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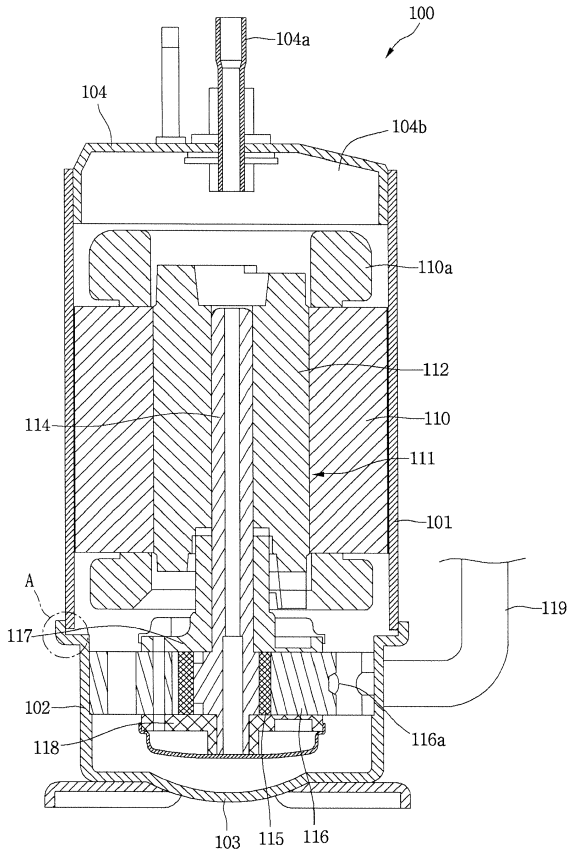
(54) ROTARY COMPRESSOR AND METHOD FOR MANUFACTURING A ROTARY COMPRESSOR

(57) A rotary compressor and a method for manufacturing a rotary compressor are provided. The rotary compressor may include a first case in which a stator may be provided, and a second case provided at one side of the first case and to which a compression mechanism may be coupled. The second case may include a first extension to which the compression mechanism may be welded, a step that extends to be stepped from the first extension, and a second extension that extends from the step. The second extension may be welded to the first case.

FIG. 4



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Description

BACKGROUND

1. Field

[0001] A rotary compressor and a method for manufacturing a rotary compressor are disclosed herein.

2. Background

[0002] In general, compressors are machines that receive power from a power generation device, such as an electric motor or a turbine, to compress air, a refrigerant, or various working gases, thereby to increase a pressure thereof. Compressors are being widely used in home appliances, such as refrigerators or air conditioners, or in various industrial fields.

[0003] Compressors may be largely classified into reciprocating compressors, in which a compression space, into/from which a working gas, such as a refrigerant, is suctioned and discharged, is defined between a piston and a cylinder to allow the piston to be linearly reciprocated into the cylinder, thereby compressing the refrigerant, rotary compressors, in which a compression space, into/from which a working gas, such as a refrigerant, is suctioned and discharged, is defined between a roller that eccentrically rotates and a cylinder to allow the roller to eccentrically rotate along an inner wall of the cylinder, thereby compressing the refrigerant, and scroll compressors, in which a compression space, into/from which a working gas, such as a refrigerant, is suctioned and discharged, is defined between an orbiting scroll and a fixed scroll to compress the refrigerant while the orbiting scroll rotates along the fixed scroll.

[0004] Figs. 1 to 3 are views of a rotary compressor according to a related art. Referring to Figs. 1 and 2, a rotary compressor 1 according to the related art includes a case 2a that defines an inner space, a lower cover 2b coupled to a lower portion of the case 2a, and an upper cover 2c coupled to an upper portion of the case 2a. The case 2a may extend upward lengthwise from the lower cover 2b to the upper cover 2c and have a cylindrical shape.

[0005] The case 2a, the lower cover 2b, and the upper cover 2c are assembled with each other to define a sealed space in the compressor 1. The lower cover 2b and the upper cover 2c may be coupled by being welded along an inner circumferential surface of the case 2a.

[0006] A stator 3 that generates magnetic force by applied power and a compression mechanism 4 that compresses a refrigerant by induced electromotive force which is generated through an interaction with the stator 3 are provided in the case 1 a. The compression mechanism 4 includes a rotor 5 rotatably provided in the stator 3. The stator 3 and the rotor 5 may be components of a compression motor. The compression mechanism 4 further includes a rotational shaft 6 coupled to the rotor 5 to rotate according to rotation of the rotor 5.

[0007] The compression mechanism 4 further includes a roller 7 eccentrically coupled to a lower portion of the rotational shaft 6 to rotate along a predetermined eccentric trajectory according to the rotation of the rotational shaft 6, a cylinder 8 in which the roller 7 is accommodated, and a main bearing 9 and a sub bearing 10, which are provided on upper and lower portions of the cylinder 8 to support the cylinder 8. Each of the main bearing 9 and the sub bearing 10 has an approximately disc shape. The main bearing 9 and the sub bearing 10 may support the upper and lower portions of the cylinder 8, respectively.

[0008] The compressor 1 may further include a suction part or portion 11 a that guides suction of the refrigerant into the cylinder 6 and a discharge part or portion 11b that discharges the refrigerant compressed in the compressor 1. The discharge portion 11 b may be coupled to the upper cover 2c.

[0009] The compressor 1 further includes a suction pipe 12 coupled to one side of the suction portion 11 a of the cylinder 8. The suction pipe 12 may be understood as a pipe that guides the refrigerant discharged from a gas/liquid separator (not shown) into the compressor 1. The suction pipe 12 may be press-fitted into the case 2a to communicate with the suction portion 11 a.

[0010] An effect due to the above-described components will be described hereinafter. When the rotational shaft 6 rotates, the roller 7 may rotate and revolve along an inner circumferential surface of the cylinder 8 while drawing a predetermined eccentric trajectory. The refrigerant may be introduced into a suction chamber of the cylinder 8 through the suction portion 11 a. Then, the refrigerant may be compressed in a compression chamber while the roller 7 rotates. The compressed refrigerant may be discharged outside of the compressor 1 through the discharge portion 11b.

[0011] A method for manufacturing the compressor 1 will be described hereinafter.

[0012] The case 2a may be heated, and the stator 3 may be press-fitted into the case 2a. The compression mechanism 4 may be inserted into the case 2a and then coupled to the case 2a through welding. After the stator 3 and the compression mechanism 4 are assembled within the case 2a, the suction pipe 12 may be coupled to the one side of the suction portion 11 a, and the lower cover 2b and the upper cover 2c may be welded to the case 2a.

[0013] In the method for manufacturing the compressor according to the related art, when the lower cover 2b is welded to the case 2a, the compression mechanism 4 which is disposed adjacent to the lower cover 2b may be thermally deformed. Also, when the suction pipe 12 is press-fitted to the one side of the suction portion 11 a of the cylinder 8, a predetermined press-fit force may be applied to the compression mechanism 4. As a result, misalignment between the stator 3 and the rotor 5 may occur by the thermal deformation or the press-fit force of the compression mechanism 4.

