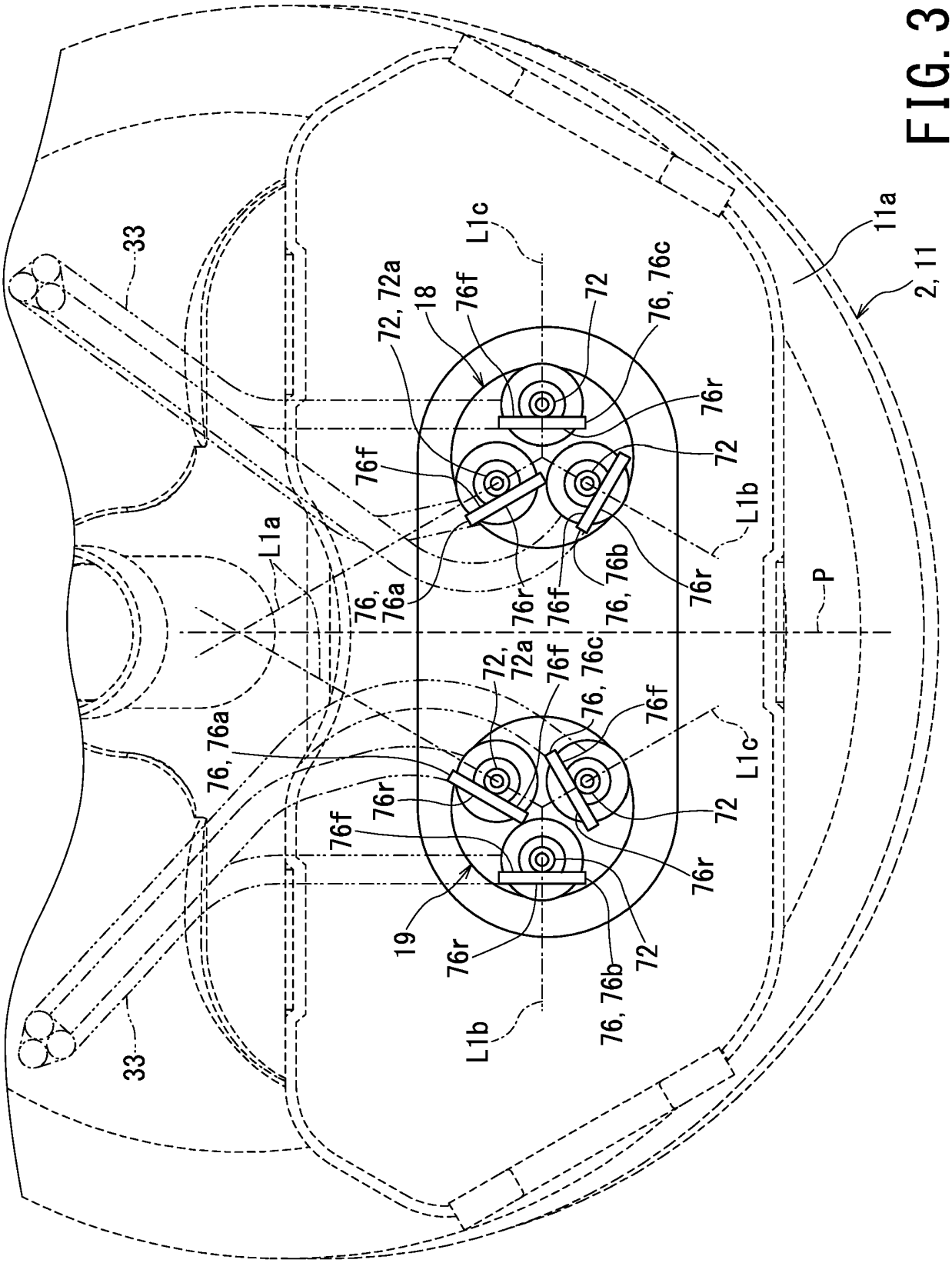


FIG. 2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18
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72
76, 76c
11a
2, 11
76r
76f
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L1b
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76r
76f
76, 76b
76r
P
72, 72a
76f
76, 76c
76f
