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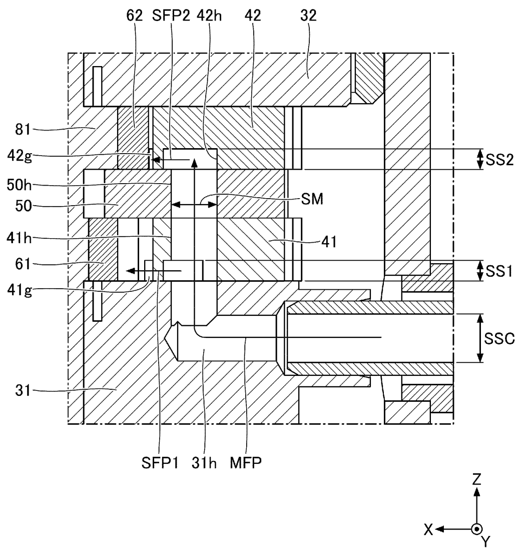
(54) **TWO-CYLINDER ROTARY COMPRESSOR**

(57) A 2-cylinder rotary compressor includes a head to which an intake pipe is connected; a first cylinder in which a first piston rotates eccentrically inside; a second cylinder in which a second piston rotates eccentrically inside; a middle plate provided between the first cylinder and the second cylinder; a main flow path penetrating from the intake pipe through the head, the first cylinder, and the middle plate to the second cylinder; a first branch flow path branching from the main flow path into an interior of the first cylinder; and a second branch flow path branching from the main flow path into an interior of the second cylinder.

FIG.3



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Description

Technical Field

[0001] The present disclosure relates to a 2-cylinder rotary compressor.

Background Art

[0002] Patent Document 1 discloses a 2-cylinder rotary compressor having a compression mechanism part and a rotary drive part. Patent Document 1 discloses that the working gas is guided into both cylinder chambers through two intake paths branched at a branch part provided in the partition plate from a single intake pipe connected to the partition plate.

Citation List

Patent Document

[0003] Patent document 1: Japanese Patent No. 5070097

Summary of Invention

Technical Problem

[0004] In a rotary compressor, flattening of a compression mechanism is required to improve performance.

[0005] The present disclosure provides a technique for flattening a compression mechanism in a 2-cylinder rotary compressor.

Solution to Problem

[0006] A 2-cylinder rotary compressor of a first aspect includes:

a head to which an intake pipe is connected;
a first cylinder in which a first piston rotates eccentrically inside;
a second cylinder in which a second piston rotates eccentrically inside;
a middle plate provided between the first cylinder and the second cylinder;
a main flow path penetrating from the intake pipe through the head, the first cylinder, and the middle plate to the second cylinder;
a first branch flow path branching from the main flow path into an interior of the first cylinder; and
a second branch flow path branching from the main flow path into an interior of the second cylinder.

[0007] According to the 2-cylinder rotary compressor of aspect 1, the compression mechanism can be flattened.

[0008] The 2-cylinder rotary compressor according to aspect 1, wherein a flow path area of the main flow path is greater than or equal to a flow path area of the intake port to which the intake pipe is connected.

[0009] The 2-cylinder rotary compressor according to aspect 1 or 2, wherein a flow path area of the second branch flow path is different from a flow path area of the first branch flow path.

[0010] The 2-cylinder rotary compressor according to any one of aspects 1 to 3, wherein a sum of a flow path area of the first branch flow path and a flow path area of the second branch flow path is greater than or equal to a flow path area of the main flow path.

[0011] The 2-cylinder rotary compressor according to any one of aspects 1 to 4, wherein

the first piston further includes a first blade dividing a first compression chamber formed between the first cylinder and the first piston into a first high-pressure chamber and a first low-pressure chamber,
a center of a first connection port through which the first branch flow path is connected to the first low-pressure chamber is provided on a side of the first blade with respect to a line connecting the main flow path and a rotation center of the first piston,
the second piston further includes a second blade dividing a second compression chamber formed between the second cylinder and the second piston into a second high-pressure chamber and a second low-pressure chamber, and
a center of a second connection port through which the second branch flow path is connected to the second low-pressure chamber is provided on a side of the second blade with respect to a line connecting the main flow path and a rotation center of the second piston.

[0012] The 2-cylinder rotary compressor according to any one of aspects 1 to 5, further including:

a holding member configured to hold the head, the first cylinder, the middle plate, and the second cylinder;
a container configured to house the head, the first cylinder, the middle plate, the second cylinder, and the holding member inside; and
an accumulator connected to the intake pipe, wherein
the holding member is fixed to the container, and
a lower portion of the accumulator is provided below the holding member.

[0013] The 2-cylinder rotary compressor according to any one of aspects 1 to 6, wherein a refrigerant used is carbon dioxide.

[0014] The 2-cylinder rotary compressor according to any one of aspects 1 to 7, wherein

the first cylinder includes

a first through-hole that penetrates outside an inner diameter of the first cylinder in a thickness direction, and

a first groove part formed from the first through-hole to inside the first cylinder, wherein

the middle plate includes a second through-hole penetrating in a thickness direction,

the second cylinder includes

a vertical hole extending in a thickness direction outside an inner diameter of the second cylinder, and

a second groove part formed from the vertical hole to inside the second cylinder, wherein

the first through-hole, the second through-hole, and the vertical hole each form a part of the main flow path,

the first groove part forms the first branch flow path, and

the second groove part forms the second branch flow path.

Brief Description of Drawings

[0015]

[FIG. 1] FIG. 1 is a perspective view of a rotary compressor according to the present embodiment.

[FIG. 2] FIG. 2 is a cross-sectional view of a rotary compressor according to the present embodiment.

[FIG. 3] FIG. 3 is an enlarged cross-sectional view of a rotary compressor according to the present embodiment.

[FIG. 4] FIG. 4 is a plan view of a head in a rotary compressor according to the present embodiment.

[FIG. 5] FIG. 5 is a plan view of a cylinder in a rotary compressor according to the present embodiment.

[FIG. 6] FIG. 6 is a bottom view of a cylinder in a rotary compressor according to the present embodiment.

[FIG. 7] FIG. 7 is a plan view of a middle plate in a rotary compressor according to the present embodiment.

[FIG. 8] FIG. 8 is a plan view of a cylinder in a rotary compressor according to the present embodiment.

[FIG. 9] FIG. 9 is a bottom view of a cylinder in a rotary compressor according to the present embodiment.

Description of Embodiments

[0016] Specific examples of the rotary compressor of the present disclosure will be described below with reference to the drawings. Note that the present disclosure is not limited to these examples, but is intended to be indicated by the claims and to include all changes within the meaning and scope equivalent to the claims.

[0017] Note that, in the description in the specification and drawings of each embodiment, with respect to components having substantially the same or corresponding functional configuration, overlapping descriptions may be omitted by assigning the same reference numerals. Further, in order to facilitate understanding, the scale of each part in the drawings may differ from the actual scale.

