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(71) Applicant: **KABUSHIKI KAISHA TOYOTA JIDOSHOKKI**
Kariya-shi, Aichi 448-8671 (JP)

(72) Inventors:
- **Inoue, Yoshinori**
  Kariya-shi Aichi 448-8671 (JP)
- **Koeda, Naoki**
  Kariya-shi Aichi 448-8671 (JP)
- **Sakamoto, Masaya**
  Kariya-shi Aichi 448-8671 (JP)
- **Tarutani, Tomoji**
  Kariya-shi Aichi 448-8671 (JP)

(74) Representative: **TBK-Patent**
Bavariaring 4-6
80336 München (DE)

(54) Oil separation structure in compressor

(57) A muffler forming member (33) defines a muffler chamber (42). Refrigerant discharged from a cylinder bore (20) is sent to the muffler chamber (42). The muffler forming member (33) is coupled to a circumferential surface (110) of a housing (11) of a compressor (10). An oil separation chamber (36) is defined in a discharge pressure zone (132, 40, 36, 42) of the compressor (10). The oil separation chamber (36) separates the oil from the refrigerant discharged from the cylinder bore (20). The oil separation chamber (36) extends into both the muffler forming member (33) and the housing (11). The oil separation chamber (36) has a refrigerant inlet (403) through which the refrigerant flows into the oil separation chamber (36). The refrigerant inlet (403) is formed in the muffler forming member (33). Therefore, the oil separation chamber (36) is prolonged in the direction from the muffler forming member toward the housing (11), thereby improving the oil separation performance (Fig. 3).

Fig.1A

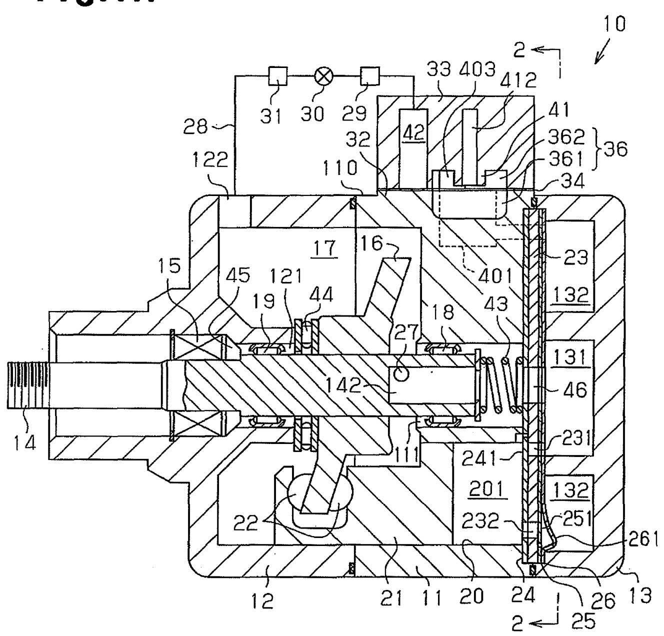

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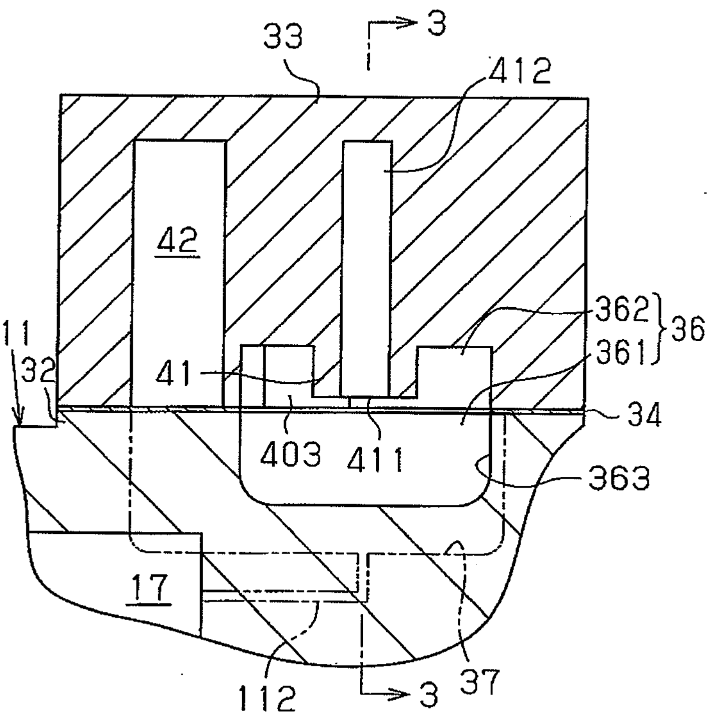
Fig.1B



Description

BACKGROUND OF THE INVENTION

[0001] The present invention relates to an oil separation structure in a compressor.

[0002] Japanese Laid-Open Patent Publication No. 11-182430 discloses a compressor having a muffler forming portion. The muffler forming portion is located on the outer circumference of a cylinder block that forms a part of the compressor housing. A first muffler chamber is defined in the muffler forming portion. The muffler forming portion is coupled to a muffler cover (muffler forming member). A second muffler chamber is defined in the muffler cover. A swirl chamber is defined in the first muffler chamber. A downwardly projecting cylindrical oil separator is provided in the swirl chamber. As pistons reciprocate, refrigerant is discharged to a discharge chamber from the cylinder bores. The refrigerant is then led to the first muffler chamber via a discharge passage. After entering the first muffler chamber, the refrigerant flows into the swirl chamber. The refrigerant flows downward while swirling along the circumferential wall of the swirl chamber. Oil contained in the refrigerant that has entered the swirl chamber is separated as the refrigerant swirls in the swirl chamber. The refrigerant then flows to the second muffler chamber from a lower end and the interior of the cylindrical oil separator. The oil, which has been separated from refrigerant in the swirl chamber, is supplied to a crank chamber that accommodates a swash plate through a recovery passage. The lubricant oil supplied to the crank chamber lubricates parts in the compressor that needs lubrication.