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19
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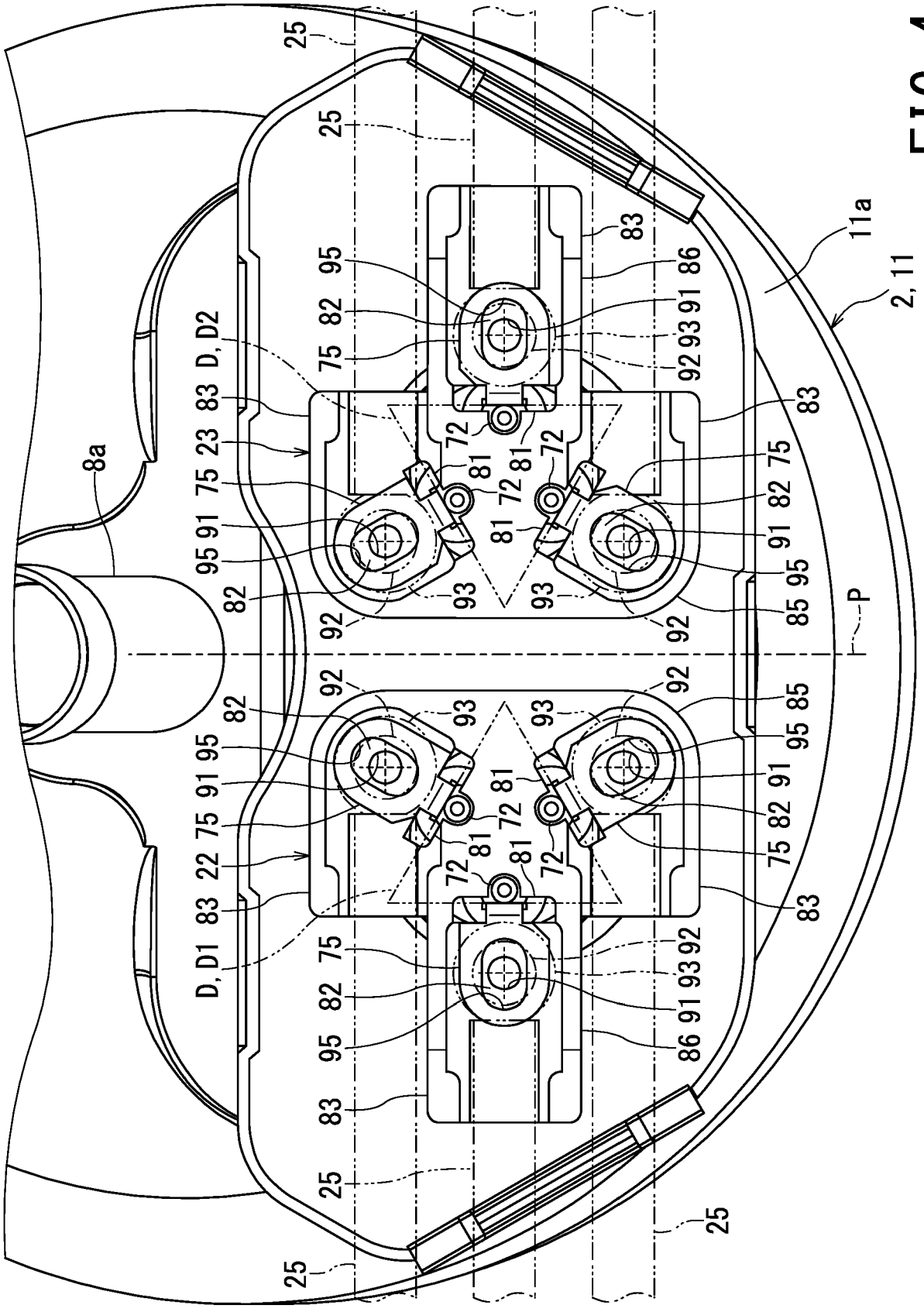
72
76, 76b
L1b
33

FIG. 3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93
92
72
81
72
81
72
81
93
93
92
92
85
95
91
82
75
P
92
92
82
93
93
95
91
75
22
83
D, D1
75
82
95
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75
82
91
95
85

