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(54) ELECTRIC COMPRESSOR

(57) [Object]

To provide an electric compressor which allows a reduction in size by reducing a dimension in an axial direction, and allows to enhance flexibility of a position for forming an intake port and layout of a refrigerant route. Even though the intake port is not arranged in the vicinity of a drive circuit, the drive circuit is sufficiently cooled.

[Abstract]

In a configuration including: a compressing mechanism 3 and an electric motor 4 configured to drive the compressing mechanism 3 in a housing, wherein the electric motor 4 includes : a stator 21 formed by winding coils on a stator core 24 fixed in the housing 2; and a rotor 22 fixedly mounted on a drive shaft 10 and rotatably arranged inside the stator 21, so that compressed fluid is introduced to the compressing mechanism 3 through an electric motor storage space 12a that houses the electric motor 4, a fluid introducing passage 31 extended along the axial direction of the drive shaft 10 is formed between the housing 2 and the stator core 24, and the intake port 30 configured to introduce the compressed fluid is provided at the position of the housing 2 facing the outer peripheral surface of the stator core 24 and is connected to the fluid introducing passage 31.

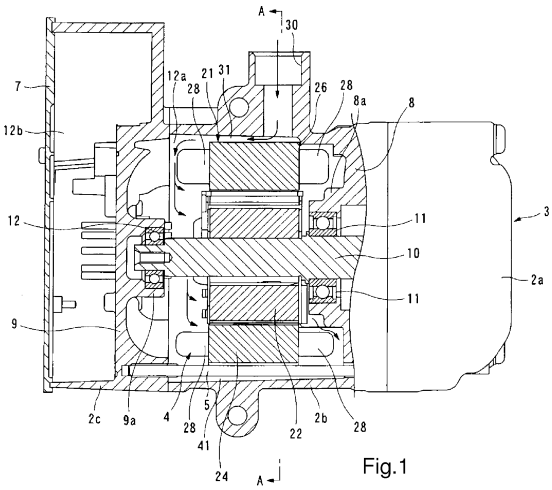

Fig.1

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Description

Technical Field

[0001] The present invention relates to an electric compressor including a compressing mechanism and an electric motor configured to drive the compressing mechanism in a housing, and configured to introduce compressed fluid into the compressing mechanism via an electric motor storage space that houses the electric motor.

Background Art

[0002] Configurations described in the following Patent Literatures 1 to 3, for example, are publicly known as an electric compressor provided with a compressing mechanism and an electric motor configured to drive the compressing mechanism in a housing.

[0003] Among these Patent Literatures, Patent Literature 1 (JP-A-2000-291557) and Patent Literature 2 (JP-A-2005-291004) disclose a configuration of an electric compressor for refrigerant compression configured to have a compressing mechanism and an electric motor integrated with each other, in which the housing is formed by assembling a discharging housing, an intermediate housing, and an intake housing by fastening in an axial direction with a bolt, a partitioning wall is provided in the intake housing, an intake port is formed on a side surface biased to the intermediate housing with respect to the partitioning wall, a space encapsulated by a lid member is formed on an outside of the partitioning wall, a drive circuit including a control circuit and an inverter integrated with each other is stored in the space, and the drive circuit is provided in the vicinity of the intake port, whereby a switching element which constitutes the inverter is cooled by refrigerant gas.

[0004] Also, Patent Literature 3 (JP-A-2008-184995) discloses an electric compressor including a compressing mechanism (compressing portion) and an electric motor configured to drive the compressing mechanism provided in the housing, wherein a plurality of refrigerant passages in which refrigerant flows in an axial direction are arranged in a direction of rotation between the housing and a stator core, one of the plurality of refrigerant passages is arranged so as to oppose the drive circuit via the housing, other refrigerant passages than the one refrigerant passage are closed by a restraining member arranged between one end side of the housing in the axial direction and the stator core to prevent the refrigerant taken from a refrigerant inlet port from flowing into the other cooling passages, and a deviation of a stress distribution in the direction of rotation is reduced between the housing and the stator core, whereby the drive circuit is cooled sufficiently while securing a pressure capacity of the housing.

Prior Art Literatures

Patent Literatures

[0005]

PTL1: JP-A-2000-291557
PTL2: JP-A-2005-291004
PTL3: JP-A-2008-184995

Summary of Invention

Technical Problem

[0006] However, since the configurations disclosed in Patent Literatures 1 and 2 have a configuration in which the intake port is arranged on an outer peripheral wall located between the electric motor located in the vicinity of the drive circuit and the drive circuit for cooling the drive circuit by an intake refrigerant, the electric compressor needs to secure a margin for forming the intake port between the electric motor and the drive circuit, and hence the length in the axial direction is increased, and hence there arises a problem that demands of a reduction in size cannot be achieved. In order to cool the drive circuit, the intake port needs to be arranged as close to the drive circuit as possible, and hence a position for forming the intake port and a layout of refrigerant routes are limited.

[0007] In view of such circumstances, it is an object of the invention mainly to provide an electric compressor which allows a reduction in size by reducing a dimension in an axial direction, and allows to enhance flexibility of the position for forming the intake port and layout of a refrigerant route. It is another object to enable the drive circuit to be cooled sufficiently without providing the intake port in the vicinity of the drive circuit.

Solution to Problem

[0008] In order to achieve the above-described object, an electric compressor of the invention includes: a compressing mechanism and an electric motor configured to drive the compressing mechanism in a housing, wherein the electric motor includes: a stator formed by winding coils on a stator core fixed in the housing; and a rotor fixedly mounted on a drive shaft and rotatably arranged inside the stator, so that compressed fluid is introduced to the compressing mechanism through an electric motor storage space that houses the electric motor, a fluid introducing passage extending along an axial direction of the drive shaft between the housing and the stator core is formed, and an intake port configured to introduce the compressed fluid is provided at a position of the housing facing an outer peripheral surface of the stator core and is connected to the fluid introducing passage.