[0014] A predetermined gap, that is, an air gap, defined between the stator 3 and the rotor 5 may be non-uniform (increase or decrease) to increase noise due to the motor (stator 3 and rotor 5). That is, as illustrated in Fig. 3, a non-uniform air gap g1 may be defined between an inner circumferential surface $\ell 1$ of the stator 3 and an outer circumferential surface $\ell 2$ of the rotor 5, causing noise.

[0015] Also, in a case of the compressor 1 according to the related art, as the cylindrical case 2a extending lengthwise from the upper portion to the lower portion of the compressor is used, if assembly of components of the compressor 1 within the case 2a is completed, it may be impossible to change an assembled state of the compressor

1 again even though the air gap g1 between the stator 3 and the rotor 5 is non-uniform. In addition, an outer diameter of the stator 3 has to be the same as an inner diameter of the compression mechanism 4. Thus, the compression mechanism 4 may be restricted in design.

BRIEF DESCRIPTION OF THE DRAWINGS

[0016] Embodiments will be described in detail with reference to the following drawings in which like reference numerals refer to like elements, and wherein:

Fig. 1 is a cross-sectional view of a rotary compressor according to a related art;
Fig. 2 is a view of a compression mechanism of the rotary compressor of Fig. 1;
Fig. 3 is a view illustrating a state in which a non-uniform air gap g1 occurs in the rotary compressor of Fig. 1;
Fig. 4 is a cross-sectional view of a rotary compressor according to an embodiment;
Fig. 5 is an enlarged view illustrating a portion A of Fig. 4;
Figs. 6 to 9 are views illustrating a process of manufacturing a rotary compressor according to an embodiment;
Fig. 10 is a flowchart illustrating a method for manufacturing a rotary compressor according to an embodiment;
Fig. 11 is a cross-sectional view of a rotary compressor according to another embodiment; and
Fig. 12 is a cross-sectional view of a rotary compressor according to still another embodiment.

DETAILED DESCRIPTION

[0017] Hereinafter, embodiments will be described with reference to the accompanying drawings. The embodiments may, however, be embodied in many different forms and should not be construed as being limited to the embodiments set forth herein; rather, alternate embodiments falling within the spirit and scope will fully convey the concept to those skilled in the art.

[0018] Fig. 4 is a cross-sectional view of a rotary compressor according to an embodiment. Fig. 5 is an enlarged view illustrating a portion A of Fig. 4.

[0019] Referring to Fig. 4, a rotary compressor 100 (hereinafter, referred to as a "compressor") according to an embodiment may include a case 101 and 102, in which components of the compressor 100 may be provided, and an upper cover 104 coupled to an upper portion of the case 101 and 102 to define an upper outer appearance of the rotary compressor 100. An outer appearance of the compressor 100 may be defined by the case 101 and 102 and the upper cover 104, and a sealed space may be defined in the compressor 100.

[0020] The case 101 and 102 may include a first case 101, and a second case 102 coupled to a lower portion of the first case 101. Each of the first and second cases 101 and 102 may have a cylindrical shape. The first case 101 may be referred to as an "upper case", and the second case 102 may be referred to as a "lower case". The upper cover 104 may be coupled to an upper portion of the first case 101.

[0021] The compressor 100 may include a stator 110 provided in the first case 101. A coil 110a, to which current may be applied, may be provided in the stator 110, and thus, a magnetic force may be generated by the applied current.

[0022] The compressor 100 may further include a compression mechanism 111 configured to compress a refrigerant using an induced electromotive force generated through an interaction with the stator 110. The compression mechanism 111 may be provided in the second case 102. While the first and second cases 101 and 102 are assembled with each other, at least a portion of the compression mechanism 111 may be provided in the first case 101.

[0023] The compression mechanism 111 may include a rotor 112, which may be rotatably provided in the stator 110. The stator 110 and the rotor 112 may be components of a compression motor. The compression mechanism 111 may further include a rotational shaft 114 coupled to the rotor 112 to rotate according to rotation of the rotor 112.

[0024] The compression mechanism 111 may further include a roller 115 eccentrically coupled to a lower portion of the rotational shaft 114 to rotate along a predetermined eccentric trajectory according to rotation of the rotational shaft 114, a cylinder 116, in which the roller 115 may be accommodated, and a main bearing 117 and a sub bearing 118, which may be provided on upper and lower portions of the cylinder 116 to support the cylinder 116.

[0025] The cylinder 116 may be provided in the second case 102. Each of the main bearing 117 and the sub bearing 118 may have an approximately disc shape. The main bearing 117 and the sub bearing 118 may support the upper and lower portions of the cylinder 116, respectively. The main bearing 117 may be provided on the

upper portion of the cylinder 116 to disperse a compression force of the refrigerant, which may be generated in the cylinder 116, or a force generated in the compression motor (stator 110 and rotor 112) toward the first and second cases 101 and 102.

[0026] The compressor 100 may further include a suction part or portion 116a that guides suction of the refrigerant into the cylinder 116 and a discharge part or portion 104b that discharges the refrigerant compressed in the compressor mechanism 111. The discharge portion 104a may be provided in the upper cover 104.

[0027] The compressor 100 may further include a suction pipe 119 coupled to one side of the suction portion 116a of the cylinder 116. The suction pipe 119 may be a pipe that guides the refrigerant discharged from a gas/liquid separator (not shown) into the compressor 100. The suction pipe 119 may be press-fitted into the second case 102 to communicate with the suction portion 116a.

[0028] A lower cover 103 that defines an outer appearance of the lower portion of the compressor 100 may be provided on a lower portion of the second case 102. The lower cover 103 may define a bottom surface of the case 101 and 102. For example, the lower cover 103 may be integrated with the second case 102. Thus, deformation of the case due to, for example, welding of the lower cover to the case according to the related art may be prevented.

[0029] Referring to Fig. 5, the second case 102 may include a step 121b, on which a lower portion of the first case 101 may be provided. The second case 102 may include a first extension 121 a that extends upward from the lower cover 103, the step 121b bent from the first extension 121a, and a second extension 121c that extends upward from the step 121 b.

[0030] The step 121b may extend outward from an upper end of the first extension 121a, that is, in a direction in which an inner diameter of the second case 102 increases. An outer circumferential surface of the second case 102 may have a bent shape due to the step 121 b.

[0031] The first case 101 may be placed on the step 121b. A lower end 101a of the first case 101 may be spaced apart from the step 121b. That is, a top surface of the step 121b and the lower end 101a of the first case 101 may be spaced a predetermined distance d1 from each other.

[0032] As the distance d1 is provided, a degree of freedom in assembly of the first and second cases 101 and 102 may be improved, and an air gap between the stator 110 and the rotor 112 may be easily adjusted. If the lower end 101 a of the first case 101 is seated or contacts the step 121b, even though the stator 110 and the rotor 112 are twisted in position while the first and second cases 101 and 102 are assembled with each other, causing a non-uniform air gap, the first and second cases 101 and 102 may interfere with each other, restricting adjustment of the air gap.

[0033] A first welding 125 to couple the first and second cases 101 and 102 to each other may be provided between an outer circumferential surface of the first case 101 and an inner circumferential surface of the second case 102. The first welding 125 may be provided between the lower portion of the first case 101 and the second extension 121c of the second case 102.