[0003] To improve the oil separation performance of the swirl chamber, the swirl chamber is preferably prolonged in the direction from the muffler cover to the cylinder block. However, if the swirl chamber (oil separation chamber) is excessively prolonged in the direction along the cylindrical oil separator, the required strength of the cylinder block cannot be ensured. Therefore, the length of the swirl chamber cannot be simply prolonged.

SUMMARY OF THE INVENTION

[0004] Accordingly, it is an objective of the present invention to provide an oil separation structure that is capable of increasing the length of an oil separation chamber, thereby improving the oil separation performance.

[0005] According to one aspect of the invention, an oil separation structure provided in a discharge pressure zone in a compressor is provided. The compressor includes: a piston for compressing refrigerant containing oil; a housing defining a cylinder bore for accommodating the piston. The housing has a circumferential surface. The compressor further includes a muffler forming member coupled to the circumferential surface of the housing. The muffler defines a muffler chamber. The refrigerant discharged from the cylinder bore is sent to the muffler chamber. The oil separation structure in the compressor includes an oil separation chamber separating the oil from the refrigerant. The oil separation chamber extends into both the muffler forming member and the housing. The oil separation chamber has a refrigerant inlet through which the refrigerant flows into the oil separation chamber. The refrigerant inlet is formed in the muffler forming member.

[0006] Other aspects and advantages of the invention will become apparent from the following description, taken in conjunction with the accompanying drawings, illustrating by way of example the principles of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] The invention, together with objects and advantages thereof, may best be understood by reference to the following description of the presently preferred embodiments together with the accompanying drawings in which:

Fig. 1A is a cross-sectional side view illustrating the entirety of a compressor according to a first embodiment;
Fig. 1B is a partially enlarged cross-sectional view of the compressor shown in Fig. 1A;
Fig. 2 is a cross-sectional view taken along line 2-2 of Fig. 1A;
Fig. 3 is a cross-sectional view taken along line 3-3 of Fig. 1B;
Fig. 4 is a cross-sectional view taken along line 4-4 of Fig. 3;
Fig. 5 is a cross-sectional view taken along line 5-5 of Fig. 3; and
Fig. 6 is a cross-sectional view illustrating a second embodiment.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0008] A fixed displacement piston compressor according to a first embodiment of the present invention will now be described with reference to Figs. 1A to 5.

[0009] As shown in Fig. 1A, a front housing member 12 and a rear housing member 13 are coupled to a cylinder block 11. A suction chamber 131 and a discharge chamber 132 are defined in the rear housing member 13. The cylinder block 11, the front housing member 12, and the rear housing member 13 form a housing of a compressor 10.

[0010] A rotary shaft 14 is rotatably supported by the cylinder block 11 and the front housing member 12. The rotary shaft 14 extends through shaft holes 111, 121 formed in the cylinder block 11 and the front housing member 12. The rotary shaft 14 is supported by the cylinder block 11 and the front housing member 12 with radial bearings 18, 19 located in the shaft holes 111, 121.

[0011] A swash plate 16 is fixed to the rotary shaft 14.

The swash plate 16, which functions as a cam member, is accommodated in a cam chamber 17. The swash plate 16 is pressed against a thrust bearing 44 located between the front housing member 12 and the swash plate 16 by the force of a compression spring 43. The force of the compression spring 43 prevents the rotary shaft 14 from chattering in the axial direction.

[0012] A sealing device 15 of lip seal type is located between the front housing member 12 and the rotary shaft 14. An accommodation chamber 45 for accommodating the sealing device 15 communicates with the cam chamber 17. The sealing device 15 prevents refrigerant from leaking through between the circumferential surface of the rotary shaft 14 and the front housing member 12.

[0013] The cam chamber 17 is connected to an external refrigerant circuit 28 via a suction hole 122 formed in the front housing member 12. A heat exchanger 29 for removing heat from refrigerant, an expansion valve 30, and a heat exchanger 31 for transferring the ambient heat to refrigerant are located on the external refrigerant circuit 28.

[0014] Cylinder bores 20 are formed in the cylinder block 11 to surround the rotary shaft 14. As show in Fig. 2, the number the cylinder bores 20 is five in this embodiment. A piston 21 is retained in each cylinder bore 20.

[0015] Rotation of the swash plate 16, which rotates integrally with the rotary shaft 14, is converted into reciprocation of the pistons 21 via shoes 22, which slide on the swash plate 16 as shown in Fig. 1A. Thus, each piston 21 reciprocates back and forth inside the corresponding cylinder bore 20. That is, the pistons 21 are interlinked with rotation of the rotary shaft 14 by means of the swash plate 16, which is integrated with the rotary shaft 14. Each piston 21 defines a compression chamber 201 in the corresponding cylinder bore 20.

[0016] A valve plate 23, suction valve plate 24, discharge valve plate 25, and a retainer plate 26 are arranged between the cylinder block 11 and the rear housing member 13. Suction ports 231 are formed in the valve plate 23, the discharge valve plate 25, and the retainer plate 26. Discharge ports 232 are formed in the valve plate 23 and the suction valve plate 24. Flexible suction valves 241 are formed on the suction valve plate 24, and flexible discharge valves 251 are formed on the discharge valve plate25. The suction valves 241 open and close the suction ports 231, and the discharge valves 251 open and close the discharge ports 232. Retainers 261 are formed on the retainer plate 26. The retainers 261 limit the opening degree of the discharge valve 251.

[0017] An in-shaft passage 142 is formed in the rotary shaft 14. The in-shaft passage 142 communicates with the suction chamber 131 through a bore 46 extending through the valve plate 23.