[0009] Therefore, according to the above-described configuration, since the fluid introducing passage extended along the axial direction of the drive shaft is formed between the housing and the stator core, and the intake port configured to introduce the compressed fluid is connected to the fluid introducing passage at a position facing the outer peripheral surface of the stator core, a margin of formation of the intake port needs not to be secured between the drive circuit and the motor, so that a reduction in size of the electric compressor can be achieved by reducing an axial dimension of the housing.

[0010] Since the position for forming the intake port can be formed at an arbitrary position in the axial direction within a range facing the outer peripheral surface of the stator core, flexibility of the position for forming the intake port and flexibility of layout of a refrigerant route can be enhanced.

[0011] Furthermore, in the configuration described above, a restraining mechanism configured to restrain a flow of the compressed fluid flowing in the fluid introducing passage from the intake port toward a compressing mechanism side may be provided between the intake port and the compressing mechanism in the axial direction of the drive shaft.

[0012] In this configuration, the compressed fluid flowing in from the intake port can be flowed to the compressing mechanism side through gaps between the coils of the stator and a gap between the stator and the rotor after having been flowed once to a side opposite to the compressing mechanism, whereby cooling of the coils can be accelerated.

[0013] Examples of the modes of the restraining mechanism as described above include (i) a configuration in which a compressing mechanism side opening edge of the fluid introducing passage is throttled or closed by part of the housing, (ii) a configuration in which a cross section of a passage of a portion biased to the compressing mechanism side with respect to the intake port of the fluid introducing passage is throttled or closed, and (iii) a configuration in which a downstream side of the fluid introducing passage is throttled or closed by a bobbin provided at a coil end at a position biased to the compressing mechanism side with respect to the fluid introducing passage.

[0014] A clearance extending along the axial direction of the drive shaft may formed between the housing and the stator core at a position different from the fluid introducing passage, and the restraining mechanism configured to restrain a flow of the compressed fluid may be provided at a portion of the clearance.

[0015] In this configuration, since the clearance extending along the axial direction of the drive shaft is formed between the housing and the stator core at a position different from the fluid introducing passage in a circumferential direction of the stator core, a deviation of stress distribution (concentration of the stress to a specific position on the housing) generated in the housing may be alleviated when assembling the stator core to the housing by press-fitting thereto. Since the restraining mechanism configured to restrain a flow of the compressed fluid is provided in the clearance, a flow of the compressed fluid taken therein can be flowed into the gaps between the coils and the gap between the rotor and the stator positively by restraining a flow of the compressed fluid to the clearance so that cooling of the rotor and the stator can be accelerated.

[0016] Here, in the case where an inverter storage space that houses an inverter board which controls driving of the electric motor is provided integrally with the electric compressor, the inverter storage space may be provided at an axial end portion of the housing on a side opposite to a side where the compressing mechanism is provided, or provided along an outer peripheral wall of the housing.

[0017] In the former configuration, the compressed fluid flowed from the intake port flows also to the axial end portion on the side opposite to the side where the compressing mechanism is provided via the fluid introducing passage, even when the inverter is provided at the axial end portion on the side opposite to the compressing mechanism, the inverter can be cooled efficiently. In particular, by employing a configuration in which the restraining mechanism configured to restrain the flow of the compressed fluid flowing in the fluid introducing passage from the intake port to the compressing mechanism side, most part or all of the compressed fluid flowed in from the intake port is introduced to a side opposite to the compressing mechanism side, whereby the cooling of the inverter board can further be accelerated.

[0018] In the latter configuration, since the compressed fluid flowed in from the intake port flows into or is filled in the fluid introducing passage and the clearance in the axial direction along the outer peripheral wall of the hosing, even though the inverter is provided on the outer peripheral wall of the housing, the inverter can be cooled efficiently. In particular, with the configuration in which the inverter storage space is provided radially outside of the fluid introducing passage along the fluid introducing passage, the inverter can be cooled by refrigerant immediately after flowing into the fluid introducing passage from the intake port.

[0019] A passage cross section of the fluid introducing passage may be formed to be larger than the passage cross section of the clearance. In order to alleviate a deviation of stress distribution generated in the housing when the stator core is assembled, the clearance needs only to have a small gap. However, since the fluid introducing passage constitutes the inflow route of the compressed fluid, an increase in resistance in the passage therein can be avoided by securing a large surface area. And, by reducing the passage cross section of the clearance (by securing a slight amount of clearance), a reduction in size of the compressor is also achieved.

Advantageous Effects of Invention

[0020] As described above, according to the present invention, since the fluid introducing passage extended along the axial direction of the drive shaft is formed between the housing and the stator core, and the intake port configured to introduce the compressed fluid is provided at the position of the housing facing the outer peripheral surface of the stator core and is connected to the fluid introducing passage, the axial dimension of the housing can be reduced. A reduction in size of the electric compressor is also possible.

[0021] Furthermore, by a configuration in which a restraining mechanism configured to restrain a flow of the compressed fluid flowing in the fluid introducing passage from the intake port toward the compressing mechanism side is provided between the intake port and the compressing mechanism in the axial direction of the drive shaft, the compressed fluid flowing in from the intake port can be flowed to the compressing mechanism side through gaps between the coils of the stator and a gap between the stator and the rotor after having been flowed once to a side opposite to the compressing mechanism. The cooling of the stator can be accelerated.

[0022] Here, by a configuration in which the clearance is formed between the housing and the stator core at a position different from the fluid introducing passage so as to extend along the axial direction of the drive shaft, and the restraining mechanism configured to restrain the flow of the compressed fluid is provided at a portion of the clearance, the deviation of stress distribution generated in the housing when the stator core is assembled can be alleviated, and even though the clearance is provided, the compressed fluid taken from the intake port is allowed to flow in the gaps between the coils and in the gap between the rotor and the stator by restraining the flow of the compressed fluid thereto and therefrom, so that the cooling of the rotor and the stator can be accelerated.

[0023] Also, in the configuration as described above, even in the case where the inverter storage space that houses the inverter board in which driving of the electric motor is controlled is provided at the axial end portion of the housing on the side opposite to the side where the compressor is provided, or provided along an outer peripheral wall of the housing, the inverter can be cooled efficiently.