FIG. 4

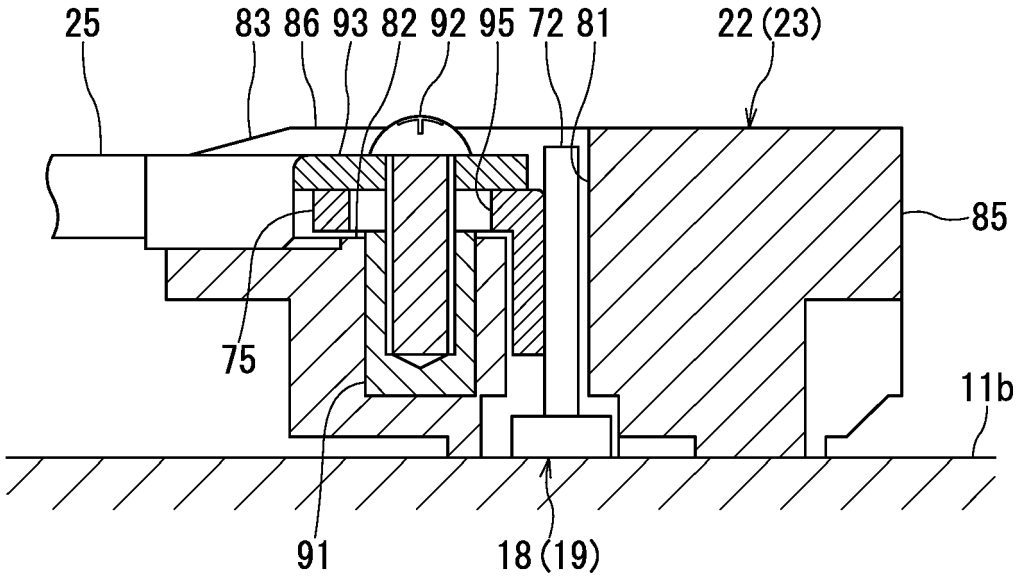

FIG. 5

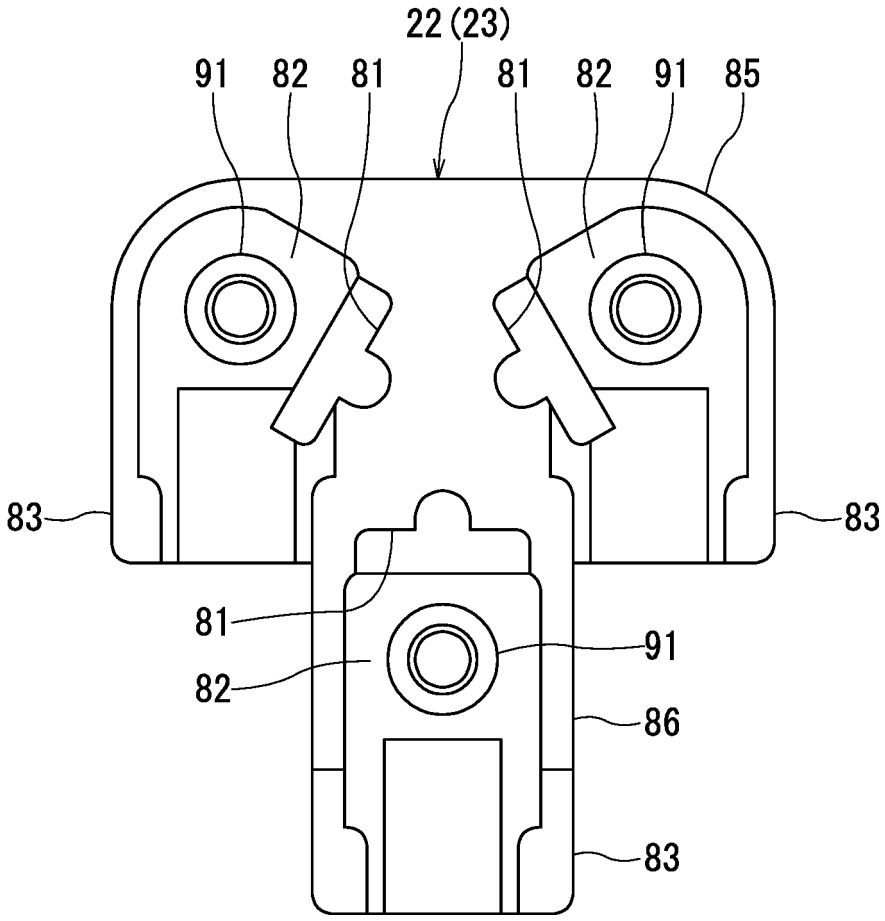

FIG. 6

REFERENCES CITED IN THE DESCRIPTION

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- JP 2019035394 A **[0005]**