[0034] In a state in which the first and second cases 101 and 102 are assembled with each other, a predetermined gap may be defined between the lower portion of the first case 101 and the second extension 121c. Thus, a welding agent may be supplied through the gap to perform a welding process, for example.

[0035] According to the above-described components, the inner diameter of the second case 102, that is, an inner diameter of the first extension 121 a may be less than an inner diameter of the first case 101. In other words, the stator 110 may have an outer diameter greater than an outer diameter of the cylinder 116. Thus, the inner circumferential surface of the first case 101 and the inner circumferential surface of the second case 102 may define surfaces different from each other.

[0036] As described above, when the compressor is designed so that the motor (stator 110 and rotor 112) has a width greater than a width of the compression mechanism 111, the step 121b may increase in extension length to realize a stable coupling of the first and second cases 101 and 102.

[0037] Figs. 6 to 9 are views illustrating a process of manufacturing a rotary compressor according to an embodiment.

[0038] Referring to Fig. 6, stator 110 may be installed in first case 101 having opened upper and lower sides. For example, the stator 110 may be installed by performing a "thermal shrink-fit" process on the first case 101. The first case 101 may be heated to be deformed, and then, the stator 110 may be inserted into an inner space of the first case 101.

[0039] Although the stator 110 has an outer diameter which is slightly greater than the inner diameter of the first case 101, while the stator 110 is inserted, the first case 101 may be deformed so that the inner diameter of the first case 101 is expanded. Also, when the first case 101 is cooled, the stator 110 may be press-fitted into an inner surface of the first case 101 while the first case 101 is shrunk.

[0040] Referring to Figs. 7 and 8, compression mechanism 111 may be installed on second case 102. The compression mechanism 111 may be an assembly of rotor 112, rotational shaft 114, cylinder 116, and upper and lower bearings 117 and 118.

[0041] A hook protrusion 128 may be formed on an inner circumferential surface of the second case 102. The hook protrusion 128 may protrude inward from an inner circumferential surface of first extension 121 a of the second case 102.

[0042] At least a portion of the compression mechanism 111 may be hooked with the hook protrusion 128. For example, a lower portion of the cylinder 116 may be

hooked with the hook protrusion 128. The compression mechanism 111 may be stably installed inside of the second case 102 by the hook protrusion 128.

[0043] A pipe coupling part or portion 131, to which suction pipe 119 may be coupled, may be formed in the second case 102. At least a portion of the second case 102 may be penetrated to form the pipe coupling portion 131. A connection pipe (not shown) may be connected to the pipe coupling portion 131, and the pipe coupling portion 131 may be coupled to the connection pipe.

[0044] A second welding 133 to fix the compression mechanism 111 to the second case 102 may be formed in the second case 102. At least a portion of the first extension 121a of the second case 102 may be penetrated to form the second welding 133. A plurality of the second welding 133 may be provided along a circumference of the first extension 121 a, and the plurality of second weldings 133 may be spaced apart from each other.

[0045] Explaining a process of manufacturing the compressor, the compression mechanism 111 may be assembled with the second case 102, and then, the suction pipe 119 may be coupled to the pipe coupling portion 131. In this state, an object to be welded may be supplied through the second welding 133 and then welded. When the welding is completed, as illustrated in Fig. 8, the second case 102, the compression mechanism 111, and the suction pipe 119 may be fixed.

[0046] Referring to Fig. 9, the first case 101 may be moved downward from an upper side of the second case 102 to assemble the first and second cases 101 and 102 with each other. While the first and second cases 101 and 102 are assembled with each other, the rotor 112 may be inserted into the stator 110. The first case 101 may be moved downward until the lower portion of the first case 101 is disposed inside of the second extension 121c of the second case 102. The lower end 101a of the first case 101 may be disposed at a position which is adjacent to the step 121b of the second case 102, that is, a position spaced upward from the step 121b.

[0047] In this state, the air gap between the stator 110 and the rotor 112 may be adjustable. For example, the first case 101 may be changed in position or centered so that the air gap is uniform. According to the above-described configuration and assembling method, a degree of freedom in assembly of the first and second cases 101 and 102 may be secured. Thus, even though the first case 101 is assembled to be twisted with respect to the second case 102, the first case 101 may be adjustable in position.

[0048] As described above, after the first and second cases 101 and 102 are assembled with each other so that the air gap between the stator 110 and the rotor 112 is uniform, the first welding 125 may be performed. The first and second cases 101 and 102 may be firmly coupled to each other by the welding.

[0049] After the first and second cases 101 and 102 are assembled with each other, the upper cover 104 may be coupled to the upper portion of the first case 101. For example, the lower portion of the upper cover 104 may be inserted into the opened upper portion of the first case 101, and a welding welded to the inner circumferential surface of the first case 101 may be disposed along an outer circumferential surface of the upper cover 104.

[0050] Fig. 10 is a flowchart illustrating a method for manufacturing a rotary compressor according to an embodiment. A method for manufacturing a rotary compressor according to an embodiment will be described with reference to Fig. 10.

[0051] First, a stator, such as stator 110 of Fig. 4, may be installed in a first case, such as first case 101 of Fig. 4, according to an embodiment. The stator may be press-fitted into the first case through a thermal shrink-fit process (S11).

[0052] A compression mechanism, such as compression mechanism 111 of Fig. 4, may be disposed in a second case, such as second case 102 of Fig. 4. The compression mechanism may be inserted into the second case until at least a portion of the compression mechanism is supported by a hook protrusion, such as hook protrusion 128 of Fig. 7. For example, at least a portion of the compression mechanism may include a lower end of a cylinder, such as cylinder 116 of Fig. 4 (S12).

[0053] A suction pipe, such as suction pipe 119 of Fig. 4, may be assembled with a pipe coupling part or portion, such as pipe coupling portion 131 of Fig. 7, of the second case. For example, the suction pipe may be press-fitted into the pipe coupling portion (S13).

[0054] A welding agent may be supplied through a welding, such as second welding 133 of Fig. 7, to perform welding of the compression mechanism and the second case. The compression mechanism may be stably fixed to the second case through the welding (S14).

[0055] The first case may be placed on the second case. The second case may move downward until a lower end of the first case is disposed on at upper portion, which is adjacent to a step, such as step 121 b of Fig. 7 of the second case.

[0056] A lower portion of the second case may be disposed inside of a second extension, such as second extension 121c of Fig. 5, of the second case 102. The lower end of the first case may be spaced upward from the step of the second case. In this state, an air gap between the stator and a rotor, such as rotor 112 of Fig. 4, may be uniformly adjusted.

[0057] According to the above-described method, a degree of freedom in assembly of the first and second cases may be secured (S15).

[0058] The welding of the first and second cases may be performed through a welding, such as first welding 125 of Fig. 5. The second case may be stably fixed to the first case through the welding (S16).