[0024] By forming the passage cross section of the fluid introducing passage to be larger than the passage cross section of the clearance, an increase in resistance in the fluid introducing passage can be avoided while facilitating the assembly at the time of press-fitting the stator core and, by reducing the passage cross section of the clearance, a radial dimension of the housing can be reduced and hence a reduction in size of the electric compressor can be realized.

Brief Description of Drawings

[0025]

[Fig. 1] Fig. 1 is a cross-sectional view illustrating a configuration example of an electric compressor according to the present invention, and illustrating a configuration example in which an inverter storage space that houses an inverter board is provided at an axial end portion on a side opposite to a side where a compressing mechanism of a housing is provided.

[Fig. 2] Fig. 2 is a cross-sectional view of the electric compressor in Fig. 1 taken along a portion of an intake port (A-A line).

[Fig. 3] Fig. 3 is a perspective view partly in cross section illustrating a motor storage portion side of the electric compressor according to the present invention.

[Fig. 4] Fig. 4 is a drawing illustrating an example of a restraining mechanism, in which Fig. 4(a) is a cross-sectional view showing a configuration in which a compressing mechanism side opening edge of a fluid introducing passage is throttled or closed by part of the housing (configuration in which an opening end of the fluid introducing passage is throttled or closed by bringing an end surface of the compressing mechanism side of a stator into proximity to or abutment against the housing), Fig. 4 (b) is a cross-sectional view illustrating a configuration in which the cross section of the passage is throttled or closed at a portion of the fluid introducing passage on the compressing mechanism side with respect to the intake port, and Fig. 4C is a cross-sectional view illustrating a configuration in which a downstream side of the fluid introducing passage is throttled or closed by bringing a bobbin provided at a coil end into proximity to or abutment against an inner wall of the housing on the compressing mechanism side with respect to the fluid introducing passage.

[Fig. 5] Fig. 5 is a drawing illustrating an example in which the restraining mechanism (a projecting ridge projecting from the housing) configured to restrain the flow of the compressed fluid is provided in part of the clearance formed between the housing and a stator core.

[Fig. 6] Fig. 6 is a cross-sectional view illustrating a configuration example of the electric compressor according to the present invention, and illustrating a configuration example in which the inverter storage space that houses an inverter board is provided along an outer peripheral wall of the housing.

Description of Embodiments

[0026] Referring now to the drawings, a configuration example of an electric compressor of the present invention will be described.

[0027] In Fig. 1 to Fig. 3, an electric compressor 1 suitable for a freezing cycle using refrigerant as working fluid is illustrated. The electric compressor 1 is provided with a compressing mechanism 3 in a housing 2 formed of aluminum alloy on the rightward in the drawing, and an electric motor 4 configured to drive the compressing mechanism on the left side in the drawing. In Fig. 1, the left side in the drawing is defined as the front of the compressor, and the right side in the drawing is defined as the rear side of the compressor.

[0028] The housing 2 includes a compressing mechanism storage housing member 2a that houses the compressing mechanism 3, an electric motor storage housing member 2b that houses the electric motor 4 configured to drive the compressing mechanism 3, and an inverter storage housing member 2c that houses the board, which is not illustrated, including a drive circuit having a control circuit configured to control the driving of the electric motor 4 and an inverter integrated with each other mounted thereon fastened in the axial direction with fastening bolts 5.

[0029] A partitioning wall 8 including an axially supporting portion 8a formed integrally therewith is provided on a side of the electric motor storage housing member 2b facing the compressing mechanism storage housing member 2a, a partitioning wall 9 including an axially supporting portion 9a formed integrally therewith is provided on a side of the inverter storage housing member 2c facing the electric motor storage housing member 2b, and a drive shaft 10 is rotatably supported by the axially supporting portions 8a, 9a of the partitioning walls 8, 9 via bearings 11 and 12. With the partitioning walls 8, 9 formed on the electric motor storage housing member 2b and the inverter storage housing member 2c, an interior of the housing 2 is divided into a compressing mechanism storage space (not illustrated) that houses the compressing mechanism 3, an electric motor storage space 12a that houses the electric motor 4, and an inverter storage space 12b that houses an inverter circuit board from the rear.

[0030] In this example, the inverter storage space 12b is defined by closing an opening end of the inverter storage housing member 2c with a lid member 7.

[0031] The compressing mechanism 3 itself is a known scroll type having a fixed scroll member and a turning scroll member arranged so as to oppose thereto, for example, includes the fixed scroll member having a disc-shaped end plate fixed to the housing, a cylindrical outer peripheral wall provided over an entire circumference along an outer edge of the end plate and extending upright toward the front, the fixed scroll member including a spiral-shaped spiral wall extending from the end plate toward the front inside the outer peripheral wall, and the turning scroll member having a disc-shaped end plate, a spiral-shaped spiral wall extending upright toward the rear from the end plate, an eccentric shaft provided at a rear end portion of the drive shaft connected to a boss portion formed on a back surface of the end plate, and the turning scroll member being supported about an axial center of the drive shaft so as to be capable of making an orbital motion, and includes a compression chamber with a space surrounded by the end plate and the spiral wall of the fixed scroll member, and the end plate and the spiral wall of the turning scroll member by engaging the spiral walls of the fixed scroll member and the turning scroll member with each other.

[0032] A refrigerant inflow port configured to suck the refrigerant introduced from the intake port, which will be described later, via the electric motor storage space 12a is formed between the outer peripheral wall of the fixed scroll member and an outermost peripheral portion of the spiral wall of the turning scroll member, and a discharge port configured to discharge refrigerant gas compressed in the compression chamber is formed at a substantially center of the end plate of the fixed scroll member.

[0033] Therefore, a rotor 22 rotates and hence the drive shaft 10 rotates, the turning scroll member makes an orbital motion about the axial center of the drive shaft 10, the compression chamber is moved from an outer peripheral side of the spiral wall of the both scroll members toward the center while gradually reducing the volumetric capacity, the refrigerant gas is compressed and the compressed refrigerant gas is discharged via the discharge port formed in the end plate of the fixed scroll member.

