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(54) **Rotary piston compressor**

(57) In the rotary compressor including, in a sealed vessel, a electromotive element and a rotary compression element driven by this electromotive element, on one of an upper end face of a rotor constituting the electromotive element (on a side opposite to a compression mechanism) and a lower end face of the rotor (on a compression mechanism side), a rotation inertia article ca-

pable of obtaining a rotation inertia moment is disposed. In consequence, it is possible to obtain the compressor having a high efficiency in which an increase of the rotary vibration of the compressor is suppressed even during an operation having the small number of the rotations of the compressor.

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Description

BACKGROUND OF THE INVENTION

[0001] The present invention relates to a rotary compressor including, in a sealed vessel, a electromotive element, a rotary compression element driven by a rotary shaft of this electromotive element and a cantilever bearing which rotatably supports the rotary shaft of this rotary compression element.

[0002] Heretofore, a rotary compressor such as a multistage compression type rotary compressor including first and second rotary compression elements includes, in a sealed vessel, a electromotive element and the first and second rotary compression elements driven by a rotary shaft of this electromotive element.

[0003] An electromotive element is constituted of an annular stator fixed along an inner peripheral surface which defines an upper space of the sealed vessel by welding; and a rotor inserted in the element so that a slight interval is disposed between the rotor and an inner periphery of this stator. This rotor is fixed to the rotary shaft passed through the center of the element in a vertical direction.

[0004] Moreover, the first and second rotary compression elements include an intermediate partition plate; upper and lower cylinders disposed on and under this intermediate partition plate; rollers which are fitted into eccentric portions disposed on the rotary shaft with a phase difference of 180 degrees to eccentrically rotate in these cylinders; vanes which abut on the rollers to define the insides of the cylinders into low pressure chamber sides and high pressure chamber sides, respectively; an upper support member and a lower support member which block an upper opening surface of the upper cylinder and a lower opening surface of the lower cylinder and which have bearings of the rotary shaft, respectively; and upper and lower discharge muffling chambers, respectively. Each discharge muffling chamber is connected to the high pressure chamber side in each cylinder by a discharge port. In each discharge muffling chamber, a discharge valve is disposed which openably blocks the discharge port (see, e.g., Japanese Patent Application Laid-Open No. 2004-19599).

[0005] In the rotor of the conventional rotary compressor, a rotation angular speed inversely proportional to a rotation inertia moment is generated in proportion to a difference between a compression torque and a torque of a motor, and a fluctuation (reaction of the rotation angular speed) of the rotation angular speed, which is inversely proportional to the rotation inertia moment, is a cause for a rotary vibration of the rotary compressor. The rotation angular speed of the rotor is an integral of the rotation angular speed inversely proportional to the rotation inertia moment with respect to a time. After one rotation, the rotation angular speed returns to an original rotation angular speed. Therefore, the smaller the number of the rotations of the compressor is, the longer

a time required for one rotation becomes. Moreover, a fluctuation width of the rotation angular speed during one rotation increases. Therefore, there is a problem that the vibration of the compressor increases.

[0006] Furthermore, when there is a large fluctuation width of the rotation angular speed during one rotation, a ratio increases at which the compressor is operated in a rotation angular speed range having a small efficiency, and an efficiency of the motor decreases. Therefore, the smaller the number of the rotations of the motor is, the more the efficiency of the compressor decreases. When the compressor or the motor is miniaturized, the rotation inertia moment decreases, and the increase of the compressor vibration and the decrease of the efficiency easily appear.

SUMMARY OF THE INVENTION

[0007] A rotary compressor of a first invention has, in a sealed vessel, a electromotive element, a compression mechanism driven by this electromotive element and a cantilever bearing which rotatably supports a rotary shaft of the electromotive element, and the rotary compressor has, on the bottom of a rotor (on a compression mechanism side), a mass article which extends to a lower part of a stator and which obtains a rotation inertia moment.

[0008] Moreover, a rotary compressor of a second invention has, in a sealed vessel, a electromotive element, a compression mechanism driven by this electromotive element and a cantilever bearing which rotatably supports a rotary shaft of the electromotive element, and the rotary compressor has, on the top of a rotor (on a side opposite to the compression mechanism), a mass article which extends to a lower part of a stator and which obtains a rotation inertia moment.

[0009] Furthermore, in a rotary compressor of a third invention, the above inventions are characterized in that the mass article disposed on the rotor is formed into a shape having an outer diameter which is equal to or smaller than an outer diameter of the rotor until a necessary insulation distance is reached from a stator coil, and after the insulation distance, the outer diameter of the shape is enlarged toward an inner wall of the sealed vessel into such as size as to cover the stator coil.

[0010] In addition, in a rotary compressor of a fourth invention, the above inventions are characterized in that a discharge port to discharge a compressed gas from the rotary compression element into the sealed vessel is disposed in a position corresponding to 1/2 or less of the maximum outer diameter of the mass article disposed on the rotor.