[0018] The rotary shaft 14 has an inlet hole 27, which communicates with the in-shaft passage 142. The entrance of the inlet hole 27 of the rotary shaft 14 is located between the swash plate 16 and the cylinder block 11. Gaseous refrigerant in the cam chamber 17 flows into the in-shaft passage 142 via the inlet hole 27. The refrigerant in the in-shaft passage 142 flows to the suction chamber 131.

[0019] When each cylinder bore 20 is in a suction stroke, that is, when the associated piston 21 is moved from right to left as viewed in Fig. 1A, refrigerant in the suction chamber 131 is drawn into the cylinder bore 20 (the compression chamber 201) through the corresponding suction port 231, while opening the suction valve 241. When each cylinder bore 20 is in a discharge stroke, that is, when the associated piston 21 is moved from left to right as viewed in Fig. 1A, gaseous refrigerant in the cylinder bore 20 (the compression chamber 201) is discharged to the discharge chamber 132 through the corresponding discharge port 232, while opening the discharge valve 251. The thrust bearing 44 receives discharge reaction force that acts on the swash plate 16 from the cylinder bores 20 through the pistons 21 and the shoes 22.

[0020] A mount 32 is integrally formed with and projects from an upper portion of the outer circumferential surface 110 of the cylinder block 11, which forms a part of the entire housing of the compressor 10. As shown in Fig. 1B, the upper end of the mount 32 is flat. A muffler forming member 33 is coupled to the upper end of the mount 32 with a flat plate-like sealing gasket 34 in between. As shown in Figs. 2 and 4, the muffler forming member 33 and the gasket 34 are secured to the mount 32 by means of screws 35.

[0021] As shown in Fig. 3, a lower oil separation chamber 361 is defined in the mount 32 of the cylinder block 11, and an upper oil separation chamber 362 is defined in the muffler forming member 33. The upper oil separation chamber 362 communicates with the lower oil separation chamber 361. That is, an oil separation chamber 36 includes the lower oil separation chamber 361 and the upper oil separation chamber 362, and the oil separation chamber 36 extending into the mount 32 and the muffler forming member 33. As shown in Fig. 4, the oil separation chamber 36 is cylindrical and has a circumferential surface 363. The axis of the circumferential surface 363 is perpendicular to the gasket 34.

[0022] The lower oil separation chamber 361 is defined above a first intervening portion 115 of the cylinder block 11. The first intervening portion 115 is located between a first cylinder bore 20A, which is the topmost one of the cylinder bores 20, and a second cylinder bore 20B, which is adjacent to the first cylinder bore 20A. The second cylinder bore 20B is the one to the left of the first cylinder 20A as viewed in Fig. 3. That is, a bottom 365 of the lower oil separation chamber 361 is located above the first intervening portion 115. An oil reservoir chamber 37 is defined in the mount 32 to communicate with the lower oil separation chamber 361 in the mount 32 of the cylinder block 11. A bottom 375 of the reservoir chamber 37 is located above a second intervening portion 116. The second intervening portion 116 is located between the first cylinder bore 20A, which is the topmost one of the cylinder bore 20, and a third cylinder bore 20C, which is adjacent to the first cylinder bore 20A. The third cylinder bore 20C is the one to the right of the first cylinder 20A as viewed in Fig. 3. That is, the oil reservoir chamber 37 is located adjacent to the oil separation chamber 36 in the circumferential direction of the cylinder block 11.

[0023] As shown in Fig. 1B, the oil reservoir chamber 37 is connected to the cam chamber 17 through an oil supply passage 112. The inlet of the oil supply passage 112 is located in the bottom of the oil reservoir chamber 37.

[0024] As shown in Fig. 4, the oil reservoir chamber 37 is divided from the lower oil separation chamber 361 by an arcuate dividing wall 38, which is formed integrally with the mount 32. The oil reservoir chamber 37 communicates with the lower oil separation chamber 361 through a port 39 at the end of the arcuate dividing wall 38. As shown in Fig. 3, the port 39 is located at a position higher than the bottom of the lower oil separation chamber 361.

[0025] As shown in Fig. 3, a discharge passage 40 is formed in the mount 32 and the muffler forming member 33, extending through the gasket 34. The discharge passage 40 includes a lower discharge passage 401 and an upper discharge passage 402. The lower discharge passage 401 is formed in the mount 32, and communicates with the discharge chamber 132. The upper discharge passage 402 is defined in the muffler forming member 33 to communicate with the lower discharge passage 401. The upper discharge passage 402 is connected to the upper oil separation chamber 362 through a port 403 formed in the circumferential wall of the upper oil separation chamber 362. That is, the port 403 serves as an outlet of the upper discharge passage 402, and serves as an inlet of the upper oil separation chamber 362.

[0026] As shown in Fig. 5, the port 403 is directed to the circumferential surface 363 of the upper oil separation chamber 362 as indicated by arrow R in Fig. 5 when viewed from above the compressor 10 (as viewed along the longitudinal direction of the oil separation chamber 36). Gaseous refrigerant in the discharge chamber 132 flows into the upper oil separation chamber 362 via the discharge passage 40. Refrigerant that flows into the oil separation chamber 36 via the port 403 serving as the refrigerant inlet, swirls counterclockwise in the oil separation chamber 36 when viewed from above the compressor 10.

[0027] As shown in Fig. 3, an oil separating cylinder 41 is integrally formed with the muffler forming member 33. The oil separating cylinder 41 extends into the upper oil separation chamber 362 from the muffler forming member 33 toward the mount 32. An opening 411 at the lower end of the oil separating cylinder 41 opens to the upper oil separation chamber 362 to face the cylinder block 11 at a position lower than the port 403 of the upper oil separation chamber 362.