[0059] In the state in which the first and second cases are coupled to each other, an upper cover, such as upper cover 104 of Fig. 4, may be coupled to the upper portion of the first case. For example, the upper cover and the first case may be, for example, welded and coupled along

an outer circumferential surface of the upper cover (S17). For another example, after the first case and the upper cover are coupled to each other, the first case and the second case may be coupled to each other.

[0060] Hereinafter, descriptions will be made according to additional embodiments. As the additional embodiments may be similar or the same as the previous embodiment except for a coupled structure of first and second cases, differences among these embodiments will be described principally, and descriptions of the same or like components will be denoted by the same or like reference numerals and repetitive descriptions have been omitted.

[0061] Fig. 11 is a cross-sectional view of a rotary compressor according to another embodiment. Referring to Fig. 11, a compressor 100a according to this embodiment may include a first case 201, in which stator 110 may be provided, and a second case 202 coupled to a lower portion of the first case 210 to accommodate cylinder 116.

[0062] The second case 202 may include a first extension 221a that extends upward from lower cover 103, a step 221b bent from the first extension 221a, and a second extension 221c that extends upward from the step 221 b. The step 221b may extend outward from an upper end of the first extension 221a, that is, in a direction in which an inner diameter of the second case 202 increases. An outer circumferential surface of the second case 202 may have a bent shape due to the step 221 b.

[0063] Lower end 201 a of the first case 201 may be spaced a predetermined distance d2 from a top surface of the step 221b. A degree of freedom in assembly of the first and second cases 201 and 202 may be improved due to the above-described arrangement, and description will be derived from that of the previous embodiment.

[0064] A welding 225 may be provided between an outer circumferential surface of the first case 201 and the second extension 221c. An inner diameter of the second case 202, that is, an inner diameter of the first extension 221a may be equal to an inner diameter of the first case 201. In other words, the stator 110 may have a same diameter as the cylinder 116.

[0065] That is, when the compressor is designed so that the motor (stator 110 and rotor 112) has a same width as the compression mechanism 111, the step 221 b may have a relatively short extension length when compared to an extension length of the step 121b according to the previous embodiment. Thus, the first and second cases 201 and 202 may be stably coupled to each other.

[0066] Fig. 12 is a cross-sectional view of a rotary compressor according to still another embodiment. Referring to Fig. 12, a compressor 100b according to this embodiment may include a first case 301, in which stator 110 may be provided, and a second case 302 coupled to a lower portion of the first case 301 to accommodate cylinder 116.

[0067] The second case 302 may include a first extension 321a that extends upward from lower cover 103, a step 321 b bent from the first extension 321a, and a second extension 321c that extends upward from the step 321b. The step 321b may extend inward from an upper end of the first extension 321a, that is, in a direction in which an inner diameter of the second case 302 decreases. An outer circumferential surface of the second case 302 may have a bent shape due to the step 321 b.

[0068] Lower end 301 a of the first case 301 may be spaced a predetermined distance d3 from a top surface of the step 321 b. A degree of freedom in assembly of the first and second cases 301 and 302 may be improved due to the above-described arrangement, and description will be derived from that of the previous embodiment.

[0069] A welding 325 may be provided between an outer circumferential surface of the first case 301 and the second extension 321c. An inner diameter of the second case 302, that is, an inner diameter of the first extension 321a may be greater than an inner diameter of the first case 301. In other words, the stator 110 may have an outer diameter less than an outer diameter of the cylinder 116. That is, when the compressor is designed so that the motor (stator 110 and rotor 112) has a width less than a width of the compression mechanism 111, the upper portion of the second case 302 may be bent inward, and thus, the first and second cases 301 and 302 may be stably coupled to each other.

[0070] According to embodiments disclosed herein, as the first case in which the stator may be provided and the second case integrated with the lower cover may be coupled to each other to form a case of the compressor, the compressor may be prevented from being thermally deformed by welding the lower cover to the case. Also, in the manufacturing process according to embodiments disclosed herein, after the compression mechanism is assembled with the second case, and the suction pipe is press-fitted into the second case, the first case in which the stator may be provided may be assembled with the second case. Also, while the first and second cases are assembled with each other, the air gap between the stator and the rotor may be uniformly adjusted.

[0071] As described above, as the air gap is adjustable after the suction pipe is press-fitted into the second case, the non-uniform air gap between the stator and the rotor due to the press-fitting of the suction pipe may be prevented. Also, when compared to a case in which one case is provided as the cylindrical case, two separated cases may be assembled with each other to form the case of the compressor. In addition, as the step for locating the lower portion of the case on the second case is provided, the degree of freedom in design of the assembly of the case may be secured.

[0072] More particularly, as the first and second cases are assembled with each other in a state in which the lower end of the first case and the step of the second case are spaced a predetermined distance from each other, the air gap between the stator and the rotor may be easily adjusted to be uniform. Therefore, as the air gap is uniform, occurrence of noise due to the non-uniform air gap may be prevented.

[0073] Embodiments disclosed herein provide a rotary compressor and a method of manufacturing a rotary compressor, which are simple, and a degree of freedom in design of which is capable of being secured.

[0074] Embodiments disclosed herein provide a rotary compressor that may include a first case, in which a stator may be installed; and a second case installed at one side of the first case and to which a compression mechanism may be coupled. The second case may include a first extension part or extension, to which the compression mechanism may be welded; a stepped part or step that extends to be stepped from the first extension part; and a second extension part or extension that extends from the stepped part. The second extension part may be welded to the first case.

[0075] The stepped part and an end of the first case may be disposed or provided to be spaced apart from each other. The second case may be coupled to a lower portion of the first case, and a top surface of the stepped part and a lower end of the first case may be disposed or provided to be spaced apart from each other.

[0076] The rotary compressor may further include a lower cover integrated with the second case to define an outer appearance of a lower portion of the second case. The stepped part may extend from the first extension part in a direction in which the second case increases in inner diameter.

[0077] The compression mechanism may include a cylinder, in which a roller may be accommodated, and the cylinder may have an outer diameter less than that of the stator. The compression mechanism may include a cylinder, in which a roller may be accommodated, and the cylinder may have a same outer diameter as the stator. The stepped part may extend from the first extension part in a direction in which the second case decreases in inner diameter.

[0078] The compression mechanism may include a cylinder in which a roller may be accommodated, and the cylinder may have an outer diameter greater than that of the stator.

[0079] The rotary compressor may further include a first welding part or welding disposed or provided between an outer circumferential surface of the first case and an inner circumferential surface of the second extension part. The rotary compressor may further include a second welding part or welding disposed or provided on the first extension part and coupled to the compression mechanism.

[0080] The rotary compressor may further include a hook protrusion that protrudes inward from the first extension part to support the compression mechanism. The rotary compressor may further include an upper cover coupled to the first case to define an outer appearance of an upper portion of the first case.

[0081] Embodiments disclosed herein further provide a method for manufacturing a rotary compressor that may include installing a stator in a first case; installing a compression mechanism including a rotor in a second case; coupling a suction pipe to the second case; welding the compression mechanism to the second case; assembling the first case with the second case to adjust an air gap between the stator and the rotor; and welding the first and second cases to each other. The second case may include a stepped part or step that is bent to extend, and in the assembling of the first and second cases may include locating an end of the first case at a position which is spaced apart from the stepped part. The installing of the compression mechanism in the second case may include supporting the compression mechanism on a hook protrusion of the second case.