[0011] According to the first or second invention, the rotary compressor comprises, in the sealed vessel, the electromotive element, the rotary compression element driven by this electromotive element and the cantilever bearing which rotatably supports the rotary shaft of the electromotive element. The mass article capable of obtaining the rotation inertia moment is attached to one of

an upper end face of the rotor (on the side opposite to the compression mechanism) and a lower end face of the rotor (on the compression mechanism side). In consequence, it is possible to provide the compressor having a high efficiency in which a vibration increase of the compressor is suppressed even during an operation having the small number of rotations of the compressor. Furthermore, the mass article to be attached extends toward the stator. Therefore, when a dimension of the mass article in a width direction is enlarged, a dimension of the article in a thickness direction can be decreased, and the whole compressor can be miniaturized in a height direction.

[0012] Moreover, in addition to the above inventions, according to the third invention, the mass article disposed on the rotor is formed into the shape having the outer diameter which is equal to or smaller than the outer diameter of the rotor until the necessary insulation distance from the stator coil is reached. After the insulation distance, the outer diameter of the shape is enlarged toward the inner wall of the sealed vessel into such a size as to cover the stator coil. In consequence, a necessary rotation inertia moment can be obtained.

[0013] Furthermore, in addition to the above inventions, according to the fourth invention, the discharge port to discharge the compressed gas from the rotary compression element into the sealed vessel is disposed in the position corresponding to 1/2 or less of the maximum outer diameter of the mass article disposed on the rotor. In consequence, an oil in the discharged gas is separated by the mass article, and an amount of the oil to be discharged from the compressor can be decreased.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014]

FIG. 1 is a vertically sectional view of a rotary compressor in Embodiment 1 of the present invention (an example in which a rotation inertia article is attached to a compression mechanism side);

FIG. 2 is a vertically sectional view of the rotary compressor in Embodiment 1 of the present invention (an example in which a rotation inertia article is attached to a side opposite to a compression mechanism);

FIG. 3 is a vertically sectional view of a rotary compressor in Embodiment 2 of the present invention; and

FIG. 4 is an enlarged view showing positions of the rotation inertia article and a discharge port in Embodiment 2 of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0015] The present invention is characterized in that a rotary compressor having a high efficiency in which a vibration increase of the compressor is suppressed even

in a region having the small number of rotations is realized by attaching a rotation inertia article to a rotor. It is also possible to cope with a vibration increase and an efficiency decrease due to miniaturization of the compressor. A mass article disposed on the rotor is formed into a shape having an outer diameter which is equal to or smaller than an outer diameter of the rotor until a necessary insulation distance is reached from a stator coil, and after the insulation distance, the outer diameter of the shape is enlarged toward an inner wall of a sealed vessel into such a size as to cover the stator coil. In consequence, a necessary rotation inertia moment is obtained. Moreover, a discharge port to discharge a compressed gas from a rotary compression element into a sealed vessel is disposed in a position corresponding to 1/2 or less of the maximum outer diameter of the mass article disposed on the rotor. In consequence, an oil contained in the discharged gas is separated by the mass article, and an amount of the oil to be discharged from the compressor is decreased.

(Embodiment 1)

[0016] Next, an embodiment of the present invention will be described in detail with reference to the drawings. FIG. 1 shows a vertically sectional view of a high inner pressure type rotary compressor 10 as an embodiment of a rotary compressor of the present invention. The rotary compressor includes first and second rotary compression elements 32, 34, and a mass article, that is, a rotation inertia article 82 attached to a rotor 24 with a rivet 73 on a compression mechanism side. FIG. 2 shows a vertically sectional view of the rotary compressor 10 in a second invention.

[0017] In FIG. 1, the rotary compressor 10 of the present embodiment is the high inner pressure type rotary compressor 10 including, in a vertically cylindrical sealed vessel 12 constituted of a steel plate, an electromotive element 14 as a driving element disposed in an upper space of this sealed vessel 12; and a rotary compression mechanism portion 18 constituted of the first and second rotary compression elements 32, 34 disposed under this electromotive element 14 and driven by a rotary shaft 16 of the electromotive element 14. It is to be noted that in the rotary compressor 10 of the present embodiment, carbon dioxide is used as a refrigerant.

[0018] The sealed vessel 12 is constituted of a vessel main body 12A having a bottom part as an oil reservoir and containing the electromotive element 14 and the rotary compression mechanism portion; and a substantially bowl shaped end cap (lid body) 12B which blocks an upper opening of this vessel main body 12A. Moreover, a circular attachment hole 12D is formed in the top of this end cap 12B, and a terminal (a wiring line is omitted) 20 for supplying a power to the electromotive element 14 is attached to this attachment hole 12D.

[0019] The electromotive element 14 is constituted of an annular stator 22 fixed along an inner peripheral sur-

face of an upper part of the sealed vessel 12 by welding; the rotor 24 inserted in the element so that a slight interval is disposed between the rotor and an inner periphery of the stator 22; and the rotation inertia article 82 attached to the rotor 24 with the rivet 73. The rotor 24 and the rotation inertia article 82 are fixed to the rotary shaft 16 extending through the center of the element in a vertical direction.

[0020] Here, the rotation inertia article 82 is formed into a shape having an outer diameter which is equal to or smaller than an outer diameter of the rotor until the minimum necessary insulation distance (changes with a voltage to be applied) is reached from a stator coil 28, and after the insulation distance is reached, the outer diameter of the shape is enlarged toward an inner wall of the sealed vessel 12 into such a size as to cover the stator coil 28. Since the outer diameter of the shape of the article is enlarged, it is possible to obtain a large rotation inertia moment with a small amount of a material.