[0028] The muffler forming member 33 is formed such that a muffler chamber 42 communicates with a passage 412 in the oil separating cylinder 41. The muffler chamber 42 communicates with the external refrigerant circuit 28 via a discharge hole 47 to discharge the refrigerant from the compressor 10. The muffler chamber 42 is divided from the oil reservoir chamber 37 by the gasket 34 serving as a partition.

[0029] After discharged to the discharge chamber 132, refrigerant flows out to the external refrigerant circuit 28 via the discharge passage 40, the port 403 serving as a refrigerant inlet, the oil separation chamber 36, the opening 411 serving as a refrigerant outlet, the passage 412 in the oil separating cylinder 41, the muffler chamber 42, and the discharge hole 47. This discharge path from the discharge chamber 132 to the external refrigerant circuit 28 constitutes a discharge pressure zone for receiving the discharged refrigerant. That is, the discharge chamber 132, the discharge passage 40, the port 403, the oil separation chamber 36, the opening 411, the passage 412, the muffler chamber 42, and the discharge hole 47 are parts of the discharge pressure zone. After being discharged to the external refrigerant circuit 28, the refrigerant is returned to the cam chamber 17, which is a suction pressure zone. The circuit including the compressor 10 and the external refrigerant circuit 28 contains oil, which flows together with refrigerant. After flowing into the oil separation chamber 36 through the port 403, refrigerant flows toward the bottom of the oil separation chamber 36 while swirling in the direction of arrow R along the circumferential surface 363 of the oil separation chamber 36. This separates misted oil from the refrigerant. After being separated from the refrigerant, the oil is sent to the oil reservoir chamber 37 through the port 39. The oil separated from the refrigerant is stored in the oil reservoir chamber 37, and is then supplied to the cam chamber 17 via the oil supply passage 112. When supplied to the cam chamber 17, the oil lubricates parts that require lubrication in the cam chamber 17 (sliding portions of the swash plate 16 and the shoes 22, the sealing device 15, the radial bearings 18, 19, and the thrust bearing 44).

[0030] The first embodiment provides the following advantages.

(1) The longer the oil separation chamber 36 (in the direction from the muffler forming member 33 toward the cylinder block 11), the longer the swirling distance of refrigerant swirling in the oil separation chamber 36. Accordingly, the oil separation performance in the oil separation chamber 36 is improved. Since the oil separation chamber 36 extends into the cylinder block 11 and the muffler forming member 33, which are parts of the entire housing, the oil separation chamber 36 is longer than in the case where an oil separation chamber is provided only in the mount 32 of the cylinder block 11. Accordingly, the oil separation performance of the oil separation chamber 36 is improved.

(2) The port 403 as the refrigerant inlet of the oil separation chamber 36 is formed in the muffler forming member 33. The discharged gas flows upward from the cylinder block 11, then into the oil separation chamber 36 through the port 403, and swirls around the cylinder 41 while flowing downwardly. Thereby, the swirling distance of the refrigerant is prolonged, and the oil separation performance is improved.

(3) If an oil reservoir chamber is located below the oil separation chamber 36, a large amount of separated oil will be stored in the oil separation chamber 36, too. The stored oil significantly reduces the space of the oil separation chamber 36 for oil separation. In this case, the substantial length of the oil separation chamber 36 (in the direction from the muffler forming member 33 toward the cylinder block 11) will be shortened, and thus, the oil separation performance of the oil separation chamber 36 will be significantly reduced.
Since the oil reservoir chamber 37 is divided from the oil separation chamber 36 in the circumferential direction of the cylinder block 11, the space of the oil separation chamber 36 for oil separation is prevented from being significantly reduced by stored oil.

(4) If the oil reservoir chamber 37 and the muffler chamber 42 are divided by a member other than the gasket 34, the number of parts of the compressor will be increased, which leads to an increased costs. Since the gasket 34 is a necessary part for preventing refrigerant from leaking from the joint section between the cylinder block 11 (the mount 32) and the muffler forming member 33, the structure in which the gasket 34 is used for dividing the muffler chamber 42 and the oil reservoir chamber 37 reduces the number of the parts.

(5) The discharge passage 40 passes through the gasket 34 and communicates with the oil separation chamber 36. The structure in which the discharge passage 40 passes through the gasket 34 is favorable structure for preventing refrigerant in the discharge passage 40 from leaking through the joint section between the cylinder block 11 (the mount 32) and the muffler forming member 33.

(6) The longer the distance of the swirling motion of refrigerant in the oil separation chamber 36, the more improved the oil separation performance becomes. The oil separating cylinder 41 promotes swirling of refrigerant in the oil separation chamber 36, thereby increasing the swirling distance. The longer the oil separating cylinder 41, the longer the distance of the swirling motion of the refrigerant in the oil separation chamber 36. Since the oil separation chamber 36 is longer than an oil separation chamber that is provided only in the cylinder block 11, the oil separation chamber 36 is advantageous in providing the prolonged cylinder 41.

(7) As shown in Fig. 3, the bottom 365 of the oil separation chamber 36 in the cylinder block 11 is located above the first intervening portion 115. The bottom 375 of the oil reservoir chamber 37 is located above the second intervening portion 116, which is adjacent to the first intervening portion 115 in the circumferential direction of the cylinder block 11.

[0031] Therefore, the level of oil in the oil separation chamber 36 is not raised due to the existence of the oil reservoir chamber 37.

[0032] The present invention may be embodied in the following forms.

[0033] As shown in Fig. 6, the lower oil separation chamber 361 and the oil reservoir chamber 37 in the cylinder block 11 may be divided from each other. The bottom of the lower oil separation chamber 361 and the oil reservoir chamber 37 may be connected to each other by a communication passage 233 formed in the suction valve plate 24 and a valve plate 23 (see Fig. 1A) of the cylinder block 11.

[0034] As shown in Fig. 6, the distal end of the oil separating cylinder 41 may extend into the lower oil separation chamber 361.