[0018] In the directions such as parallel, right angle, orthogonal, horizontal, vertical, up and down, left and right, front and back, etc., misalignments are permitted as long as the effect of the embodiment is not impaired. The shape of the corners is not limited to right angles and may be rounded. Parallel, right angle, orthogonal, horizontal, and vertical may include substantially parallel, substantially right angle, substantially orthogonal, substantially horizontal, and substantially vertical, respectively.

[0019] For example, substantially parallel means that even if two lines or two surfaces are not perfectly parallel to each other, they can be treated as parallel to each other within the limits permitted by manufacturing. It is intended that each of the other positional relationships of lines or surfaces, that is, substantially perpendicular, substantially orthogonal, substantially horizontal, and substantially vertical lines or surfaces fall within the manufacturing permissible range, similar to substantially parallel lines or surfaces.

[0020] A rotary compressor according to the present embodiment will be described below. The rotary compressor according to the present embodiment includes a head to which an intake pipe is connected, a first cylinder in which the first piston rotates eccentrically inside, a second cylinder in which the second piston rotates eccentrically inside, and a middle plate provided between the first cylinder and the second cylinder. The rotary compressor according to the present embodiment includes a main flow path penetrating from the intake pipe to the second cylinder through the head, the first cylinder, and the middle plate. The rotary compressor according to the present embodiment includes a first branch flow path branching from the main flow path into the interior of the first cylinder, and a second branch flow path branching from the main flow path into the interior of the second cylinder.

[0021] A rotary device according to the present embodiment will be described using a rotary compressor 1 which is an example of a rotary device according to the present embodiment. FIG. 1 is a perspective view of the rotary compressor 1 which is an example of a rotary compressor according to the present embodiment. FIG. 2 is a cross-sectional view of the rotary compressor 1 which is an example of a rotary compressor according to the present embodiment. FIG. 3 is an enlarged cross-sectional view of the rotary compressor 1 which is an example of a rotary compressor according to the present embodiment.

[0022] For the convenience of explanation, a virtual three-dimensional coordinate system (XYZ orthogonal coordinate system) consisting of the X-axis, Y-axis, and Z-axis (XYZ axis) orthogonal to each other may be set in the drawing. For example, when a black circle is illustrated in the circle of the coordinate axis perpendicular to the paper plane of the drawing, this indicates that the coordinate axis is facing toward the front side with respect to the paper plane. When a cross is illustrated in the circle of the coordinate axis, this indicates that the coordinate axis is facing toward the back side with respect to the paper plane.

[0023] However, this coordinate system is provided for the purpose of explanation and does not limit the attitude of the rotary compressor, etc., according to the present embodiment.

[0024] In the following drawings, the piston of the rotary compressor rotates in the XY plane which is a plane parallel to the X-axis direction and the Y-axis direction.

[0025] A plan view is a drawing in which an object is viewed from the +Z side in the opposite direction of the Z axis along the Z axis direction. Viewing in plan view refers to viewing an object from the +Z side in the opposite direction of the Z axis along the Z axis direction. A bottom view is a drawing in which an object is viewed from the -Z side in the Z axis direction along the Z axis direction. Viewing in bottom view refers to viewing an object from the -Z side in the Z axis direction along the Z axis direction.

[0026] The rotary compressor 1 compresses a refrigerant. The refrigerant used in the rotary compressor 1 is, for example, carbon dioxide. The refrigerant is not limited to carbon dioxide, but may be, for example, a fluorocarbon-based refrigerant. The rotary compressor 1 includes a compressor body 10 and an accumulator 20.

[Compressor body 10]

[0027] The compressor body 10 includes a container 11, an intake pipe 12, an outlet pipe 13, and a power terminal 15. The container 11 also includes a plate 14 for installing the compressor body 10.

[0028] The compressor body 10 includes a compression part 70 and an electrically driven part 80 provided inside. The electrically driven part 80 rotates a main shaft 81. The compression part 70 compresses the refrigerant supplied from the intake pipe 12. The refrigerant compressed in the compression part 70 is discharged from the outlet pipe 13 to the outside of the rotary compressor 1. The compression part 70 constitutes a compression mechanism.

[0029] The electrically driven part 80 rotates the main shaft 81. In the compression part 70, the main shaft 81 rotated by the electrically driven part 80 rotates each of a piston 61 and a piston 62. Each of the piston 61 and the piston 62 rotates eccentrically when the main shaft 81 rotates. As each of the piston 61 and the piston 62 rotates, the refrigerant is compressed in the compression part 70.

[0030] The compression part 70 includes a head 31, a cylinder 41, a middle plate 50, a cylinder 42, and a head 32. The head 31, the cylinder 41, the middle plate 50, the cylinder 42, and the head 32 are stacked sequentially from the bottom. The main shaft 81 penetrates each of the head 31, the cylinder 41, the middle plate 50, the cylinder 42, and the head 32.

[0031] The compression part 70 is provided with the piston 61 eccentrically rotated by the main shaft 81, inside the cylinder 41. The compression part 70 is provided with the piston 62 eccentrically rotated by the main shaft 81, inside the cylinder 42.

[Head 31]

[0032] The head 31 will be described below. FIG. 4 is a plan view of the lower head 31 of the rotary compressor 1, which is an example of the rotary compressor according to the present embodiment.

[0033] The head 31 has a through hole 31h extending along the Y-axis direction and from partway extending along the Z-axis direction. An intake pipe 12 is connected to one end of the through hole 31h. The other end of the through hole 31h is connected to a through hole 41h of the cylinder 41.

[0034] The head 31 has an upper surface 31S. A cylinder 41 is placed on the upper surface 31S. The piston 61 rotates on the upper surface 31S.

[Cylinder 41]

[0035] Next, the cylinder 41 will be described. FIG. 5 is a plan view of the cylinder 41 in the rotary compressor 1, which is an example of the rotary compressor according to the present embodiment. FIG. 6 is a bottom view of the cylinder 41 in the rotary compressor 1, which is an example of the rotary compressor according to the present embodiment. FIGS. 5 and 6 also illustrate the piston 61 rotating eccentrically inside the cylinder 41.

[0036] The cylinder 41 has a through hole 41h penetrating along the thickness direction, i.e., the Z-axis direction. The through hole 41h is provided outside the inner diameter of the cylinder 41. One end of the through hole 41h is connected to the through hole 31h of the head 31. The other end of the through hole 41h is connected to the through hole 50h of the middle plate 50. The cylinder 41 has a groove part 41g which is a groove formed from the through hole 41h to the inside of the cylinder 41.

[0037] The center 41gc of the connection port in the groove part 41g of the cylinder 41 is provided on the blade 61b side of the piston 61 with respect to the line L1 connecting the rotation center 41c of the piston 61 and the center of the through hole 41h.

[Middle plate 50]

[0038] Next, the middle plate 50 will be described. FIG. 7 is a plan view of the middle plate 50 in the rotary compressor 1, which is an example of the rotary compressor according to the present embodiment.