[0021] Moreover, in this case, as the material of the rotation inertia article 82, copper or a copper alloy is used. The article is formed as a cast article, a forged article or a laminated article formed by laminating plates of copper or the copper alloy.

[0022] The stator 22 has a laminated article 26 constituted by laminating donut-shaped electromagnetic steel plates; and the stator coil 28 wound around teeth portions of this laminated article 26 by a direct winding (concentrated winding) system. Moreover, the rotor 24 is formed of a laminated article 30 constituted of electromagnetic steel plates in the same manner as in the stator 22.

[0023] An intermediate partition plate 36 is sandwiched as an intermediate partition member between the first rotary compression element 32 and the second rotary compression element 34, the second rotary compression element 34 as a second stage is disposed on the side of the electromotive element 14 in the sealed vessel 12, and the first rotary compression element 32 as a first stage is disposed on a side opposite to the electromotive element 14. That is, the first rotary compression element 32 and the second rotary compression element 34 include a lower cylinder 40 as a first cylinder and an upper cylinder 38 as a second cylinder which constitute the first and second rotary compression elements 32, 34; and the intermediate partition plate 36 interposed between the cylinders 38 and 40 to block an (upper) opening of the lower cylinder 40 on the side of the electromotive element 14 and a (lower) opening of the upper cylinder 38 on a side opposite to the electromotive element 14. The elements also include a first roller 48 and a second roller 46 which are fitted into first and second eccentric portions 42, 44 disposed on the rotary shaft 16 with a phase difference of 180 degrees in the upper and lower cylinders 38, 40 to eccentrically rotate in the cylinders 38, 40, respectively; and vanes (not shown) which abut on the rollers 46, 48 to define the insides of the cylinders 38, 40 into low-pressure chamber sides and high-pressure chamber sides, respectively.

The elements further include a lower support member 56 as a first support member which blocks a (lower) opening of the lower cylinder 40 on the side opposite to the electromotive element 14 and which has a bearing 56A of the rotary shaft 16; and an upper support member 54 as a second support member which blocks an (upper) opening of the upper cylinder 38 on the side of the electromotive element 14 and which has a bearing 54A of the rotary shaft 16, respectively. On outer sides of the bearings 54A, 56A of the upper and lower support members 54, 56, there are arranged a cover 63 attached to the upper support member 54 to define a discharge muffling chamber 62; and a blocking plate 68 to define an intermediate pressure discharge muffling chamber 64 in the lower support member 56, respectively.

[0024] The upper support member 54 and the lower support member 56 include suction passages 58, 60 which communicate with the upper and lower cylinders 38, 40 via suction ports 160, 161; and the discharge muffling chamber 62 and the intermediate pressure discharge muffling chamber 64, respectively. The discharge muffling chamber 62 is formed by depressing the surface of the upper support member 54 on a side opposite to the upper cylinder 38, and blocking this depressed portion with the cover 63 as described above. The intermediate pressure discharge muffling chamber 64 is formed by depressing the surface of the lower support member 56 on a side opposite to the lower cylinder 40, and blocking this depressed portion with the blocking plate 68 so that the chamber is defined by the blocking plate 68. That is, the discharge muffling chamber 62 is blocked with the cover 63, and the intermediate pressure discharge muffling chamber 64 is blocked with the blocking plate 68.

[0025] In this case, the bearing 54A is erected in the center of the upper support member 54. Around the outer periphery of the bearing 54A, the discharge muffling chamber 62 is defined by the cover 63. A gas discharged from a discharge port (not shown) passes through the discharge muffling chamber 62, and is discharged into the sealed vessel 12 from a communication passage 65 as a donut-shaped gap between an upper portion of the upper bearing 54A and the cover 63.

[0026] Moreover, the bearing 56A is passed through the center of the lower support member 56. The bearing 56A substantially has a donut shape centering on the rotary shaft 16 and having a central hole through which the rotary shaft 16 passes. In the outer periphery of the bearing 56A, the intermediate pressure discharge muffling chamber 64 is disposed. On the other hand, the blocking plate 68 is formed of a donut-shaped circular steel plate, and fixed to the lower support member 56 from below with bolts 80 attached to four portions of a peripheral part of the plate, and the plate blocks an opening in the bottom of the intermediate pressure discharge muffling chamber 64 which communicates with the lower cylinder 40 of the first rotary compression element 32 by a discharge port (not shown). The bolts 80 are bolts for assembling the first and second rotary compression el-

elements 32, 34, and distant ends of the bolts engage with the upper cylinder 38. That is, the upper cylinder is provided with screw grooves to be engaged with screw heads formed on distant end portions of the bolts 80.

[0027] Here, there will be described a procedure to assemble the rotary compression mechanism portion 18 constituted of the first and second rotary compression elements 32, 34. First, the cover 63, the upper support member 54 and the upper cylinder 38 are positioned, and two upper bolts 78, 78 to be engaged with the upper cylinder 38 are inserted from a cover 63 side (from above) in an axial center direction (downwards) to integrate the cover, the upper support member and the upper cylinder. In consequence, the second rotary compression element 34 is assembled.