[0082] A lower cover defining an outer appearance of a lower portion of the second case may be integrated with the second case. The method may further include coupling an upper cover to the first case.

[0083] Any reference in this specification to "one embodiment," "an embodiment," "example embodiment," etc., means that a particular feature, structure, or characteristic described in connection with the embodiment is included in at least one embodiment. The appearances of such phrases in various places in the specification are not necessarily all referring to the same embodiment. Further, when a particular feature, structure, or characteristic is described in connection with any embodiment, it is submitted that it is within the purview of one skilled in the art to effect such feature, structure, or characteristic in connection with other ones of the embodiments.

[0084] Although embodiments have been described with reference to a number of illustrative embodiments thereof, it should be understood that numerous other modifications and embodiments can be devised by those skilled in the art that will fall within the spirit and scope of the principles of this disclosure. More particularly, various variations and modifications are possible in the component parts and/or arrangements of the subject combination arrangement within the scope of the disclosure, the drawings and the appended claims. In addition to variations and modifications in the component parts and/or arrangements, alternative uses will also be apparent to those skilled in the art.

Claims

1. A rotary compressor, comprising:

a first case (101, 201, 301) in which a stator (110) is provided; and

a second case (102, 202, 302) provided at one side of the first case (101, 201, 301) and to which a compression mechanism (111) is coupled, wherein the second case (102, 202, 302) includes:

a first extension (121 a, 221 a, 321 a) to which the compression mechanism (111) is coupled;

a step (121b, 221b, 321b) that extends to be stepped from the first extension (121a, 221a, 321a); and
a second extension (121c, 221c, 321c) that extends from the step (121b, 221b, 321b), wherein the second extension (121c, 221c, 321c) is coupled to the first case (101, 201, 301).

2. The rotary compressor according to claim 1, wherein the step (121b, 221b, 321b) and an end of the first case (101, 201, 301) are spaced apart from each other, and
wherein the second case (102, 202, 302) is coupled to a lower side of the first case (101, 201, 301), and wherein a top surface of the step (121b, 221b, 321b) and a lower end (101a, 201a, 301a) of the first case (101, 201, 301) are spaced apart from each other.

3. The rotary compressor according to claim 1 or 2, further including a lower cover (103) integrated with the second case (102, 202, 302) to define an outer appearance of a lower portion of the second case (102, 202, 302).

4. The rotary compressor according to any of claims 1 to 3, wherein the step (121b, 221b) extends from the first extension (121a, 221a) in a direction in which an inner diameter of the second case (102, 202) increases, and
wherein the compression mechanism (111) includes a cylinder (116) in which a roller (115) is accommodated, and
wherein the cylinder (116) has an outer diameter less than an outer diameter of the stator (110), or has a same outer diameter as the stator (110).

5. The rotary compressor according to any of claims 1 to 3, wherein the step (321 b) extends from the first extension (321 a) in a direction in which an inner diameter of the second case (302) decreases.

6. The rotary compressor according to claim 5, wherein the compression mechanism (111) includes a cylinder (116) in which a roller (115) is accommodated, and wherein the cylinder (116) has an outer diameter greater than an outer diameter of the stator (110).

7. The rotary compressor according to any of claims 1 to 6, wherein the first extension (121a, 221a, 321a) is welded to the compression mechanism (111), and wherein the second extension (121c, 221c, 321c) is welded to the first case (101, 201, 301).

8. The rotary compressor according to claim 7, further including a first welding (125, 225) provided between an outer circumferential surface of the first case (101, 201) and an inner circumferential surface of the second extension (121c, 221c).

9. The rotary compressor according to claim 7 or 8, further including a second welding (133) provided on the first extension (121a) and coupled to the compression mechanism (111).

10. The rotary compressor according to any of claims 1 to 9, further including a hook protrusion (128) that protrudes inward from the first extension (121 a, 221 a, 321 a) to support the compression mechanism (111).

11. The rotary compressor according to any of claims 1 to 10, further including an upper cover (104) coupled to the first case (101, 201, 301) to define an outer appearance of an upper portion of the first case (101, 201, 301).

12. A method for manufacturing a rotary compressor, the method comprising:

installing a stator (110) in a first case (101, 201, 301);
installing a compression mechanism (111) including a rotor (112) in a second case (102, 202, 302);
coupling a suction pipe (119) to the second case (102, 202, 302);
attaching the compression mechanism (111) to the second case (102, 202, 302);
assembling the first case (101, 201, 301) with the second case (102, 202, 302) to adjust an air gap between the stator (110) and the rotor (112); and
attaching the first and second cases to each other.

13. The method according to claim 12, wherein the second case (102, 202, 302) includes a step (121b, 221b, 321b) which is bent to extend radially, and wherein the assembling of the first and second cases includes locating an end of the first case (101, 201, 301) at a position which is spaced apart from the step (121 b, 221 b, 321 b).

14. The method according to claim 12 or 13, wherein the installing of the compression mechanism (111) in the second case (102, 202, 302) includes supporting the compression mechanism (111) on a hook protrusion (128) of the second case (102, 202, 302).

15. The method according to any of claims 12 to 14, wherein the attaching the compression mechanism (111) to the second case (102, 202, 302) includes welding the compression mechanism (111) to the second case (102, 202, 302), and
wherein the attaching the first and second cases

(101, 102; 201, 202; 301, 302) to each other includes welding the first and second cases to each other.