[0035] The oil reservoir chamber 37 of the first embodiment may be omitted, and a bottom portion of the lower oil separation chamber 361 may serve as an oil reservoir chamber.

[0036] The oil reservoir chamber 37 and the muffler chamber 42 may be divided from each other by a member other than the gasket 34.

[0037] The oil separating cylinder 41 may not be formed integrally with the muffler forming member 33. The cylinder 41 may be attached to the muffler forming member 33.

[0038] A muffler forming member may be attached to the outer periphery of the front housing member 12, and an oil separation chamber may be formed to extend into the muffler forming member and the front housing member 12.

[0039] A muffler forming member may be formed across the cylinder block 11 and the front housing member 12.

[0040] A muffler forming member may be formed across the cylinder block 11 and the rear housing member 13 may be provided.

[0041] Oil in the oil reservoir chamber 37 may be directly supplied to the suction chamber 131.

[0042] The muffler chamber 42 may be formed between the discharge passage 40 and the oil separation chamber 36, so that refrigerant flows to the external refrigerant circuit 28 from the oil separation chamber 36 without passing through a muffler chamber.

[0043] The present invention may be applied to a compressor that directly draws refrigerant from an external refrigerant circuit to a suction chamber.

[0044] The present invention may be applied to a piston compressor having a cam member other than a swash plate.

[0045] The present invention may be applied to a variable displacement piston compressor as disclosed in Japanese Laid-Open Patent Publication No. 11-182430.

[0046] A muffler forming member (33) defines a muffler chamber (42). Refrigerant discharged from a cylinder bore (20) is sent to the muffler chamber (42). The muffler forming member (33) is coupled to a circumferential surface (110) of a housing (11) of a compressor (10). An oil separation chamber (36) is defined in a discharge pressure zone (132, 40, 36, 42) of the compressor (10). The oil separation chamber (36) separates the oil from the refrigerant discharged from the cylinder bore (20). The oil separation chamber (36) extends into both the muffler forming member (33) and the housing (11). The oil separation chamber (36) has a refrigerant inlet (403) through which the refrigerant flows into the oil separation chamber (36). The refrigerant inlet (403) is formed in the muffler forming member (33). Therefore, the oil separation chamber (36) is prolonged in the direction from the muffler forming member toward the housing (11), thereby improving the oil separation performance (Fig. 3).

Claims

1. An oil separation structure provided in a discharge pressure zone (132, 40, 36, 42) in a compressor (10), wherein the compressor (10) includes:

    a piston (21) for compressing refrigerant containing oil;
    a housing (11) defining a cylinder bore (20) for accommodating the piston (21), the housing (11) having a circumferential surface (110); and
    a muffler forming member (33) coupled to the circumferential surface (110) of the housing (10), wherein the muffler forming member (33) defines a muffler chamber (42), wherein the refrigerant discharged from the cylinder bore (20) is sent to the muffler chamber (42),
    the oil separation structure in the compressor comprising; an oil separation chamber (36) separating the oil from the refrigerant,
    the oil separation structure being **characterized in that**
    the oil separation chamber (36) extends into both the muffler forming member (33) and the housing (11), the oil separation chamber (36) having a refrigerant inlet (403) through which the refrigerant flows into the oil separation chamber (36), and the refrigerant inlet (403) being formed in the muffler forming member (33).

2. The oil separation structure according to claim 1,
characterized in that the housing (11) defines an oil reservoir chamber (37), which communicates with the oil separation chamber (36), the oil reservoir chamber (37) located adjacent to the oil separation chamber (36) in a circumferential direction of the housing (11).

3. The oil separation structure according to claim 2,
characterized in that the compressor (10) further having a partition (34) functioning as a seal located between the housing (11) and the muffler forming member (33), the oil separation chamber (36) extending through the partition (34), the oil separation chamber (36) having a refrigerant outlet (411) through which the refrigerant flows out of the oil separation chamber (36) to communicate with the muffler chamber (42), the refrigerant outlet (411) being formed in the muffler forming member (33), and the partition (34) dividing the oil reservoir chamber (37) from the muffler chamber (42).

4. The oil separation structure according to claim 3,
characterized in that the compressor (10) has a discharge passage (40) through which the refrigerant discharged from the cylinder bore (20) flows, and wherein the discharge passage (40) extends from the interior of the housing (11) to the refrigerant inlet (403) through the partition (34).

5. The oil separation structure according to claim 3 or 4,
characterized in that the muffler forming member (33) has an oil separating cylinder (41), which extends from the muffler forming member (33) into the oil separation chamber (36), the oil separating cylinder (41) having an opening (411) facing the housing (11), and the opening (411) functioning as the refrigerant outlet (411).

6. The oil separation structure according to any one of claims 2 to 5,
characterized in that the cylinder bore (20) is one of a plurality of cylinder bores (20A, 20B, 20C) defined by the housing (11), the cylinder bores (20A, 20B, 20C) include a first cylinder bore (20A), a second cylinder bore (20B), and a third cylinder bore (20C), the first and second cylinder bores (20A, 20B) being adjacent to each other in a circumferential direction of the housing (11), and the third cylinder bore (20C) being adjacent to at least one of the first and second cylinder bores (20A, 20B),
wherein the housing (11) includes: a first intervening portion (115) between the first cylinder bore (20A) and the second cylinder bore (20B); and a second intervening portion (116) between the third cylinder bore (20C) and the first cylinder bore (20A) or between the third cylinder bore (20C) and the second cylinder bore (20B), and
wherein the oil separation chamber (36) has a bot-

tom (365) formed in the housing (11), the bottom (365) being located above the first intervening portion (115),
wherein the oil reservoir chamber (37) has a bottom (371) formed in the housing (11), the bottom (371) of the oil reservoir chamber (37) being located above the second intervening portion (116).