[0034] In contrast, the electric motor storage space 12a formed in a portion in the housing 2 on the front side of the partitioning wall 8 houses a stator 21 and the rotor 22 which constitute the electric motor 4. The stator 21 includes a cylindrical stator core 24 and coils 25 wound therearound (indicated by broken lines in Fig. 2), and is fixed to an inner surface of the housing 2 (the electric motor storage housing member 2b). The rotor 22 that houses a magnet is fixedly mounted on the drive shaft 10 inside the stator 21. The rotor 22 is rotated by a rotational magnetic force generated by the stator 21, and rotates the drive shaft 10. Reference numeral 28 denotes a bobbin mounted at an axial end portion (coil end) of the coils 25.

[0035] An intake port 30 configured to intake the refrigerant gas is formed on a side surface of the housing 2 facing the electric motor storage space 12a (the electric motor storage housing member 2b), so that the refrigerant (compressed fluid) is flowed into the electric motor storage space 12a via the intake port 30 and is introduced into the compressing mechanism through the electric motor storage space 12a.

[0036] The stator core 24 is fixed to the housing 2 by being press-fitted thereto, and is fixedly positioned in the axial direction with the end surface thereof being abutted against a stepped portion 26 formed on the housing. A fluid introducing passage 31 extending along the axial direction of the drive shaft 10 is formed between the housing 2 (the electric motor storage housing member 2b) and the stator 21 (the stator core 24). The fluid introducing passage 31 extends over the entire axial length of the rotor 22, and has an inner peripheral wall of the housing 2 depressed to define a passage with respect to the stator core 24.

[0037] Then, the intake port 30 configured to introduce the compressed fluid is provided at a position of the housing 2 (the electric motor storage housing member 2b) facing an outer peripheral surface of the stator core 24 and is connected to the fluid introducing passage 31. In this example, the intake port 30 extends in the radial direction of the stator 21, and more specifically, extends toward right upward of the stator, and is connected to the fluid introducing passage 31 in the vertical direction. In this example, the fluid introducing passage 31 is formed on a portion of the housing facing the outer peripheral surface of the stator core 24 biased to the compressing mechanism (in the vicinity of the end surface of the stator core 24 on the compressing mechanism side).

[0038] In addition, clearances 41 extending along an axial direction of the drive shaft are formed between the housing and the stator core at a position different from the fluid introducing passage 31 in the circumferential direction. A plurality of the clearances 41 (five, for example) are formed in the circumferential direction substantially equidistantly, and in this example, the inner peripheral wall of the housing is depressed to define gaps with respect to the stator core 24.

[0039] Grooves 42 formed on the outer peripheral surface of the stator core 24 by being depressed therefrom so as to extend in the axial direction for allowing the fastening bolts 5 to pass therethrough are formed in a portion provided with the fluid introducing passage 31 and portions where the respective clearances 41 are formed.

[0040] The stepped portion 26 formed on an inner wall of the housing for axially positioning the stator core is formed over the substantially entire circumference and, as illustrated in Fig. 4(a), a compressing mechanism side opening edge of the fluid introducing passage 31 is closed by the stepped portion 26. With the stepped portion 26, a first restraining mechanism configured to restrain a flow of refrigerant flowing in the fluid introducing passage 31 from the intake port 30 toward the compression mechanism is formed between the intake port 30 and the compressing mechanism 3 in the axial direction of the drive shaft.

[0041] The clearance 41 is provided with a second restraining mechanism that restrains the flow of the compressed fluid flowing therethrough. The second restraining mechanism is configured, for example, by providing a projecting ridge 43 projecting toward the stator core on the inner surface of the housing and bringing the projecting ridge 43 into proximity to the stator core 24 or bringing the projecting ridge 43 into abutment with the stator core 24 as illustrated in Fig. 5. The portion where the projecting ridge 43 is provided in the clearance 41 may be a portion biased toward the compressing mechanism, a portion biases toward an inverter apparatus, or a substantially center portion.

[0042] In this example, the passage cross section of the fluid introducing passage 31 is set to be larger than the passage cross section of each of the clearances 41.

[0043] Therefore, in the interior of the housing 2, spaces in the front and the rear of the stator 21 are communicated with each other via gaps between the stator core 24 and the rotor 22 and gaps between the coils 25 wound around the stator core 24, and the fluid introducing passage 31 formed between the stator 21 and the housing 2 (the electric motor storage housing member 2b), the spaces in the front and the rear of the stator 21, and gaps between the coils and between the stator 21 and the rotor 22 define an intake route for guiding the refrigerant flowing in from the intake port 30 to the compressing mechanism 3 in the electric motor storage space 12a that houses the electric motor 4.

[0044] In the configuration described above, the refrigerant flowing into the electric motor storage space 12a via the intake port 30 enters the fluid introducing passage 31. However, since the end portion of the fluid introducing passage 31 on the compressing mechanism side is closed by the stepped portion 26 of the housing 2 (since the first restraining mechanism configured to restrain the flow of the refrigerant flowing in the fluid introducing passage 31 from the intake port 30 to the compressing mechanism side is provided), the refrigerant flowed therein flows from the intake port 30 toward the inverter (the side opposite to the compressing mechanism side), and is introduced to a space between the stator 21 and the partitioning wall 9 (a space in the front of the stator 21). Subsequently, the refrigerant flows along the inverter storage space 12b (along the partitioning wall 9) and moves through the clearance between the coils and the gap between the stator 21 and the rotor 22, and is introduced from the refrigerant inflow port, which is not illustrated, of the compressing mechanism into the compressing mechanism.

[0045] Therefore, even in the case where the intake port 30 is provided at a portion facing an outer peripheral surface of the stator core 24, the refrigerant may be introduced to the compressing mechanism 3 reliably through between the coils and the gap between the stator 21 and the rotor 22, and hence the stator 21 can be cooled effectively. In addition, since the intake port 30 does not have to be provided on the outer periphery of the housing between the stator 21 and the partitioning wall 9 for cooling the inverter, an axial dimension therebetween may be reduced, and hence a reduction in size of the electric compressor 1 is achieved.