FIG. 1
Related Art

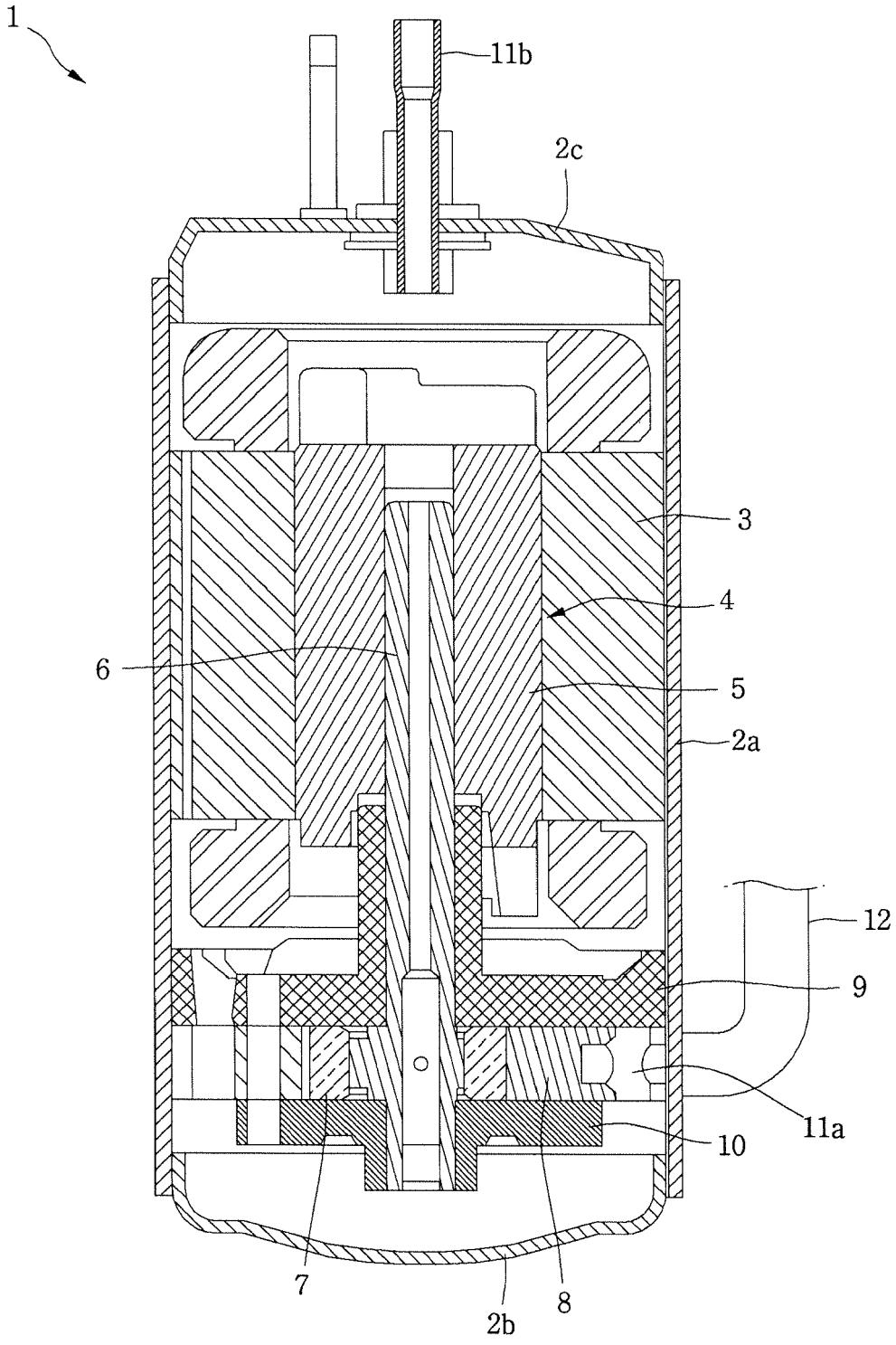


FIG. 2
Related Art

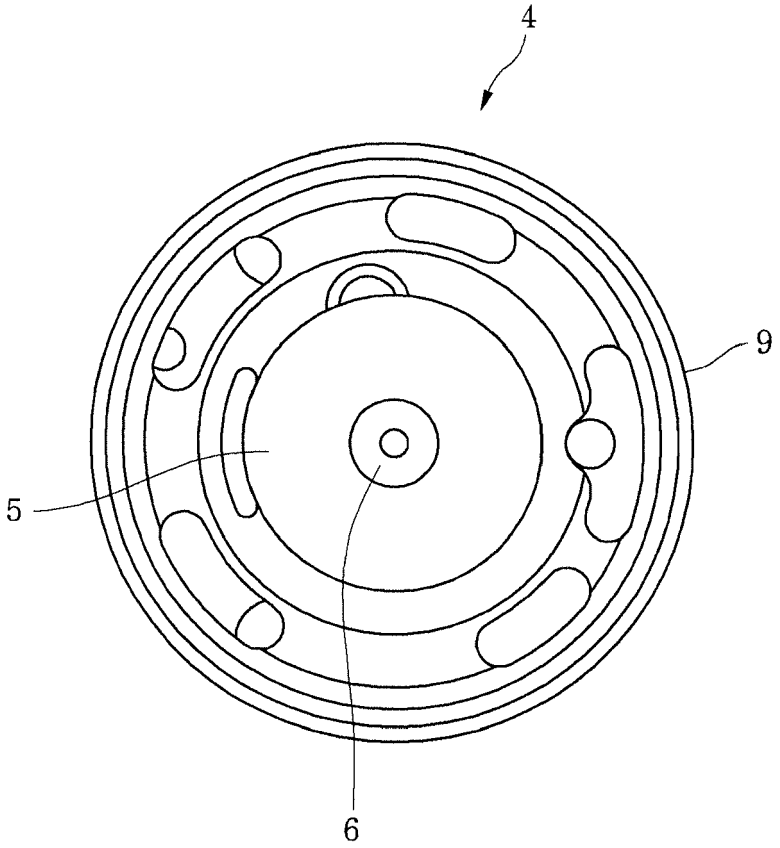


FIG. 3
Related Art

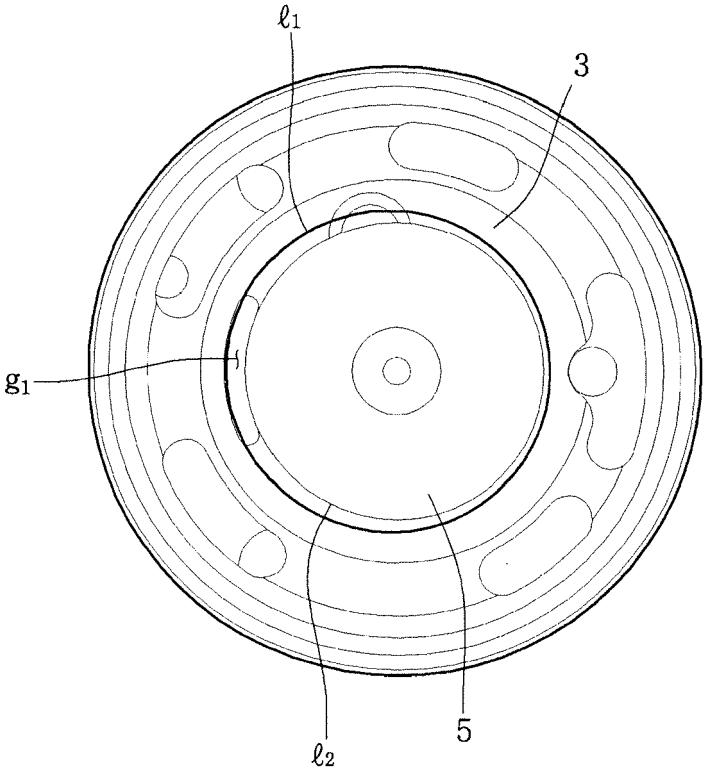