7. The oil separation structure according to claim 1, **characterized in that** the compressor (10) has a discharge passage (40) through which the refrigerant discharged from the cylinder bore (20) flows, and wherein the discharge passage (40) is connected to the oil separation chamber (36), and the oil separation chamber (36) is connected to the muffler chamber (42) such that the refrigerant in the discharge passage (40) flows into the oil separation chamber (36), and flows toward the muffler chamber (42) from the oil separation chamber (36).

Fig.1B

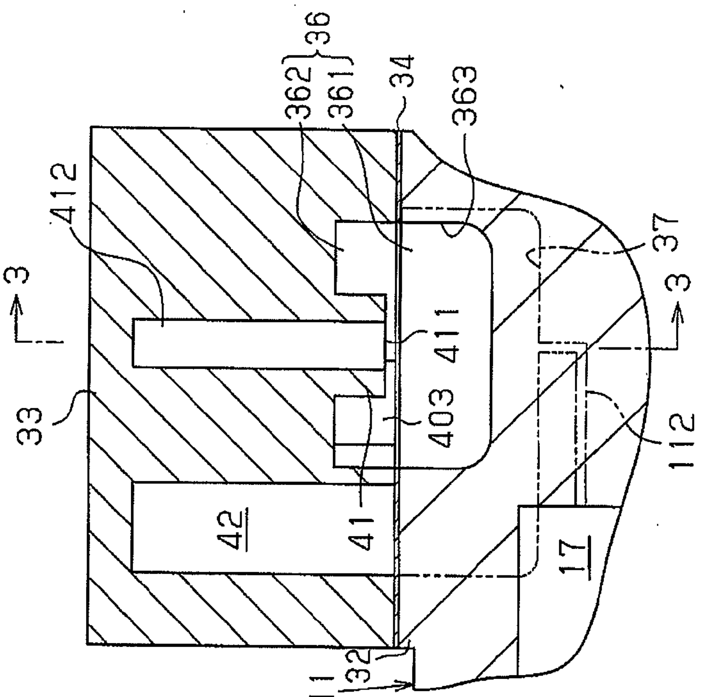

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Fig.1A

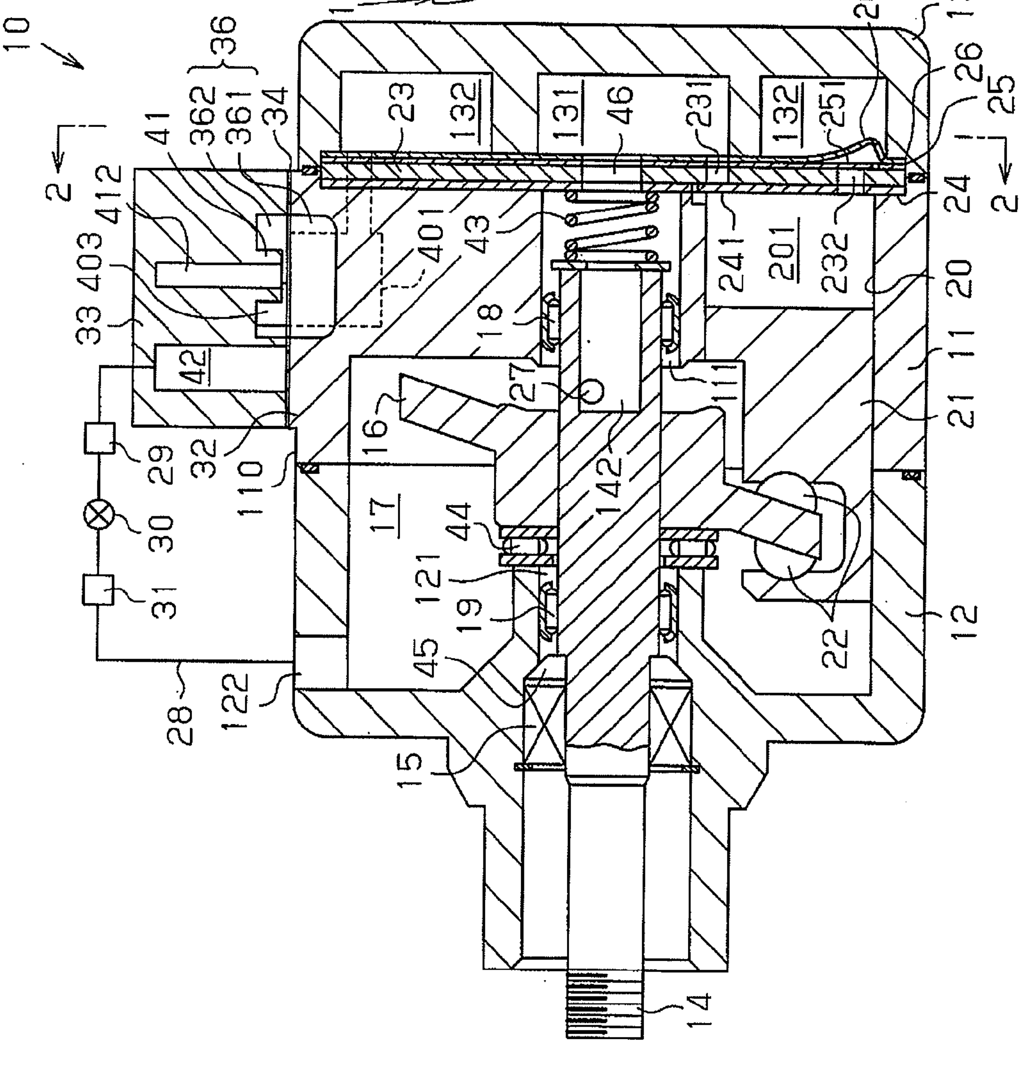
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Fig.2