[0046] Also, with the provision of the clearances 41, when the stator core 24 is assembled to the housing 2 by press-fitting thereto, the deviation of stress distribution generated in the housing 2 can be alleviated, and even when the clearances 41 are provided, since the flow of the refrigerant to the clearances 41 is restrained by the second restraining mechanisms (the projecting ridges 43), the refrigerant introduced between the stator core 24 and the partitioning wall 9 is introduced to the gaps between the coils or the gap between the stator 21 and the rotor 22, and hence impairment of cooling of the stator 21 is avoided.

[0047] In the configuration example described above, an example in which the first restraining mechanism is configured by bringing the end surface on the compressing mechanism side of the stator core 24 into abutment with the stepped portion 26 of the housing 2, and closing a compressor side opening end of a refrigerant introducing passage 31 with the stepped portion 26 has been described. However, the compressor side opening end of the refrigerant introducing passage 31 does not necessarily have to be closed, and the first restraining mechanism may be configured by generating a state of resisting the flow of the refrigerant by bringing the stepped portion 26 into proximity to the compressor side opening end of the refrigerant introducing passage 31.

[0048] Also, for example, the first restraining mechanism may be configured by providing a projecting ridge 27 projecting from the inner wall of the housing 2 inward is provided to throttle or close the cross section of the passage at a portion of the fluid introducing passage 31 on the compressing mechanism side with respect to the intake port 30 as illustrated in Fig. 4(b), or may be configured by throttling or closing the downstream side of the fluid introducing passage 31 by bringing a bobbin 28, which is provided at a coil end on the compressing mechanism side with respect to the fluid introducing passage 31 as illustrated in Fig. 4(c), into proximity to or into abutment with the inner wall of the housing.

[0049] Furthermore, as regards the second restraining mechanism, configurations of Figs. 4(a) to 4(c) in the same manner as the first restraining mechanism may be used instead of the projecting ridge 43 projecting from the inner surface of the housing.

[0050] Also, in the configuration as described above, an example in which the inverter storage space 12b is provided at the axial end portion of the housing 2 on the side opposite to the side where the compressing mechanism 3 is provided has been described. However, as illustrated in Fig. 6, the inverter storage space 12b that houses the inverter board configured to control driving of the electric motor 4 may be provided along an outer peripheral wall of the housing 2. In this example, the inverter storage space 12b is provided along the passage on the radial outside of the fluid introducing passage 31 (in the drawing, right above the fluid introducing passage 31).

[0051] In this configuration as well, the inverter can be cooled by the refrigerant flowing in the electric motor storage space 12a that houses the electric motor 4 (in particular, by the refrigerant flowing in the fluid introducing passage 31 between the housing 2 and the stator core 24).

Reference Signs List

[0052]

1	electric compressor
2	housing
2b	electric motor storage housing member
3	compressing mechanism
4	electric motor
12a	electric motor storage space
12b	inverter storage space
21	stator
22	rotor
24	stator core
25	coil
26	stepped portion
30	intake port
31	fluid introducing passage
41	clearance

Claims

1. An electric compressor (1) comprising: a compressing mechanism (3) and an electric motor (4) configured to drive the compressing mechanism (3) in a housing (2), wherein the electric motor (4) includes: a stator (21) formed by winding coils (25) on a stator core (24) fixed in the housing (2) ; and a rotor (22) fixedly mounted on a drive shaft (10) and rotatably arranged inside the stator (21), so that compressed fluid is introduced to the compressing mechanism (3) through an electric motor storage space (12a) that houses the electric motor (4),
characterized in that a fluid introducing passage (31) extending along an axial direction of the drive shaft (10) between the housing (2) and the stator core (24) is formed, and
an intake port (30) configured to introduce the compressed fluid is provided at a position of the housing (2) facing an outer peripheral surface of the stator core (24) and is connected to the fluid introducing passage (31).

2. The electric compressor (1) according to Claim 1, **characterized in that** a restraining mechanism (26) configured to restrain a flow of the compressed fluid flowing in the fluid introducing passage (31) from the intake port (30) toward a compressing mechanism side is provided between the intake port (30) and the compressing mechanism (3) in the axial direction of the drive shaft (10).

3. The electric compressor (1) according to Claim 1 or 2, **characterized in that** a clearance (41) extending along an axial direction of the drive shaft (10) is formed between the housing (2) and the stator core (24) at a position different from the fluid introducing passage (31), and
a restraining mechanism (26) configured to restrain the flow of the compressed fluid is provided in part of the clearance (41).

4. The electric compressor (1) according to any one of Claims 1 to 3, **characterized in that** an inverter storage space (12b) that houses an inverter board configured to control driving of the electric motor (4) is

provided in the housing (2) at an axial end portion on a side opposite to a side where the compressing mechanism (3) is provided.

5. The electric compressor (1) according to any one of Claims 1 to 3, **characterized in that** an inverter storage space (12b) that houses an inverter board configured to control driving of the electric motor (4) is provided in the housing (2) along an outer peripheral wall.

6. The electric compressor (1) according to any one of Claim 1 to 5, **characterized in that** a passage cross section of the fluid introducing passage (31) is larger than the passage cross section of the clearance (41).