[0039] The middle plate 50 has a through hole 50h penetrating along the thickness direction, i.e., the Z-axis direction. One end of the through hole 50h is connected to the through hole 41h of the cylinder 41. The other end of the through hole 50h is connected to the vertical hole 42h of the cylinder 42.

[Cylinder 42]

[0040] Next, the cylinder 42 will be described. FIG. 8 is a plan view of the cylinder 42 in the rotary compressor 1, which is an example of the rotary compressor according to the present embodiment. FIG. 9 is a bottom view of the cylinder 42 in the rotary compressor 1, which is an example of the rotary compressor according to the present embodiment. FIGS. 8 and 9 also illustrate the piston 62 rotating eccentrically inside the cylinder 42.

[0041] The cylinder 42 has a vertical hole 42h formed along the thickness direction, i.e., the Z-axis direction, to the middle of the thickness of the cylinder 42. The vertical hole 42h is provided outside the inner diameter of the cylinder 42. The vertical hole 42h is connected to the through hole 50h of the middle plate 50. The cylinder 42 has a groove part 42g which is a groove formed from the vertical hole 42h to the inside of the cylinder 42.

[0042] The center 42gc of the connection port in the groove part 42g of the cylinder 42 is provided on the blade 62b side of the piston 62 with respect to a line L2 connecting the rotational center 42c of the piston 62 and the center of the vertical hole 42h.

[Head 32]

[0043] The head 32 holds the head 31, the cylinder 41, the middle plate 50 and the cylinder 42. The head 32 is fixed to the container 11. For example, the head 32 is fixed to the container 11 by welding. The lower part of the accumulator 20 is provided below the head 32.

[Piston 61]

[0044] The piston 61 rotates eccentrically inside the cylinder 41. The piston 61 has a blade 61b that divides the compression chamber 41CS of the cylinder 41 into a high-pressure chamber 41HS and a low-pressure chamber 41LS. The blade 61b is fixed to the cylinder 41 by a bush 41b.

[Piston 62]

[0045] The piston 62 rotates eccentrically inside the cylinder 42. The piston 62 has a blade 62b that divides a compression chamber 42CS of the cylinder 42 into a high-pressure chamber 42HS and a low-pressure chamber 42LS. The blade 62b is fixed to the cylinder 42 by a bush 42b.

[Main flow path MFP]

[0046] As illustrated in FIG. 3, the rotary compressor 1 includes a main flow path MFP which penetrates from the intake pipe 12 to the cylinder 42 through the head 31, the cylinder 41, and the middle plate 50, by a through hole 31h, a through hole 41h, a through hole 50h, and a vertical hole 42h.

[0047] The flow path area SM in the main flow path MFP may be greater than or equal to the flow path area SSC at the intake port to which the intake pipe 12 is connected. In the present disclosure, the flow path area is the area of the cross section of the flow path cut at a plane perpendicular to the direction in which the refrigerant flows. For example, the flow path area SM is the area of a cross section cut at a plane parallel to the XY plane in the through hole 41h, the through hole 50h, and the vertical hole 42h. The flow path area SM is the area of a cross section cut at a plane parallel to the YZ plane in a portion extending in the X axis direction of the through hole 41h or the area of a cross section cut at a plane parallel to the XY plane in a portion extending in the Y axis direction of the through hole 41h.

[Branch flow path SFP1, branch flow path SFP2]

[0048] As illustrated in FIG. 3, the rotary compressor 1 includes a branch flow path SFP1 that branches from the main flow path MFP to the inside of the cylinder 41 by the groove part 41g. The rotary compressor 1 also includes a branch flow path SFP2 that branches from the main flow path MFP to the inside of the cylinder 42 by the groove part 42g.

[0049] The flow path area SS2 in the branch flow path SFP2 may be different from the flow path area SS1 in the branch flow path SFP1. For example, the flow path area SS1 in the branch flow path SFP1 and the flow path area SS2 in the branch flow path SFP2 may be determined so as to optimize the flow rate of refrigerant in the branch flow path SFP1 and the flow rate of refrigerant in the branch flow path SFP2. For example, the flow path area SS1 in the branch flow path SFP1 and the flow path area SS2 in the branch flow path SFP2 may be determined so that the flow rate of refrigerant in the branch flow path SFP1 and the flow rate of refrigerant in the branch flow path SFP2 are equal.

[0050] The sum of the flow path area SS1 in the branch flow path SFP1 and the flow path area SS2 in the branch flow path SFP2 may be greater than or equal to the flow path area SM in the main flow path MFP. By making the sum of the flow path area SS1 in the branch flow path SFP1 and the flow path area SS2 in the branch flow path SFP2 to be greater than or equal to the flow path area SM in the main flow path MFP, pressure loss in the branch flow path SFP1 and the branch flow path SFP2 can be reduced.

[0051] The flow path area SS1 in the branch flow path SFP1 is the area of the cross section of the groove part 41g cut at a plane perpendicular to the direction in which the groove part 41g extends. The flow path area SS2 in the branch flow path SFP2 is the area of the cross section of the groove part 42g cut at a plane perpendicular to the direction in which the groove part 42g extends.

[0052] The cylinder 41 is supplied with the refrigerant that has passed through the branch flow path SFP1 branched from the main flow path MFP. For example, if the intake pipe 12 is directly connected to the cylinder 41, the cylinder 41 cannot be made thinner than the outer diameter of the intake pipe 12. Because the refrigerant from the intake pipe 12 is supplied to the cylinder 41 through the main flow path MFP and the branch flow path SFP1, the cylinder 41 can be made thinner. Similarly, because the refrigerant from the intake pipe 12 is supplied through the main flow path MFP and the branch flow path SFP2 to the cylinder 42, the cylinder 42 can be made thinner.

[0053] If the intake pipe 12 is directly connected to the middle plate 50, as disclosed in Patent Document 1, for example, the middle plate 50 cannot be made thinner than the outer diameter of the intake pipe 12. Because the intake pipe 12 is not connected to the middle plate 50, the middle plate 50 can be made thinner.

[0054] The cylinder 41 is an example of a first cylinder, the cylinder 42 is an example of a second cylinder, the branch flow path SFP1 is an example of a first branch flow path, and the branch flow path SFP2 is an example of a second branch flow path.

<Overview>

[0055] According to the 2-cylinder rotary compressor according to the present embodiment, the compression mechanism can be flattened by thinning the first cylinder, the second cylinder, and the middle plate. According to the 2-cylinder rotary compressor according to the present embodiment, the main shaft can be shortened by flattening the compression mechanism. According to the 2-cylinder rotary compressor according to the present embodiment, the influence of shaft deflection of the main shaft can be reduced by shortening the main shaft.

[0056] Moreover, according to the 2-cylinder rotary compressor according to the present embodiment, because the intake pipe is connected to the head, a suction hole in the cylinder can be designed regardless of the shape of the cylinder. According to the 2-cylinder rotary compressor according to the present embodiment, because the suction hole in the cylinder can be designed regardless of the shape of the cylinder, the degree of freedom of design can be increased.