[0028] Next, the second rotary compression element 34 integrated with the upper bolts 78 is inserted along the rotary shaft 16 from an upper end. Next, the intermediate partition plate 36 is assembled with the lower cylinder 40, inserted along the rotary shaft 16 from a lower end, and aligned with the upper cylinder 38 already attached. Two upper bolts (not shown) to be engaged with the lower cylinder 40 are inserted from the cover 63 side (from above) in the axial center direction (downwards) to fix the intermediate partition plate, the lower cylinder and the upper cylinder.

[0029] Moreover, after the lower support member 56 is inserted along the rotary shaft 16 from below, the blocking plate 68 is similarly inserted along the rotary shaft 16 from the lower end to close the depressed portion of the lower support member 56. The four lower bolts 80 are inserted from a blocking plate 68 side (from below) in the axial center direction (upwards), and the distant end portions of the bolts are engaged with the screw grooves formed in the upper cylinder 38, respectively, to assemble the first and second rotary compression elements 32, 34. It is to be noted that since the rotary shaft 16 is provided with the first and second eccentric portions 42, 44, the components cannot be attached to the rotary shaft 16 in an order other than the above order. Therefore, the blocking plate 68 is finally attached to the rotary shaft 16.

[0030] Thus, the second rotary compression element 34, the intermediate partition plate 36, the lower cylinder 40, the lower support member 56 and the blocking plate 68 are successively attached to the rotary shaft 16, and the four bolts 80 are inserted from below the blocking plate 68 finally attached to engage with the upper cylinder 38. In consequence, the first and second rotary compression elements 32, 34 can be fixed to the rotary shaft 16.

[0031] Moreover, in this case, as the refrigerant, carbon dioxide (CO₂) described above which is a natural refrigerant eco-friendly to global environments is used in consideration of combustibility, toxicity and the like, and as a lubricant, an existing oil is used such as a mineral oil, an alkyl benzene oil, an ether oil, an ester oil or a polyalkyl glycol (PAG) oil.

[0032] Furthermore, on the side surface of the vessel main body 12A of the sealed vessel 12, sleeves 140, 141

and 142, a refrigerant discharge tube 96 and a service tube 97 are fixed by welding to positions corresponding, to those of the suction passages 58, 60 of the upper support member 54 and the lower support member 56, the discharge muffling chamber 64 and the upper part of the electromotive element 14, respectively. The sleeve 140 is disposed vertically adjacent to the sleeve 141, and the sleeve 142 is substantially disposed along a diagonal line of the sleeve 141.

[0033] One end of a refrigerant introducing tube 92 for introducing a refrigerant gas into the upper cylinder 38 is inserted into the sleeve 140, and the one end of the refrigerant introducing tube 92 is connected to the suction passage 58 of the upper cylinder 38. This refrigerant introducing tube 92 passes above the sealed vessel 12 to reach the sleeve 142, and the other end of the tube is inserted into the sleeve 142 and connected to the intermediate pressure discharge muffling chamber 64.

[0034] Moreover, one end of a refrigerant introducing tube 94 for introducing the refrigerant gas into the lower cylinder 40 is inserted into the sleeve 141, and the one end of this refrigerant introducing tube is connected to the suction passage 60 of the lower cylinder 40. The refrigerant discharge tube 96 is fixed to the vessel main body 12A by welding, and one end of this refrigerant discharge tube 96 is inserted into the sealed vessel 12.

[0035] Next, there will be described an operation of the rotary compressor 10 constituted as described above. When a power is supplied to the stator coil 28 of the electromotive element 14 via the terminal 20 and a wiring line (not shown), the electromotive element 14 is started to rotate the rotor 24. When this rotor rotates, the first and second rollers 46, 48 fitted into the first and second eccentric portions 42, 44 integrated with the rotary shaft 16 eccentrically rotate in the upper and lower cylinders 38, 40.

[0036] In consequence, a refrigerant gas having a low pressure (a first stage suction pressure is about 4 MPaG) is passed through the refrigerant introducing tube 94 and the suction passage 60 formed in the lower support member 56, sucked from the suction port 161 into the lower cylinder 40 on a low pressure chamber side, and compressed by operations of the first roller 48 and a vane (not shown) to obtain an intermediate pressure. The refrigerant gas having the intermediate pressure is discharged from a high pressure chamber side of the lower cylinder 40 into the intermediate pressure discharge muffling chamber 64 formed in the lower support member 56 via the discharge port (not shown).

[0037] Moreover, the intermediate pressure refrigerant gas discharged into the intermediate pressure discharge muffling chamber 64 passes through the refrigerant introducing tube 92 inserted into the intermediate pressure discharge muffling chamber 64, and is sucked from the suction port 160 into the upper cylinder 38 on a low pressure chamber side via the suction passage 58 formed in the upper support member 54.

[0038] The sucked refrigerant gas having the interme-

diate pressure is compressed in a second stage by operations of the roller 46 and a vane (not shown) to constitute a refrigerant gas having a high temperature and a high pressure (about 12 MPaG). Moreover, the refrigerant gas having the high temperature and the high pressure is discharged from the high pressure chamber side of the upper cylinder 38 into the discharge muffling chamber 62 formed in the upper support member 54 via a discharge port (not shown).

[0039] Furthermore, after the refrigerant discharged into the discharge muffling chamber 62 is discharged from the communication passage 65 disposed in the cover 63 into the sealed vessel 12, the refrigerant passes through a gap formed in the electromotive element 14 to move to the upper part of the sealed vessel 12, and is discharged from the rotary compressor 10 through the refrigerant discharge tube 96 connected to the upper part of the sealed vessel 12.