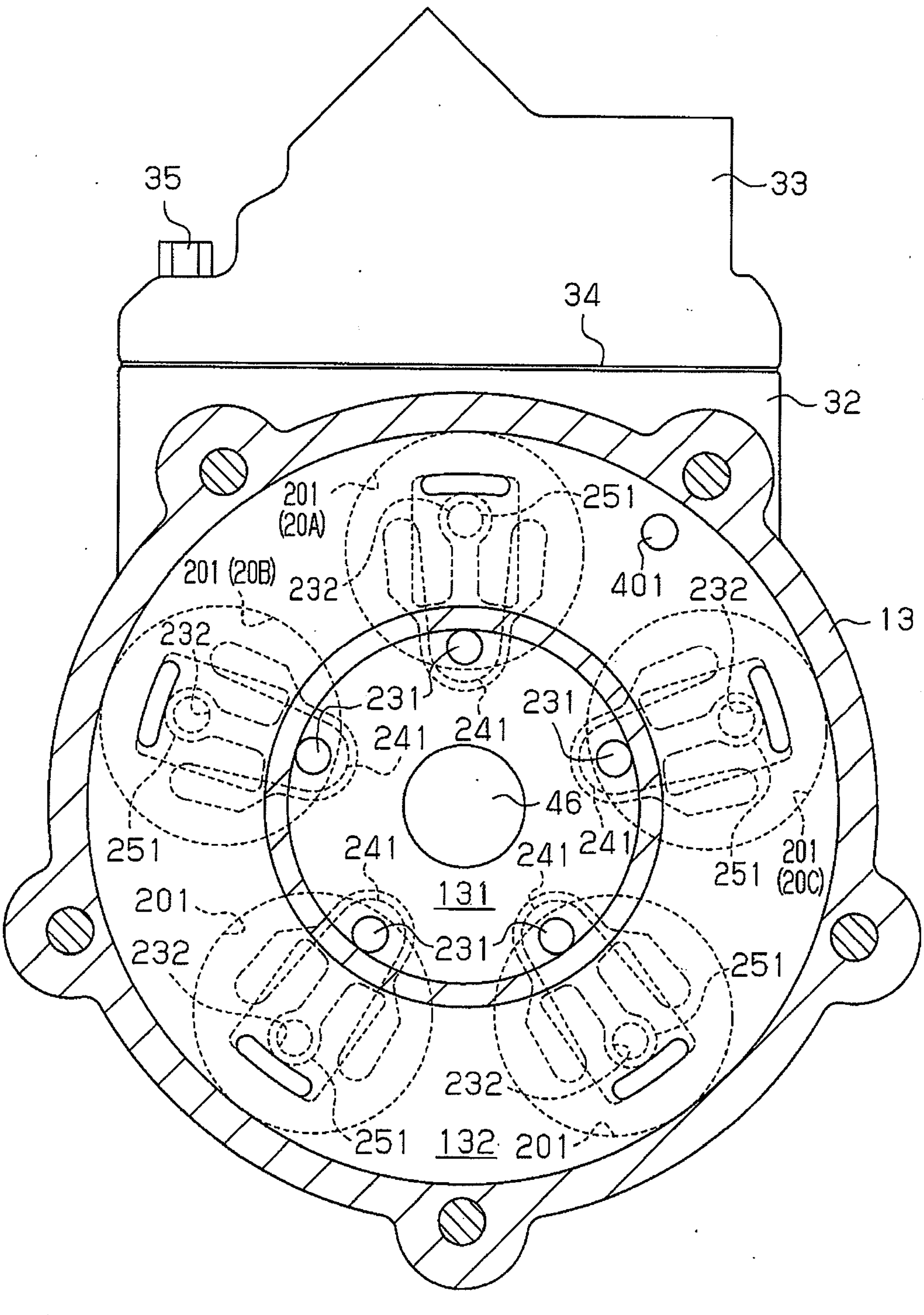
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Fig.3

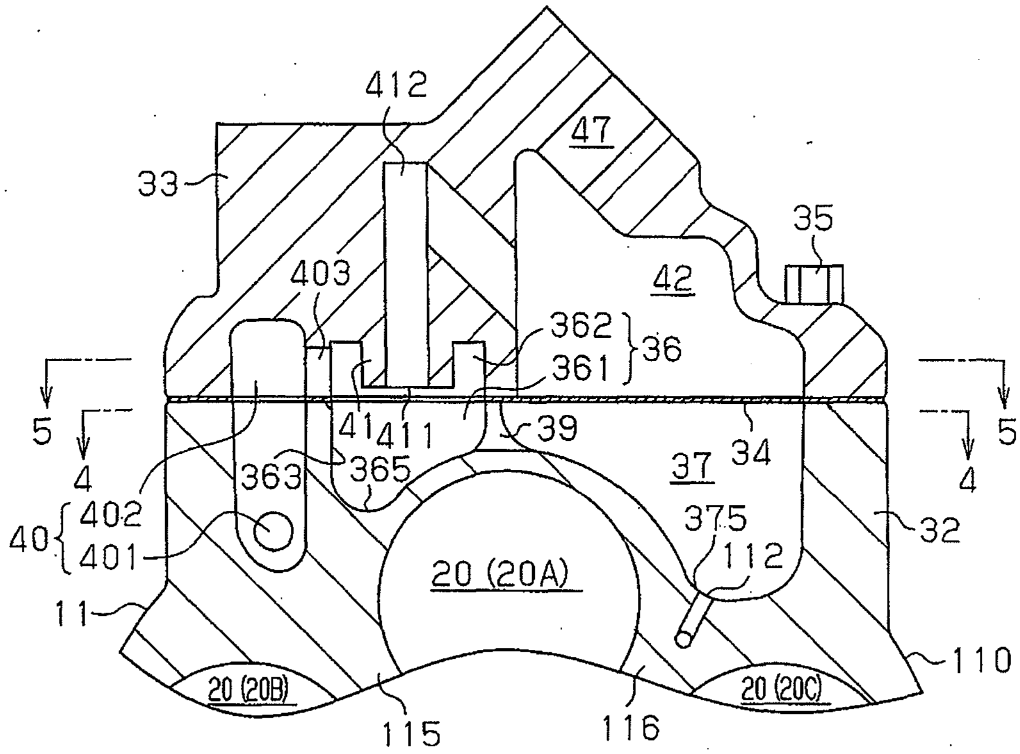
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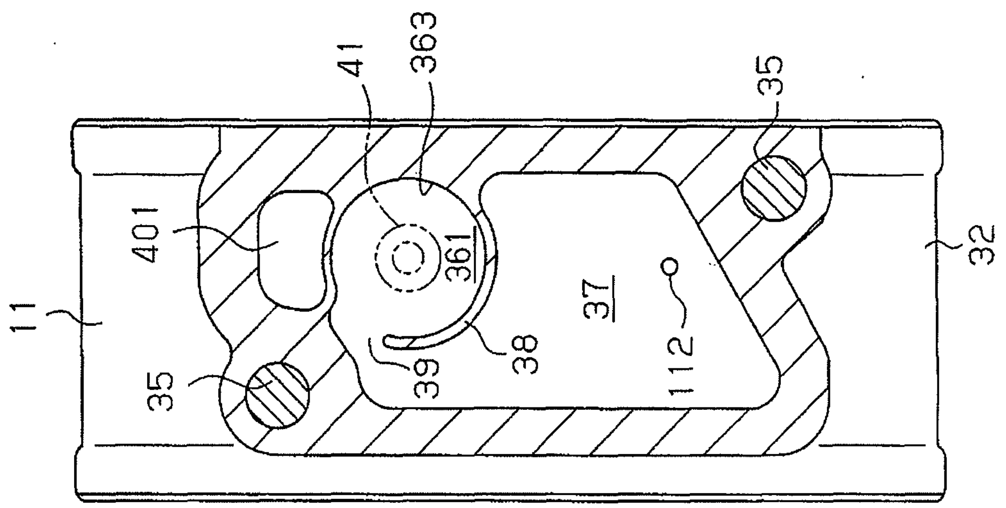
Fig.4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35