[0057] Furthermore, according to the 2-cylinder rotary compressor according to the present embodiment, the number of parts around the suction part can be reduced. According to the 2-cylinder rotary compressor according to the present embodiment, the number of parts around the suction part can be reduced, thereby reducing the manufacturing cost.

[0058] According to the 2-cylinder rotary compressor according to the present embodiment, pressure loss of refrigerant in the 2-cylinder rotary compressor can be reduced by making the flow path area of the main flow path greater than or equal to the flow path area of the suction port to which the intake pipe is connected.

[0059] According to the 2-cylinder rotary compressor according to the present embodiment, the amount of refrigerant distributed to the first cylinder and the second cylinder can be optimized because the flow path area of the second branch flow path is different from the flow path area of the first branch flow path.

[0060] According to the 2-cylinder rotary compressor according to the present embodiment, pressure loss of refrigerant in the 2-cylinder rotary compressor can be reduced by making the sum of the flow path area of the first branch flow path and the flow path area of the second branch flow path greater than or equal to the flow path area of the main flow path.

[0061] According to the 2-cylinder rotary compressor according to the present embodiment, the center of the first connection port in the first branch flow path is provided on the first blade side with respect to the line connecting the main flow path and the rotational center of the first piston, so that the first connection port can be closed quickly. That is, according to the 2-cylinder rotary compressor according to the present embodiment, the angle at which the first connection port is closed can be reduced. Similarly, according to the 2-cylinder rotary compressor according to the present embodiment, because the center of the second connection port in the second branch flow path is provided on the second blade side with respect to the line connecting the main flow path and the rotational center of the second piston, the second connection port can be closed earlier. That is, according to the 2-cylinder rotary compressor according to the present embodiment, the angle at which the second connection port is closed can be reduced.

[0062] According to the 2-cylinder rotary compressor according to the present embodiment, the lower part of the accumulator is provided below the holding member, thereby lowering the center of gravity. According to the 2-cylinder rotary compressor according to the present embodiment, vibration can be reduced by lowering the center of gravity of the 2-cylinder rotary compressor.

[0063] According to the 2-cylinder rotary compressor according to the present embodiment, the design freedom of the shape in the suction part of the cylinder can be increased by forming the main flow path with a through-hole and a vertical hole and forming the branch flow path with a groove part. Moreover, according to the 2-cylinder rotary compressor according to the present embodiment, the machining in the suction part of the cylinder can be simplified by forming the branch flow path with a groove. According to the 2-cylinder rotary compressor according to the present embodiment, the machining in the suction part of the cylinder can be simplified, thereby reducing the manufacturing cost.

[0064] Although the embodiment has been described above, it will be understood that various changes in form and details can be made without departing from the purpose and scope of the claims. Various variations and improvements such as combinations and substitutions with some or all of the other embodiments can be made.

[0065] The present international application is based upon and claims priority to Japanese patent application no. 2023-057481 filed on March 31, 2023, the entire contents of which are incorporated herein by reference.

Reference Signs List

[0066]

1 rotary compressor
10 compressor body
11 container
12 intake pipe
13 outlet pipe
20 accumulator
31 head
31h through-hole
32 head
41, 42 cylinder
41b, 42b bush
41c, 42c rotation center
41g, 42g groove part
41gc, 42gc center
41h through-hole
42h vertical hole
41CS, 42CS compression chamber
41HS, 42HS high-pressure chamber
41LS, 42LS low-pressure chamber
50 middle plate
50h through-hole
61, 62 piston
61b, 62b blade
70 compression part
80 electrically driven part
81 main shaft
MFP main flow path
SFP1, SFP2 branch flow path
SM, SS1, SS2, SSC flow path area

Claims

1. A 2-cylinder rotary compressor comprising:

a head to which an intake pipe is connected;
a first cylinder in which a first piston rotates eccentrically inside;
a second cylinder in which a second piston rotates eccentrically inside;
a middle plate provided between the first cylinder and the second cylinder;
a main flow path penetrating from the intake pipe through the head, the first cylinder, and the middle plate to the second cylinder;
a first branch flow path branching from the main flow path into an interior of the first cylinder; and
a second branch flow path branching from the main flow path into an interior of the second cylinder.

2. The 2-cylinder rotary compressor according to claim 1, wherein a flow path area of the main flow path is greater than or equal to a flow path area of the intake port to which the intake pipe is connected.

3. The 2-cylinder rotary compressor according to claim 1 or 2, wherein a flow path area of the second branch flow path is different from a flow path area of the first branch flow path.

4. The 2-cylinder rotary compressor according to any one of claims 1 to 3, wherein a sum of a flow path area of the first branch flow path and a flow path area of the second branch flow path is greater than or equal to a flow path area of the main flow path.

5. The 2-cylinder rotary compressor according to any one of claims 1 to 4, wherein

the first piston further includes a first blade dividing a first compression chamber formed between the first cylinder and the first piston into a first high-pressure chamber and a first low-pressure chamber,
a center of a first connection port through which the first branch flow path is connected to the first low-pressure chamber is provided on a side of the first blade with respect to a line connecting the main flow path and a rotation center of the first piston,
the second piston further includes a second blade dividing a second compression chamber formed between the second cylinder and the second piston into a second high-pressure chamber and a second low-pressure chamber, and
a center of a second connection port through which the second branch flow path is connected to the second low-pressure chamber is provided on a side of the second blade with respect to a line connecting the main flow path and a rotation center of the second piston.

6. The 2-cylinder rotary compressor according to any one of claims 1 to 5, further comprising:

a holding member configured to hold the head, the first cylinder, the middle plate, and the second cylinder;
a container configured to house the head, the first cylinder, the middle plate, the second cylinder, and the holding member inside; and
an accumulator connected to the intake pipe,

wherein
the holding member is fixed to the container, and a lower portion of the accumulator is provided below the holding member.

7. The 2-cylinder rotary compressor according to any one of claims 1 to 6, wherein a refrigerant used is carbon dioxide.

8. The 2-cylinder rotary compressor according to any one of claims 1 to 7, wherein

the first cylinder includes

a first through-hole that penetrates outside an inner diameter of the first cylinder in a thickness direction, and
a first groove part formed from the first through-hole to inside the first cylinder, wherein

the middle plate includes a second through-hole penetrating in a thickness direction,
the second cylinder includes

a vertical hole extending in a thickness direction outside an inner diameter of the second cylinder, and
a second groove part formed from the vertical hole to inside the second cylinder, wherein

the first through-hole, the second through-hole, and the vertical hole each form a part of the main flow path,
the first groove part forms the first branch flow path, and
the second groove part forms the second branch flow path.