FIG. 4

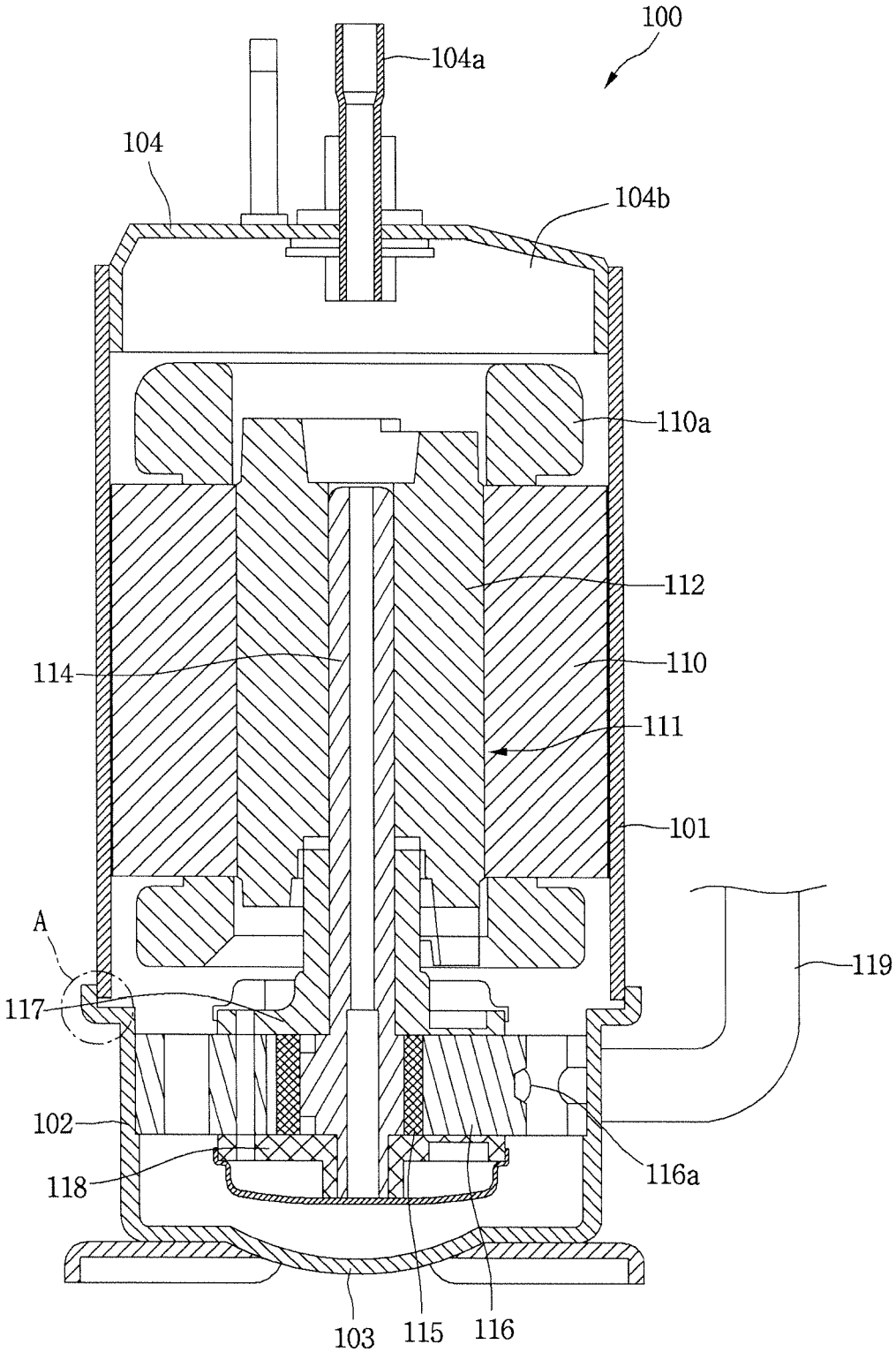

100
104a
104
104b
110a
112
114
110
111
101
A
119
117
102
116a
118
103
115
116

FIG. 5

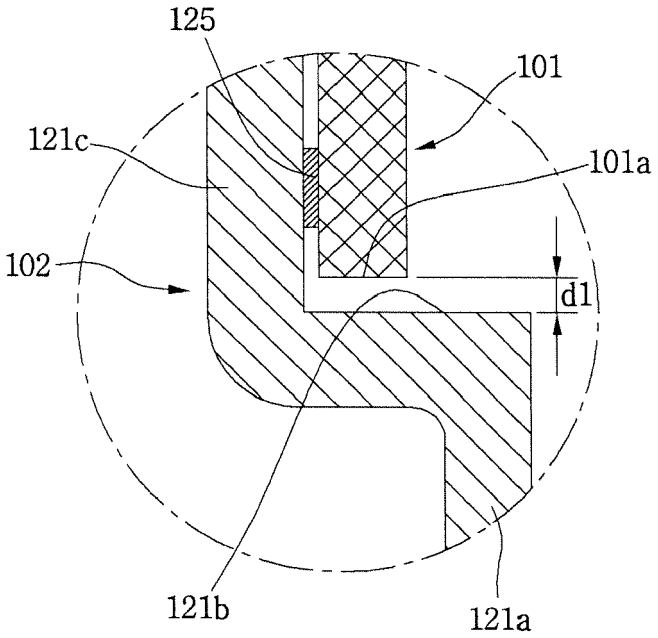