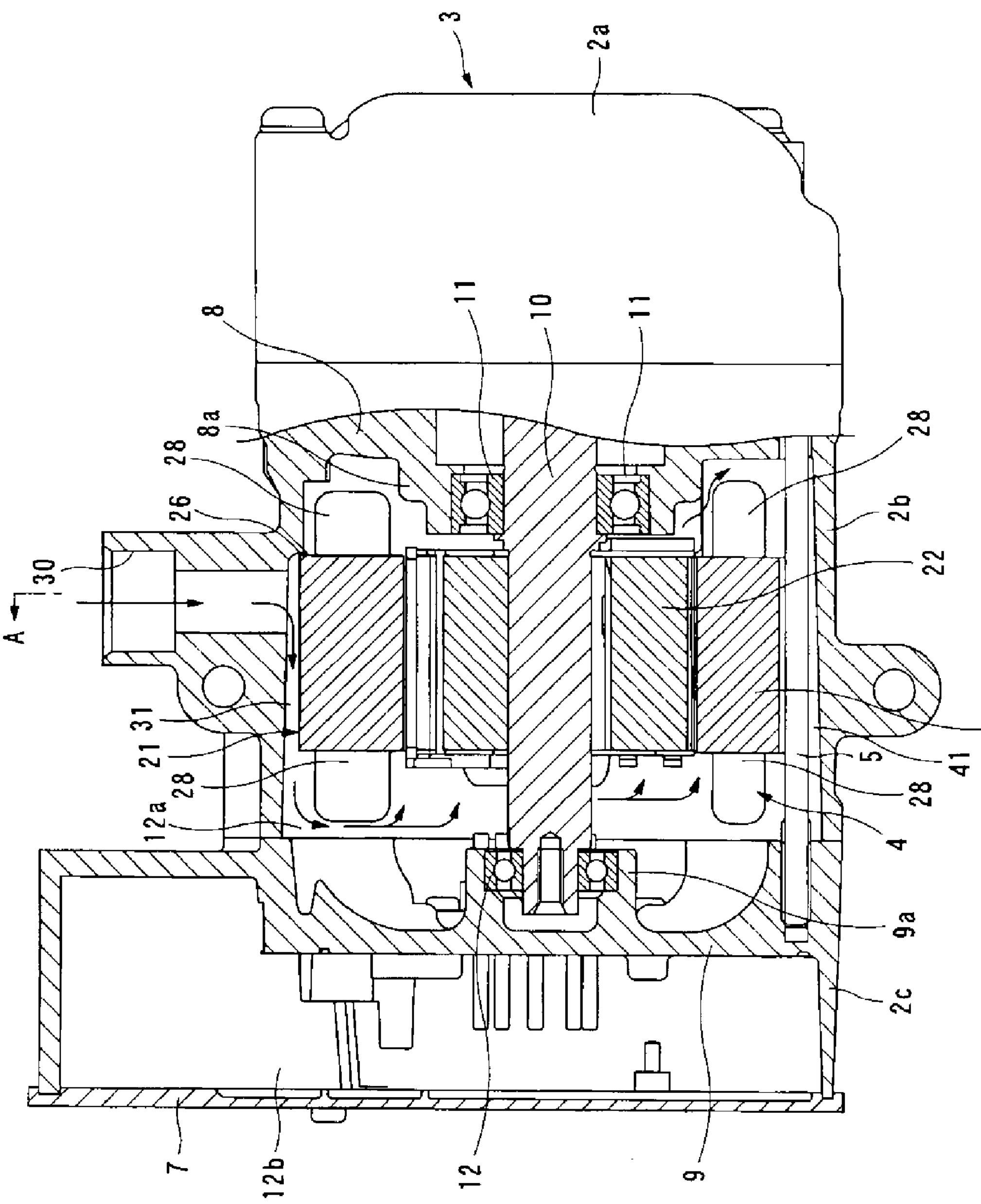
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Fig.1