FIG.1

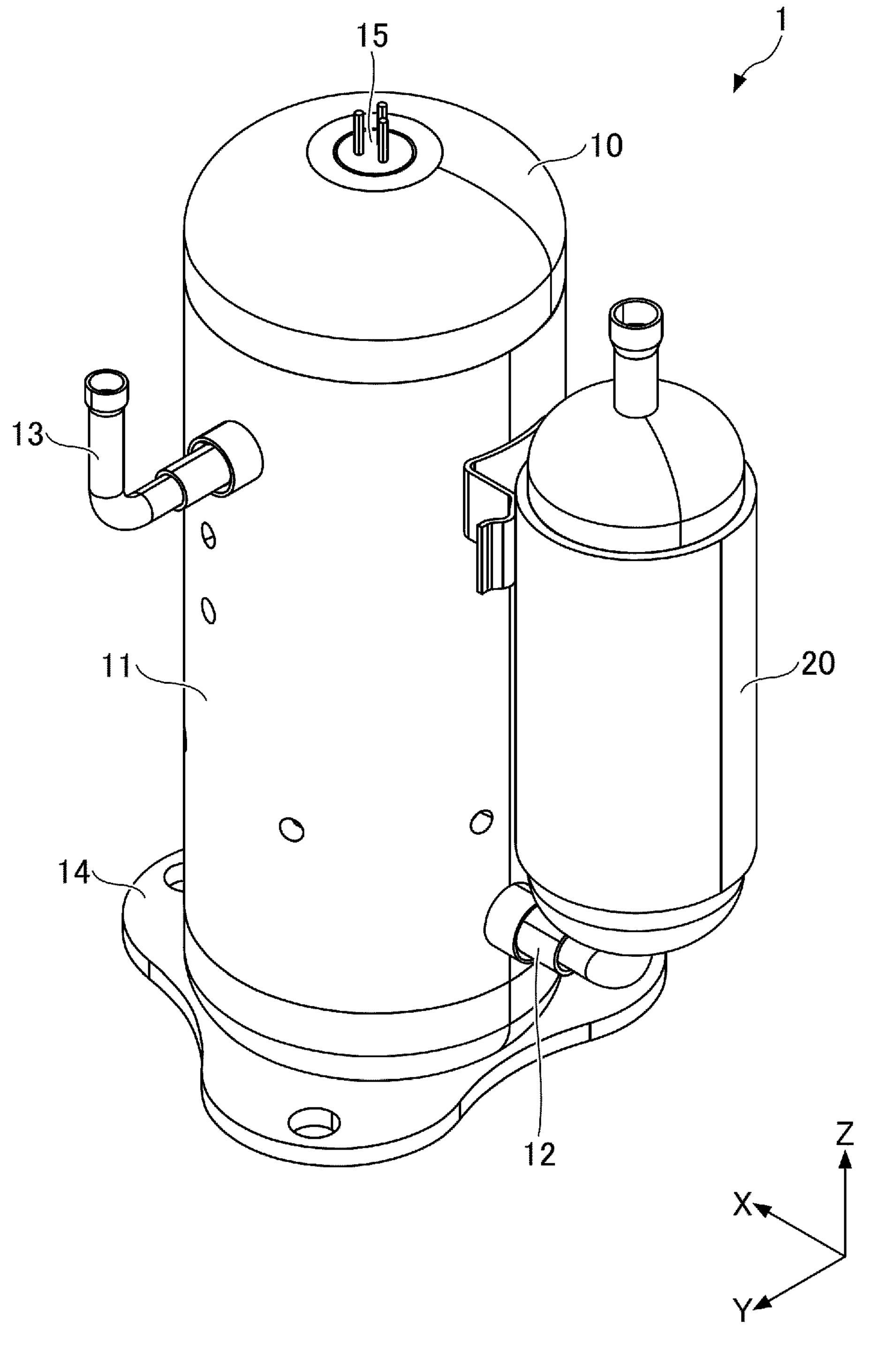


FIG.2

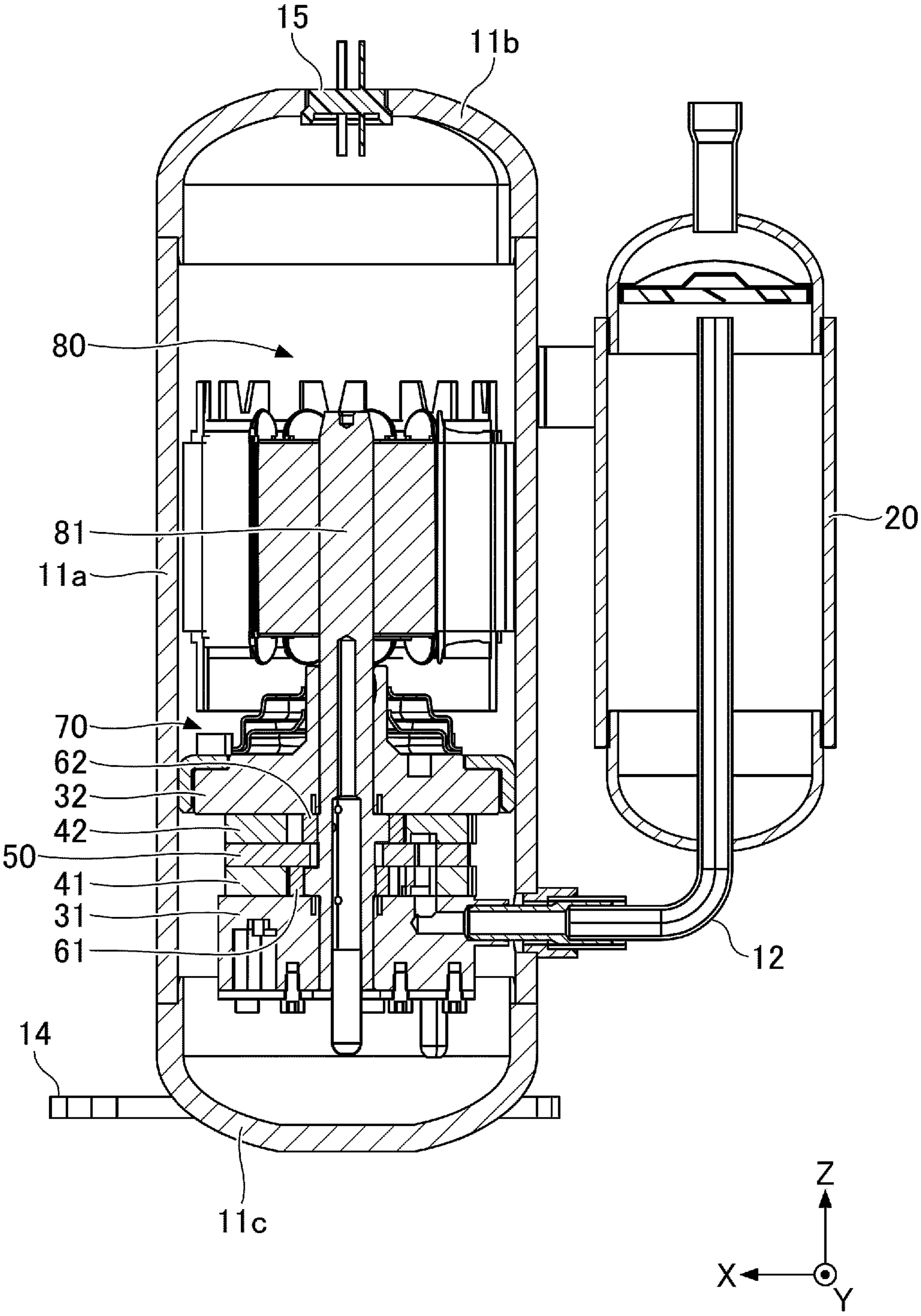


FIG.3

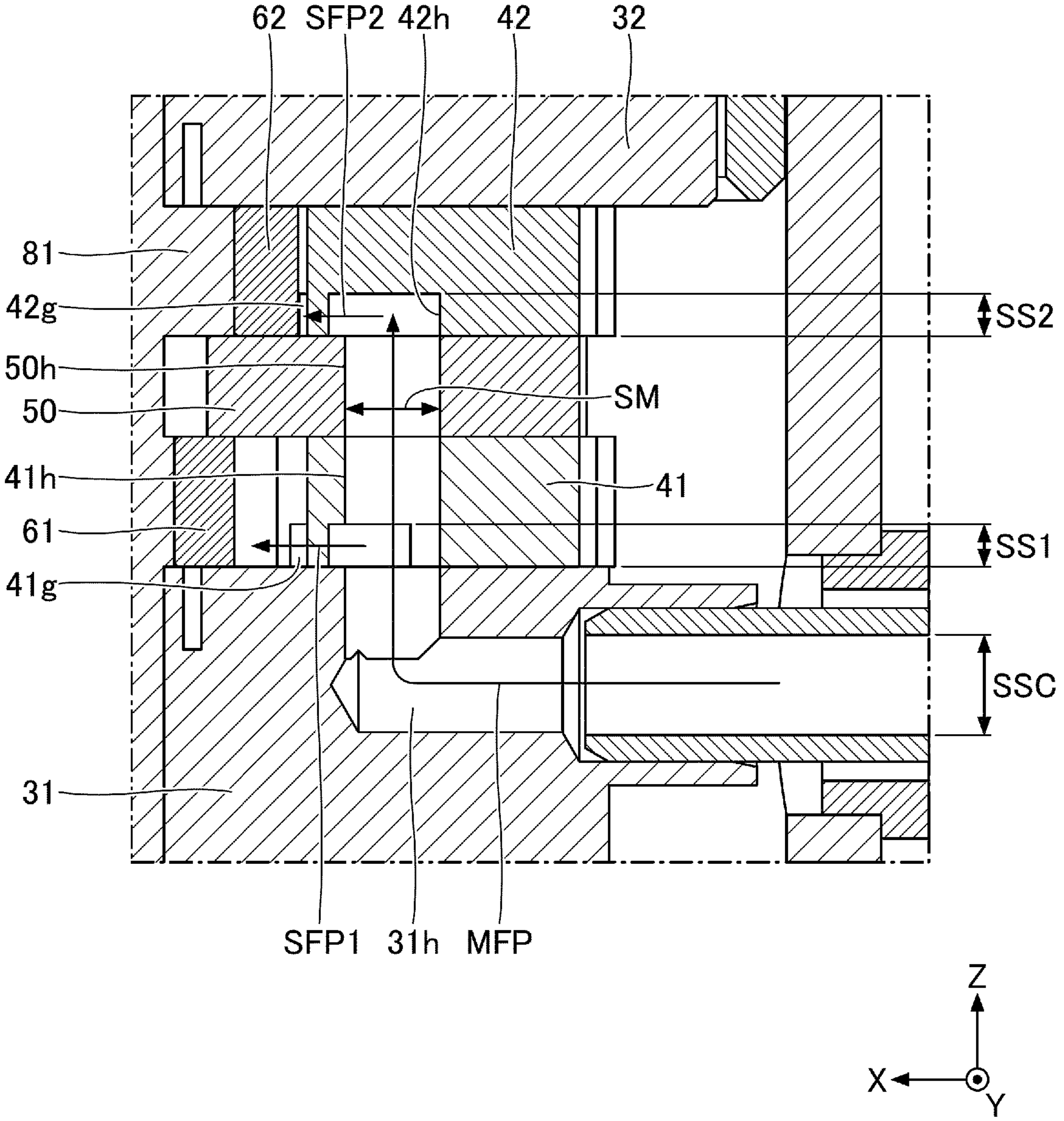

62
SFP2
42h
42
32
81
42g
50h
50
41h
61
41g
31
SM
41
SS2
SS1
SSC
SFP1
31h
MFP
Z
X
Y

FIG.4

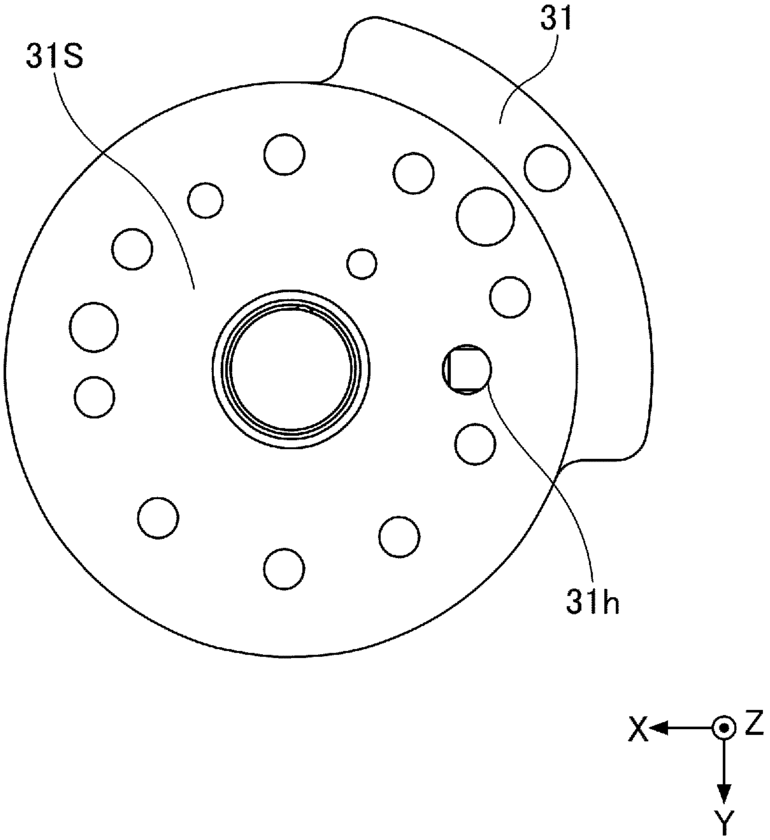


FIG.5

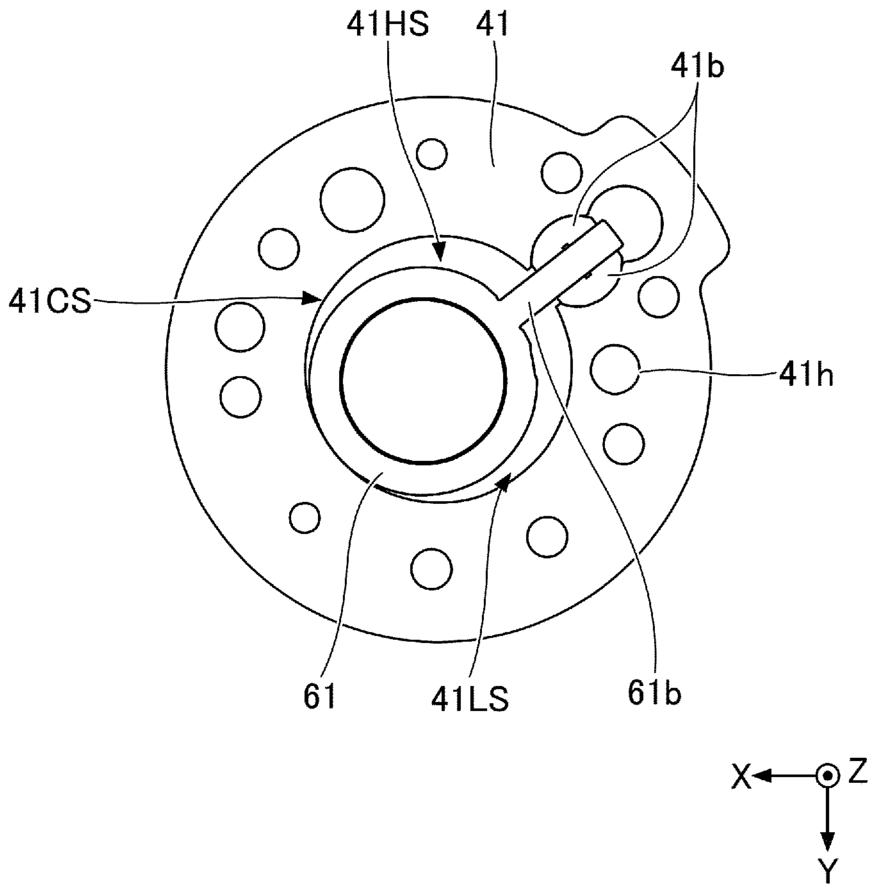


FIG.6

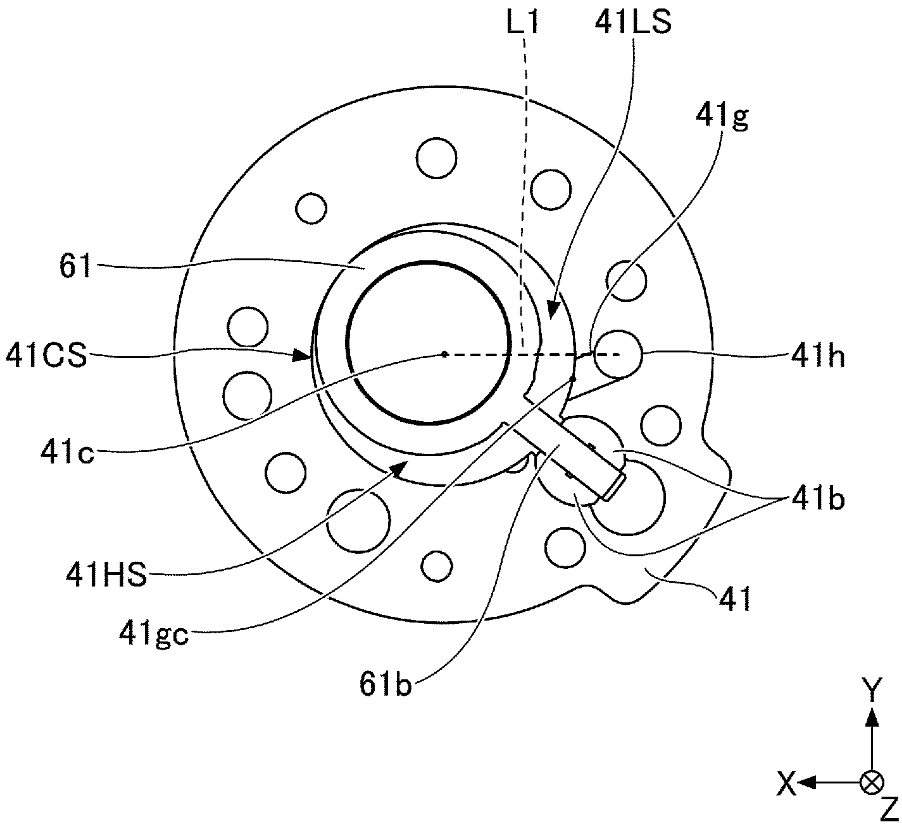


FIG.7

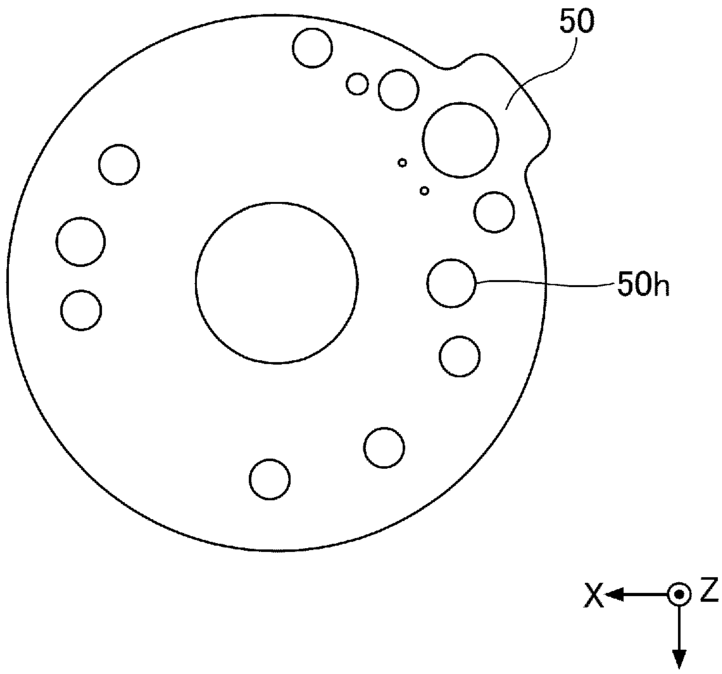


FIG.8

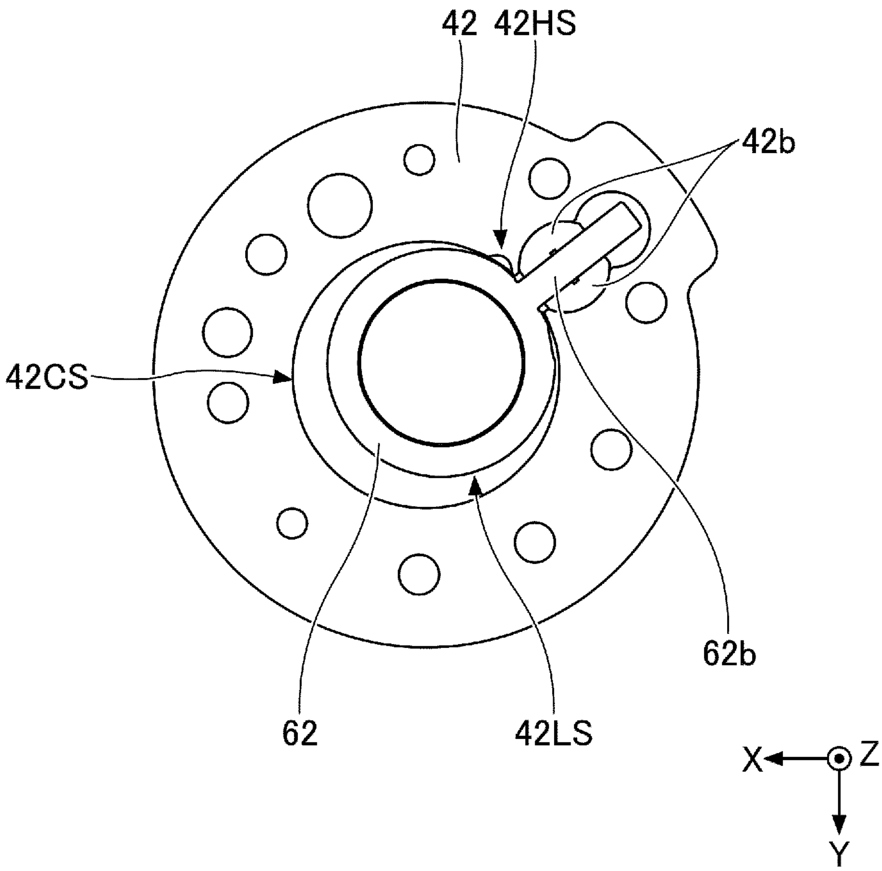
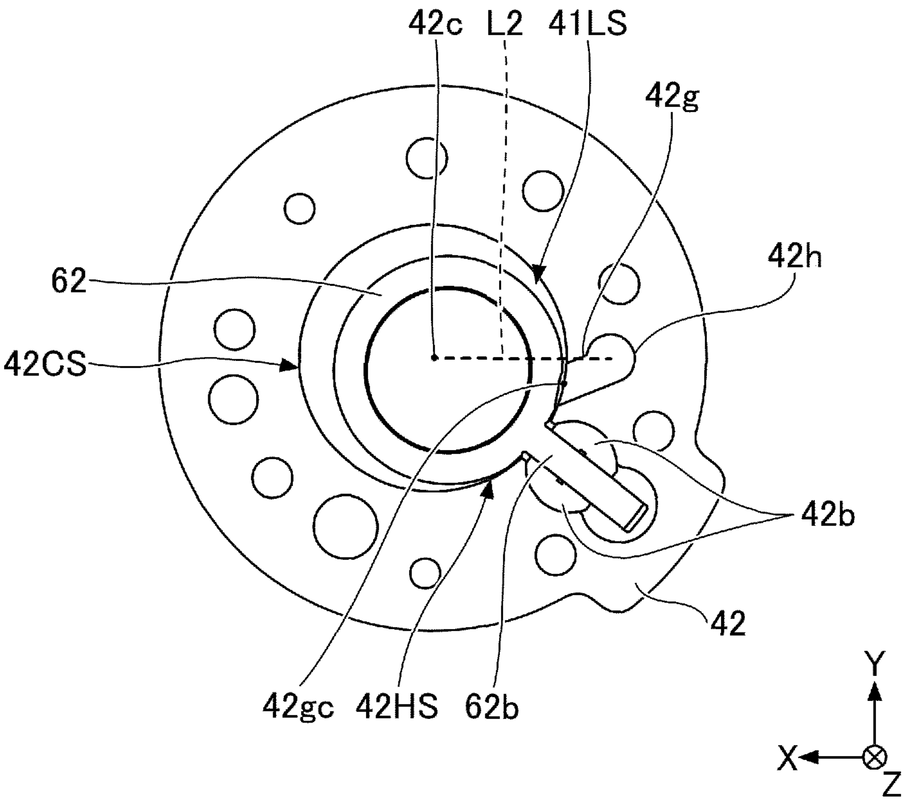


FIG.9



INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2024/009488

A. CLASSIFICATION OF SUBJECT MATTER