[0040] Since the rotation inertia article 82 is attached to the rotor 24 in this manner, a necessary rotation inertia moment can be obtained. In consequence, it is possible to obtain the having a high efficiency in which a rotary vibration can be suppressed even in a region where the compressor has the small number of rotations. Since the rotation inertia article 82 is made of copper, the copper alloy or the like, it is possible to obtain the rotation inertia moment necessary for the decrease of the vibration with the inexpensive material without enlarging the shape of the rotor 24 constituted of an expensive material.

(Embodiment 2)

[0041] Next, FIGS. 3, 4 show another embodiment of the present invention, and FIG. 3 shows a vertically sectional view of a rotary compressor in the present invention. FIG. 4 is an enlarged view showing a positional relation between a rotation inertia article and discharge ports 65 which discharge a gas to be discharged in the present invention. It is to be noted that the same components as those of the above embodiment are denoted with the same reference numerals, and description thereof is omitted. As described above in the first embodiment, in a rotary compressor 10, a rotation inertia article 84 is formed into such an enlarged shape as to cover the whole stator coil 28.

[0042] Moreover, as shown in FIG. 4, the discharge ports 65 which discharge the gas from a rotary compression mechanism portion 18 into a sealed vessel 12 are disposed in positions corresponding to 1/2 or less of the maximum outer diameter of the rotation inertia article 84.

[0043] Furthermore, an oil-containing refrigerant gas discharged from the discharge ports 65 abuts on the rotation inertia article 84, and is separated into an oil and a refrigerant by a rotary force of the rotation inertia article. The separated oil returns to an oil reservoir of the compressor, and the separated gas passes through a gap made between an outer periphery of an electromotive element 14 and an inner periphery of the sealed vessel

12 to move into the upper part of the sealed vessel 12. The gas is discharged from the rotary compressor 10 through a refrigerant discharge tube 96 connected to the upper part of the sealed vessel 12.

[0044] Since the discharge ports 65 are disposed in the positions corresponding to 1/2 or less of the maximum outer diameter of the rotation inertia article 84, an oil separating capability obtained by the rotation of the rotation inertia article can effectively be used, an amount of the oil to be discharged can be decreased, and the oil can stably be supplied.

[0045] It is to be noted that in the present embodiments, as the rotary compressor, the high inner pressure type rotary compressor 10 has been described which includes the first and second rotary compression elements 32, 34, but the present invention is not limited to this rotary compressor, and may be applied to a rotary compressor including a single cylinder or a rotary compressor including three or more stage rotary compression elements. The present invention is not limited to the high inner pressure type rotary compressor 10, and may be applied to an intermediate inner pressure type rotary compressor in which a refrigerant compressed by a first rotary compression element is discharged into a sealed vessel and then compressed by a second rotary compression element.

[0046] Moreover, it is assumed in the embodiments that the second rotary compression element 34 disposed on the side of the electromotive element 14 is a second stage, the first rotary compression element 32 disposed on the side opposite to the electromotive element 14 is a first stage, and the refrigerant compressed by the first rotary compression element 32 is compressed by the second rotary compression element 34. However, the present invention is not limited to the embodiments, and the refrigerant compressed by the second rotary compression element may be compressed by the first rotary compression element.

[0047] Furthermore, when a displacement volume of the first compression mechanism is different from that of the second compression mechanism in the multistage compressor, a weight balance of the rotation inertia article 84 may be changed in accordance with the displacement volume of each compression mechanism to achieve the whole balance.

[0048] In addition, in the present embodiments, it has been described that the rotary shaft is of a vertically disposed type, but needless to say, the present invention may be applied to a rotary compressor having a rotary shaft of a horizontally disposed type. It has been described carbon dioxide is used as the refrigerant of the rotary compressor, but another refrigerant may be used.