Fig.5

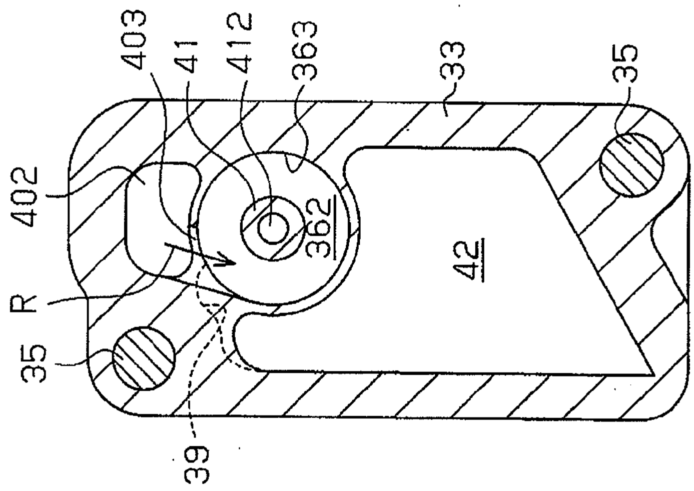
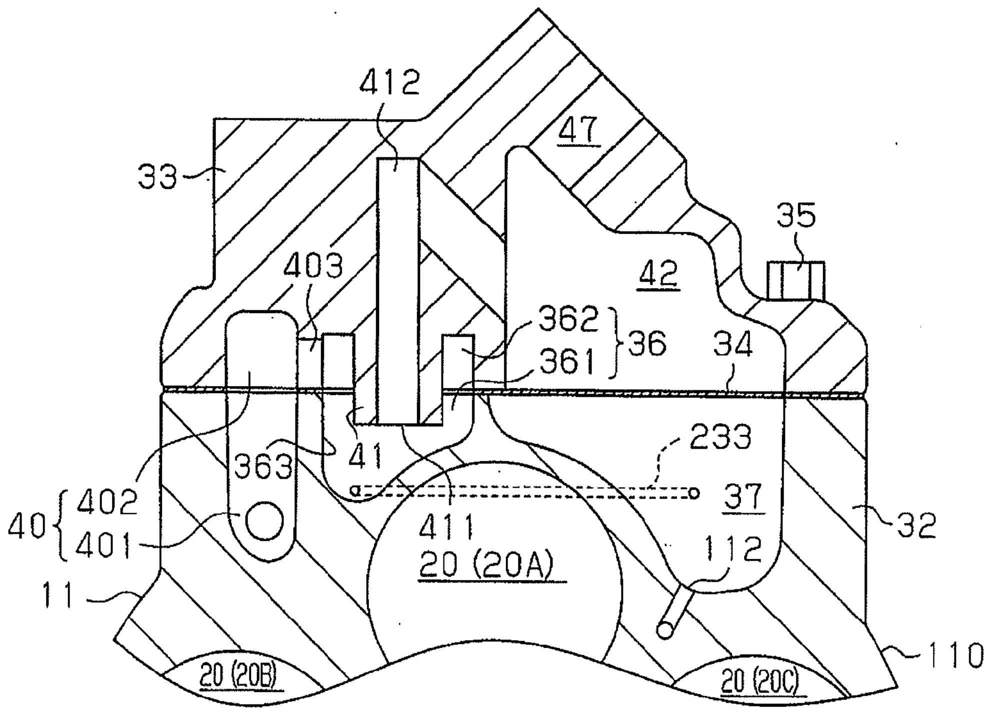

403
41
412
363
33
35
402
362
42
R
35
39

Fig.6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36
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41
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40
402
401
411
20 (20A)
112
32
11
110
20 (20B)
20 (20C)

REFERENCES CITED IN THE DESCRIPTION

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