F04C 18/356(2006.01)i; ***F04C 18/32***(2006.01)i; ***F04C 23/00***(2006.01)i
FI: F04C18/356 L; F04C18/32; F04C23/00 F

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

F04C18/356; F04C18/32; F04C23/00

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Published examined utility model applications of Japan 1922-1996
Published unexamined utility model applications of Japan 1971-2024
Registered utility model specifications of Japan 1996-2024
Published registered utility model applications of Japan 1994-2024

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y	JP 2005-207306 A (MITSUBISHI ELECTRIC CORPORATION) 04 August 2005 (2005-08-04) paragraphs [0013]-[0037], [0050], fig. 1-4	1-4 5-8
Y	CN 101469710 A (SHANGHAI HITACHI ELECTRICAL APPLIANCES CO., LTD.) 01 July 2009 (2009-07-01) specification, p. 2, fig. 2	5
Y	WO 2018/169072 A1 (DAIKIN INDUSTRIES, LTD.) 20 September 2018 (2018-09-20) paragraphs [0055]-[0077], fig. 7	6
Y	JP 2022-174441 A (PANASONIC INTELLECTUAL PROPERTY MANAGEMENT CO., LTD.) 24 November 2022 (2022-11-24) paragraphs [0039]-[0050], fig. 6	7-8

☐ Further documents are listed in the continuation of Box C. ☑ See patent family annex.

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
29 March 2024	**09 April 2024**

Name and mailing address of the ISA/JP	Authorized officer
Japan Patent Office (ISA/JP) **3-4-3 Kasumigaseki, Chiyoda-ku, Tokyo 100-8915** **Japan**	Telephone No.

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/JP2024/009488

Patent document cited in search report	Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
JP 2005-207306 A	04 August 2005	CN 1644926 A	
CN 101469710 A	01 July 2009	(Family: none)	
WO 2018/169072 A1	20 September 2018	EP 3597923 A1 paragraphs [0055]-[0078], fig. 7 CN 110418892 A	
JP 2022-174441 A	24 November 2022	WO 2022/239675 A1	

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REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- JP 5070097 B **[0003]**
- JP 2023057481 A **[0065]**