Claims

1. A rotary compressor comprising: an electromotive element disposed in a sealed vessel and including

- a stator and a rotor; a rotary compression element driven by the electromotive element to compress and discharge a refrigerant; and a rotary shaft which connects the rotary compression element to the rotor of the electromotive element and which is rotatably supported by a bearing, wherein on the bottom of the rotor of the electromotive element, a mass article is disposed which extends to a lower part of the stator and which obtains a rotation inertia moment.
2. A rotary compressor comprising: an electromotive element disposed in a sealed vessel and including a stator and a rotor; a rotary compression element driven by the electromotive element to compress and discharge a refrigerant; and a rotary shaft which connects the rotary compression element to the rotor of the electromotive element and which is rotatably supported by a bearing, wherein on the top of the rotor of the electromotive element, a mass article is disposed which extends to a lower part of the stator and which obtains a rotation inertia moment.
 3. The rotary compressor according to claim 1 or 2, wherein a motor forming the electromotive element is of a direct winding type, and the mass article disposed on the rotor is formed into a shape having an outer diameter which is equal to or smaller than an outer diameter of the rotor until a necessary insulation distance is reached from a stator coil, and after the insulation distance, the outer diameter of the shape is enlarged toward an inner wall of the sealed vessel into such a size as to cover the stator coil.
 4. The rotary compressor according to any one of claims 1 to 3, wherein a discharge port to discharge a compressed gas from the rotary compression element into the sealed vessel is disposed in a position corresponding to 1/2 or less of the maximum outer diameter of the mass article disposed on the rotor.
 5. A rotary compressor comprising a sealed housing (12) containing a rotary compression element (32), a driving element (14) having a rotary shaft (16) extending therefrom to drive the rotary compression element (32), the driving element comprising a rotor (24) on the rotary shaft (16) and a stator (22) disposed around the rotor (24), **characterised in that** the driving element (14) includes a weight (82) mounted for rotation with the rotary shaft (16) and the rotor (24) to increase the rotational moment of inertia thereof.
 6. A rotary compressor according to claim 5 wherein the weight (82) is secured to the rotor (24) on a side thereof remote from the compression element (32).
 7. A rotary compressor according to claim 5 wherein the weight (82) is secured to the rotor (24) on a side thereof proximate to the compression element (32).
 8. A rotary compressor according to any of claims 5 - 7 wherein the weight (82) extends axially around the rotary shaft (16) to at least the distal edge of the stator (22).
 9. A rotary compressor according to any of claims 5 - 8 wherein the stator (22) comprises a stator coil (28) and, the weight (82) is shaped with a first portion proximate the rotor (24) having an outer diameter less than or equal to the diameter of the rotor (24) and which extends axially away from the rotor until a predetermined insulation distance from the stator coil (28) and, a second portion having an outer diameter which extends radially from the rotary shaft (16) at least as far as the maximum radial distance of the stator coil (28) from the rotary shaft (16).
 10. A rotary compressor according to any of claims 5 - 9 wherein the compression element (32) includes a discharge port for the discharge of compressed gas therefrom into the sealed housing (12), the discharge port being disposed at a radial distance from the rotary shaft (16) of not more than 0.5 of the maximum outer radius of the weight (82).