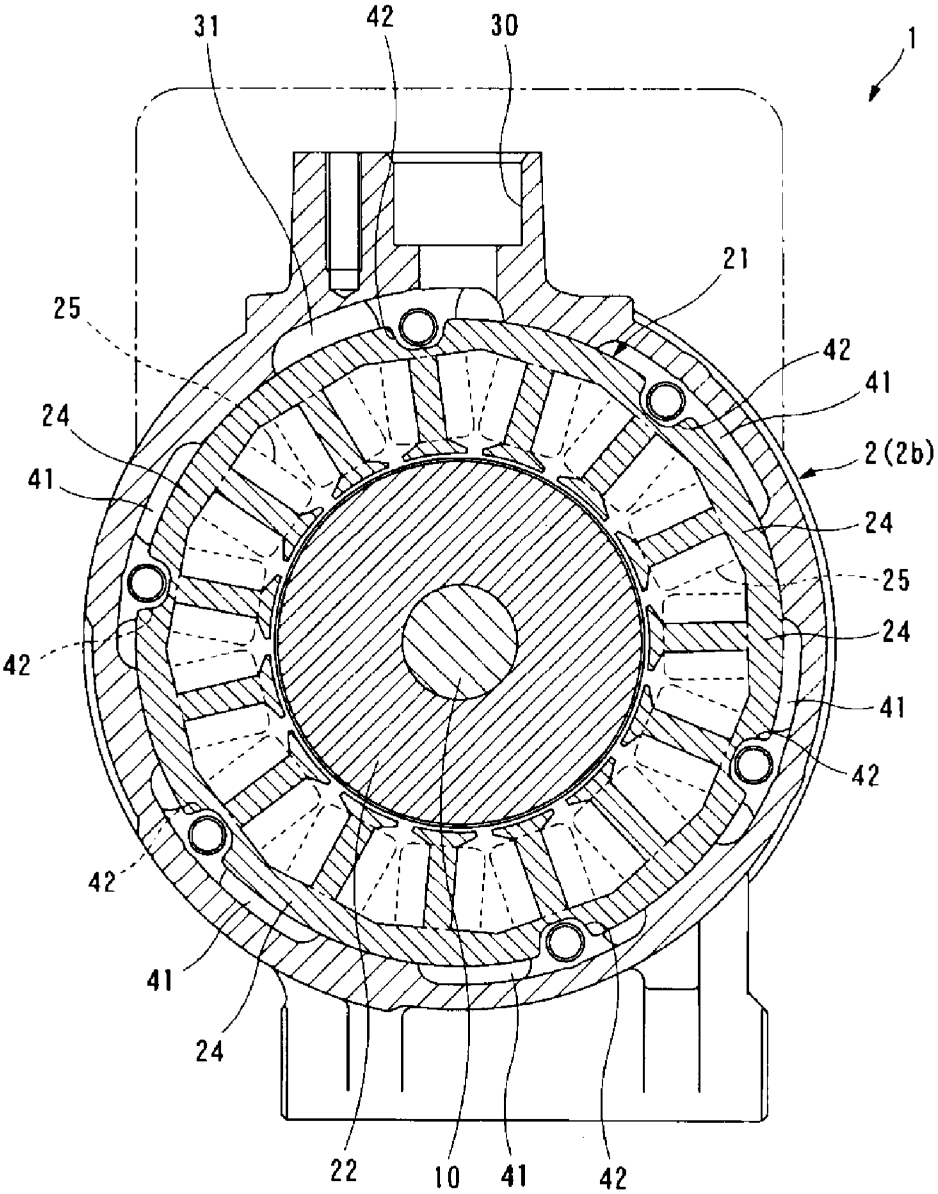

Fig.2

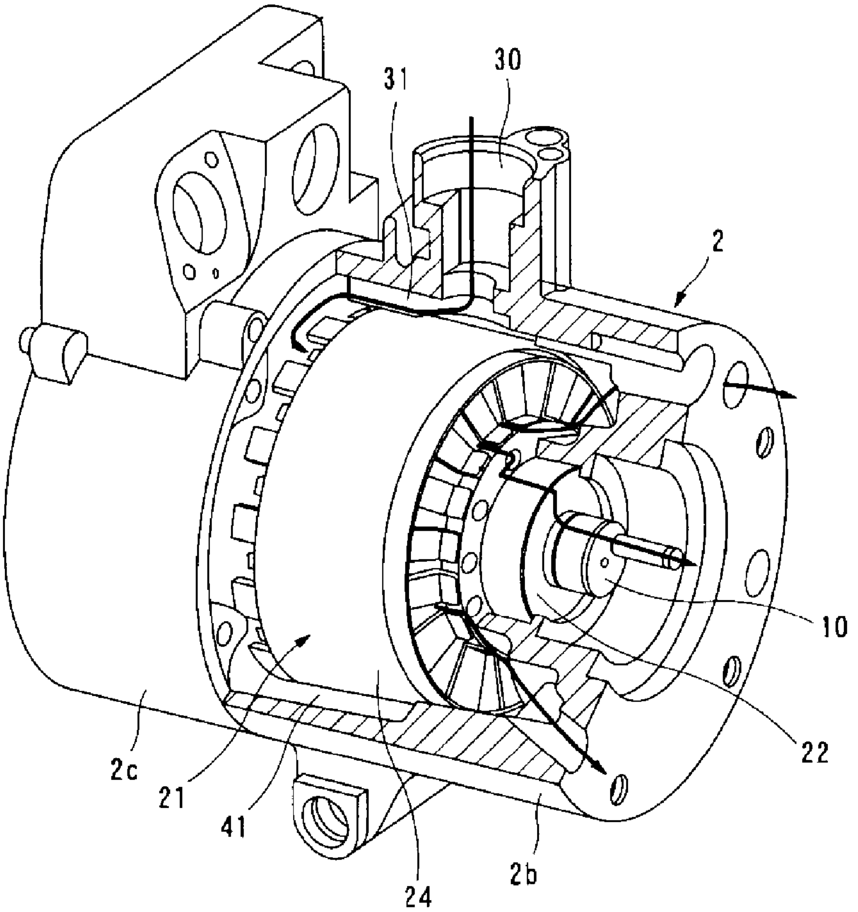

Fig.3

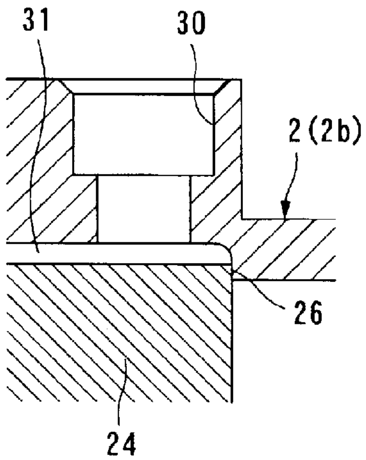

Fig.4A

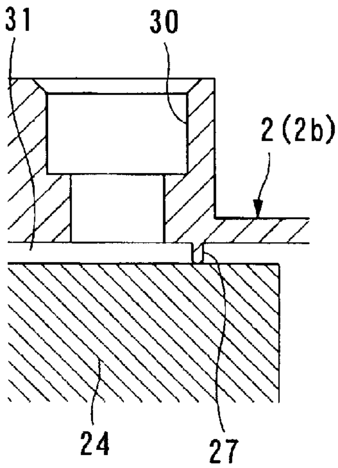

Fig.4B

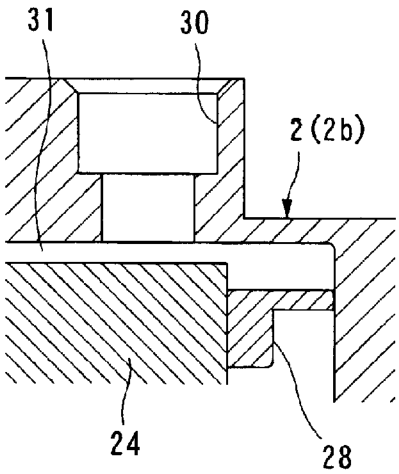

Fig.4C

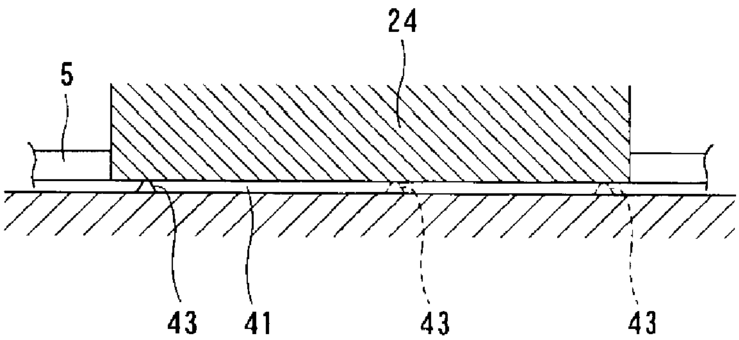

Fig.5

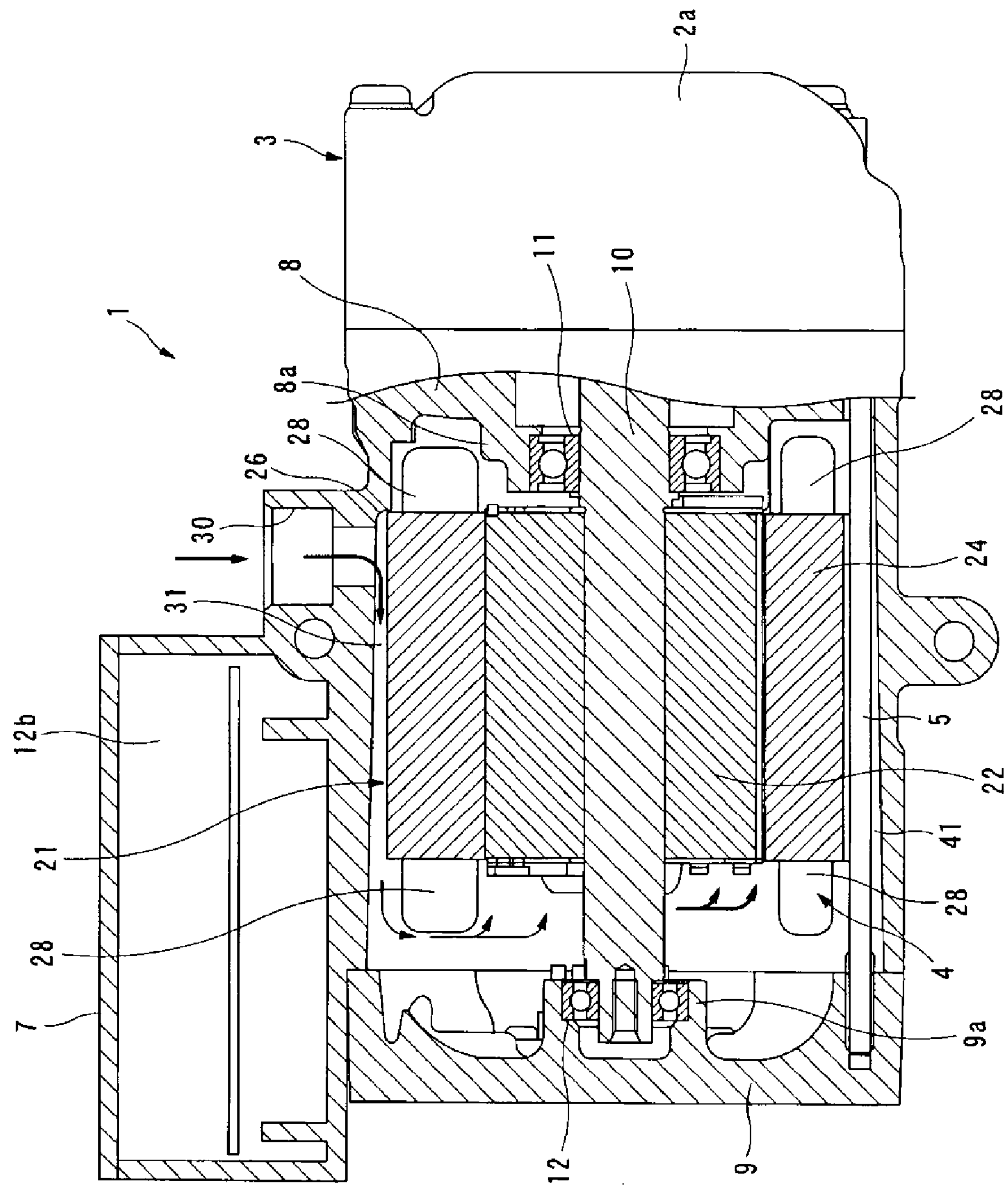

Fig.6

INTERNATIONAL SEARCH REPORT

International application No. PCT/JP2013/062532

A. CLASSIFICATION OF SUBJECT MATTER
F04B39/12(2006.01)i, *F04B39/00*(2006.01)i, *F04B39/06*(2006.01)i, *F04C29/04*(2006.01)i

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)
F04B39/12, F04B39/00, F04B39/06, F04C29/04

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

Jitsuyo Shinan Koho	1922-1996	Jitsuyo Shinan Toroku Koho	1996-2013
Kokai Jitsuyo Shinan Koho	1971-2013	Toroku Jitsuyo Shinan Koho	1994-2013

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 A	JP 9-112474 A (Daikin Industries, Ltd.), 02 May 1997 (02.05.1997), paragraphs [0024] to [0033]; fig. 1 to 4 & US 6042346 A & EP 798465 A1 & WO 1997/014891 A1 & CN 1174594 A	1,2 4,5 3,6
Y	JP 2004-293445 A (Mitsubishi Heavy Industries, Ltd.), 21 October 2004 (21.10.2004), fig. 7, 8, 11, 12 (Family: none)	4,5
A	JP 2012-90412 A (Denso Corp.), 10 May 2012 (10.05.2012), entire text; all drawings (Family: none)	1-6

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

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"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
04 July, 2013 (04.07.13)	16 July, 2013 (16.07.13)
Name and mailing address of the ISA/ Japanese Patent Office Facsimile No.	Authorized officer Telephone No.

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2013/062532

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 4-86387 A (Daikin Industries, Ltd.), 18 March 1992 (18.03.1992), entire text; all drawings (Family: none)	1-6
A	JP 9-177688 A (Daikin Industries, Ltd.), 11 July 1997 (11.07.1997), entire text; all drawings (Family: none)	1-6

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REFERENCES CITED IN THE DESCRIPTION

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- JP 2000291557 A **[0003] [0005]**
- JP 2005291004 A **[0003] [0005]**
- JP 2008184995 A **[0004] [0005]**