FIG. 1

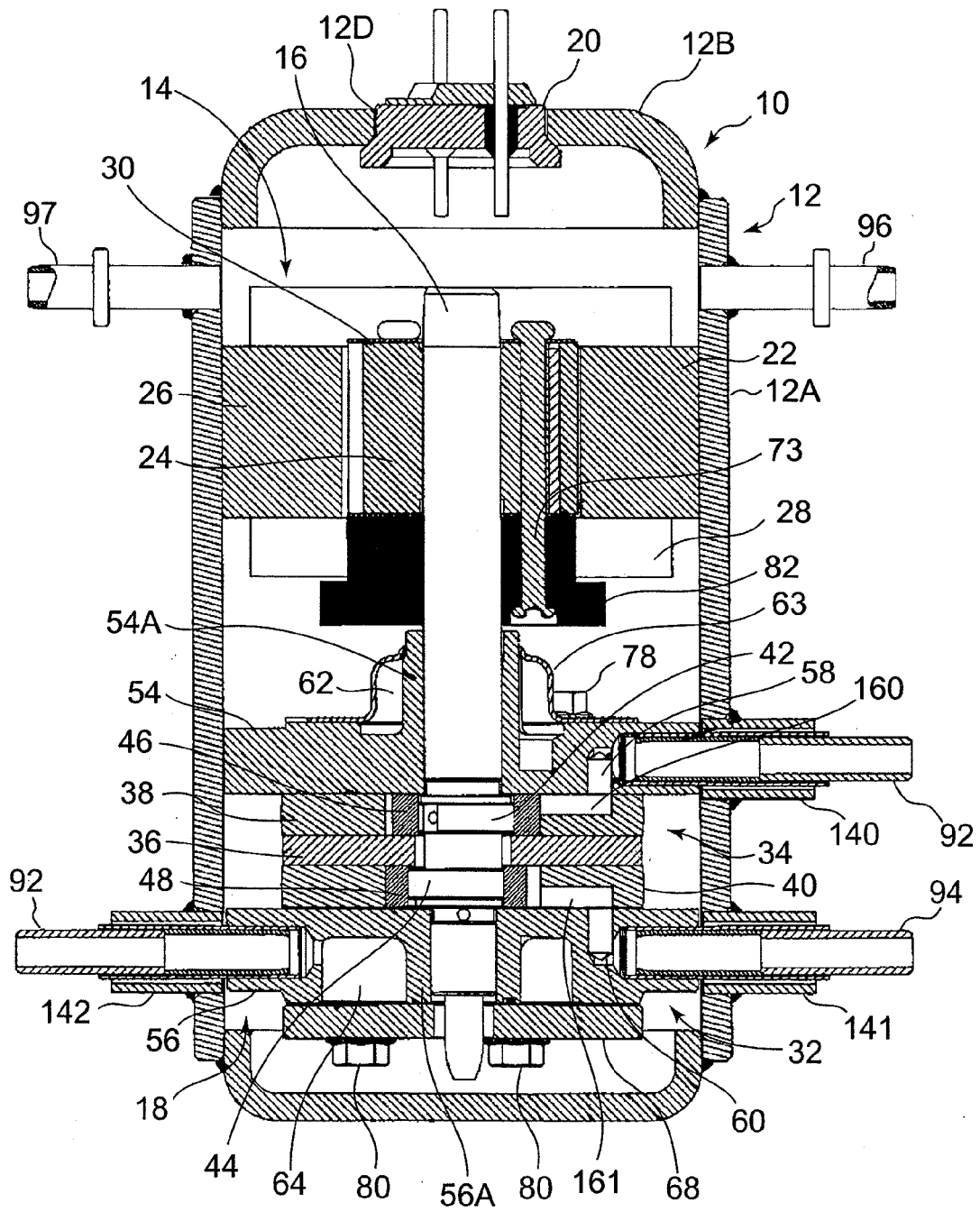


FIG. 2

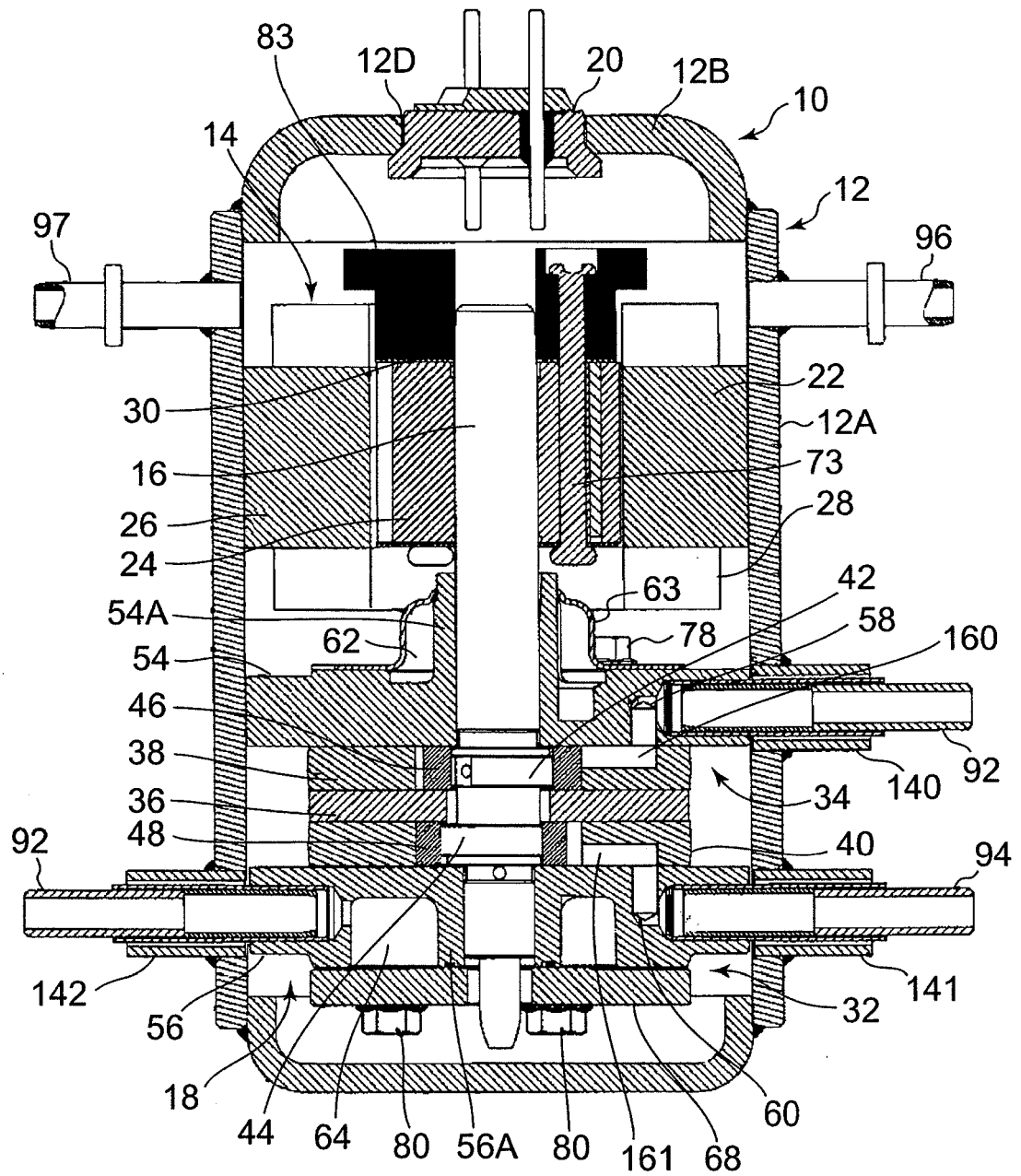


FIG. 3

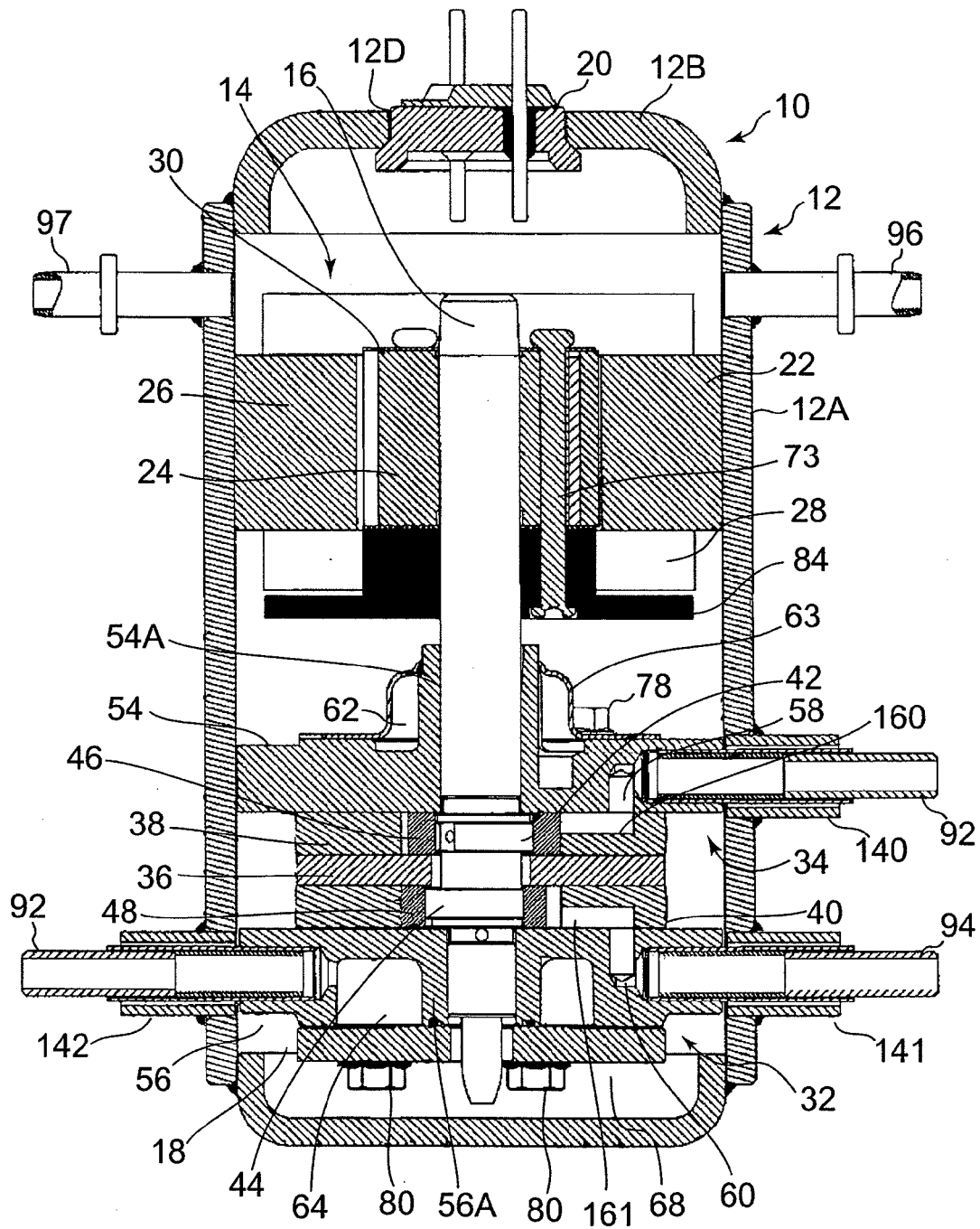
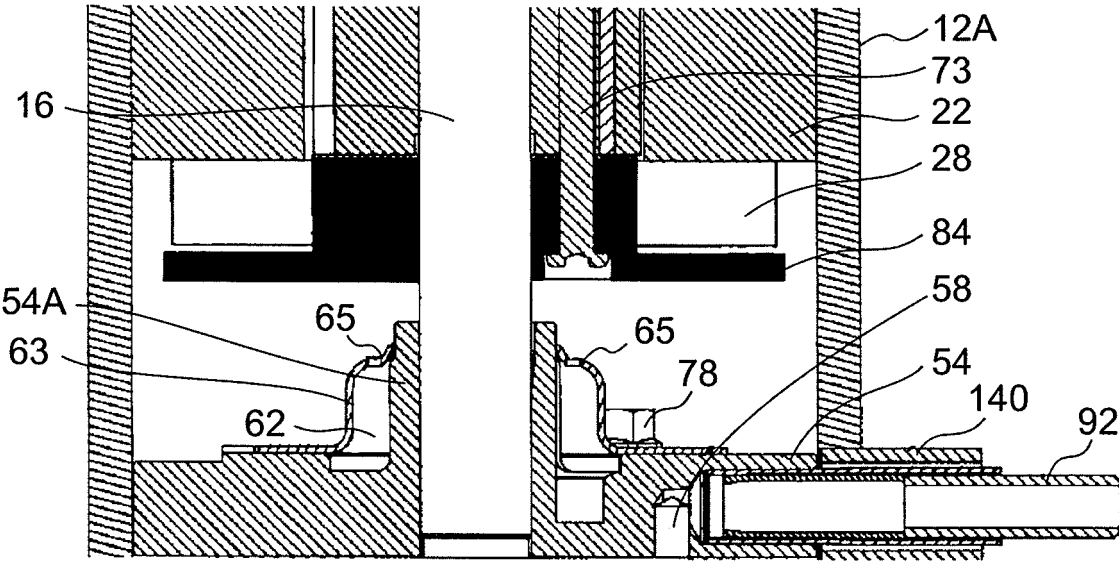


FIG. 4





European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 06 12 4109

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 8 March 2007	Examiner Lequeux, Frédéric
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EPO FORM 1503 03.82 (P04C01)



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EUROPEAN SEARCH REPORT

Application Number
EP 06 12 4109

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