FIG. 6

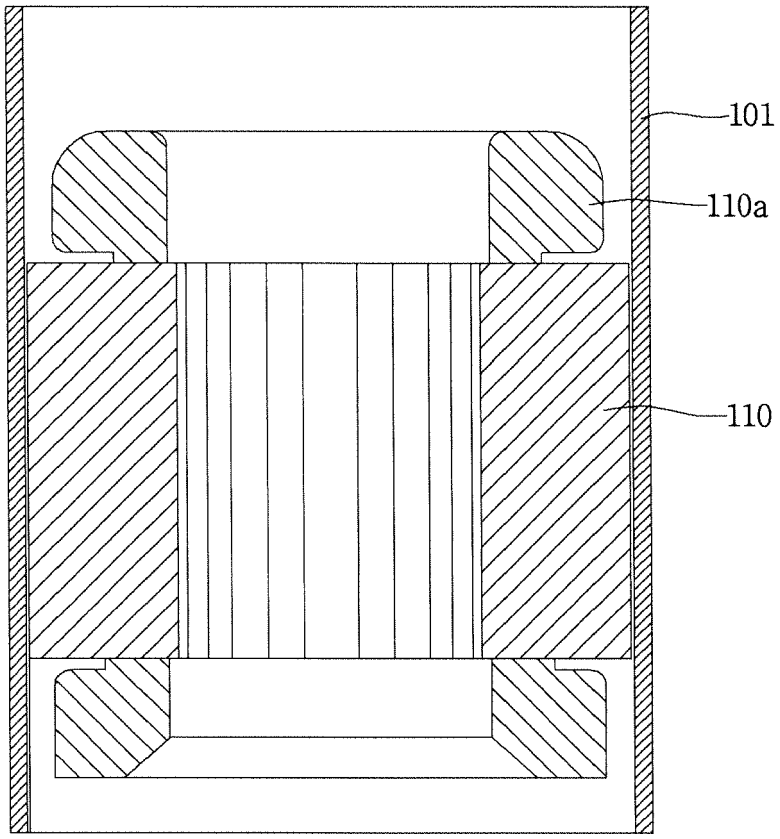


FIG. 7

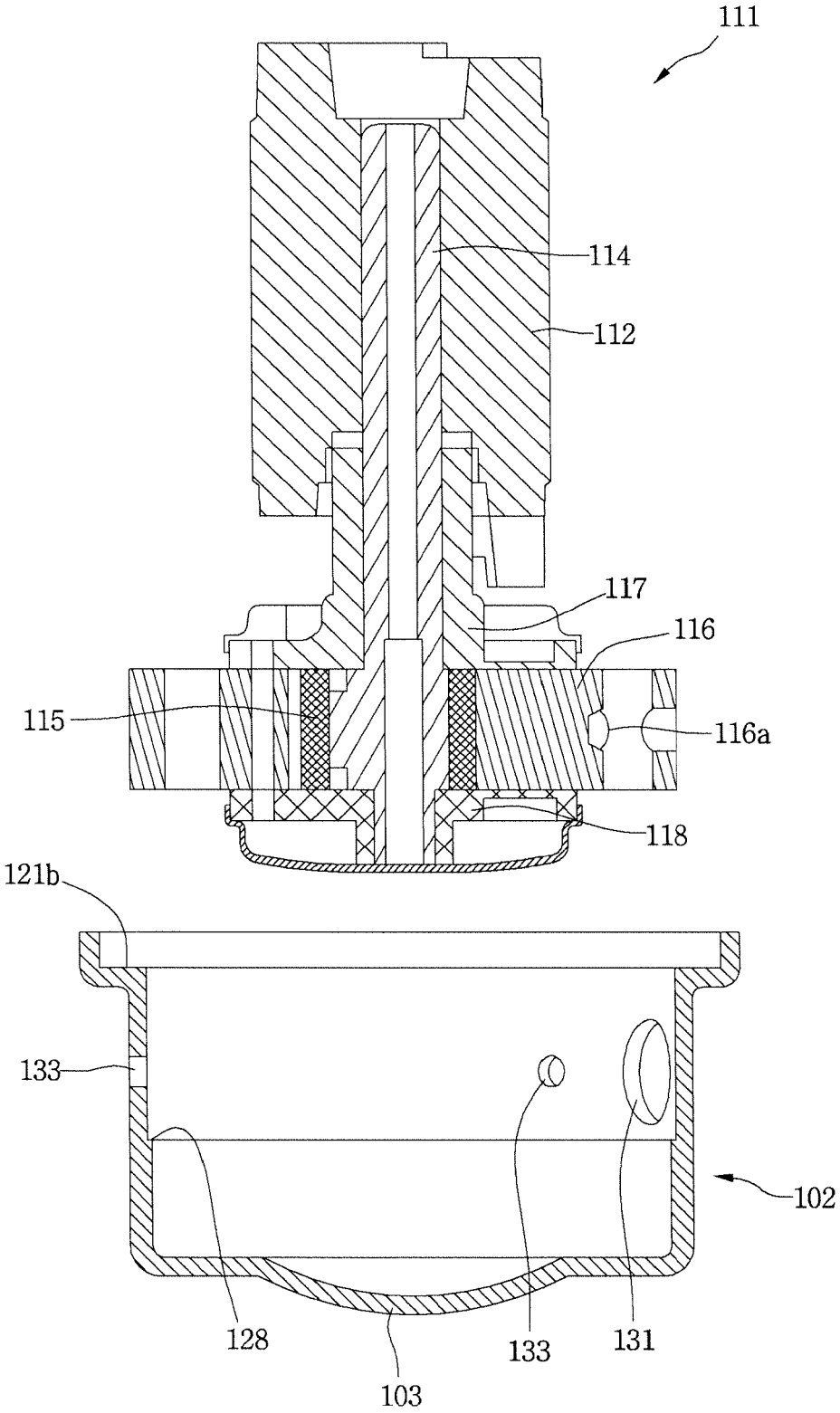


FIG. 8

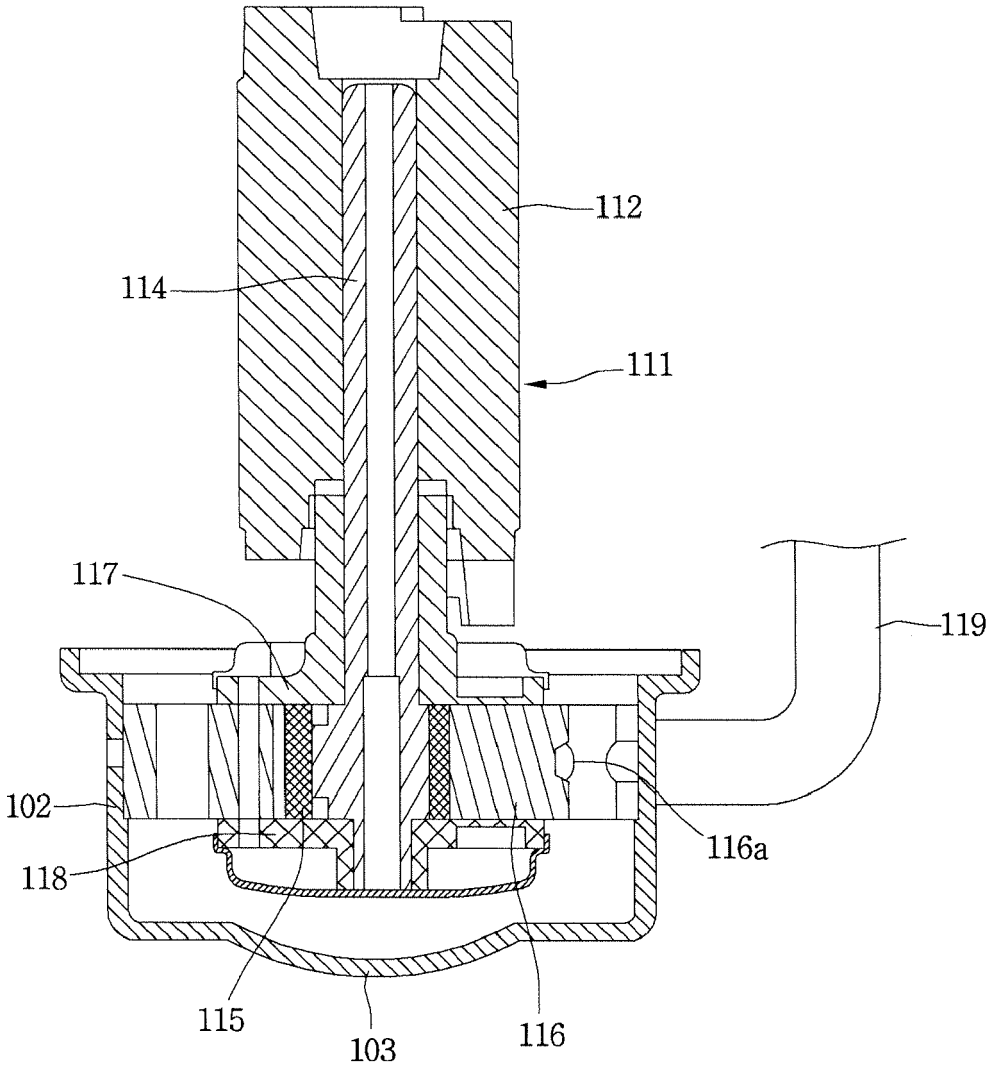


FIG. 9

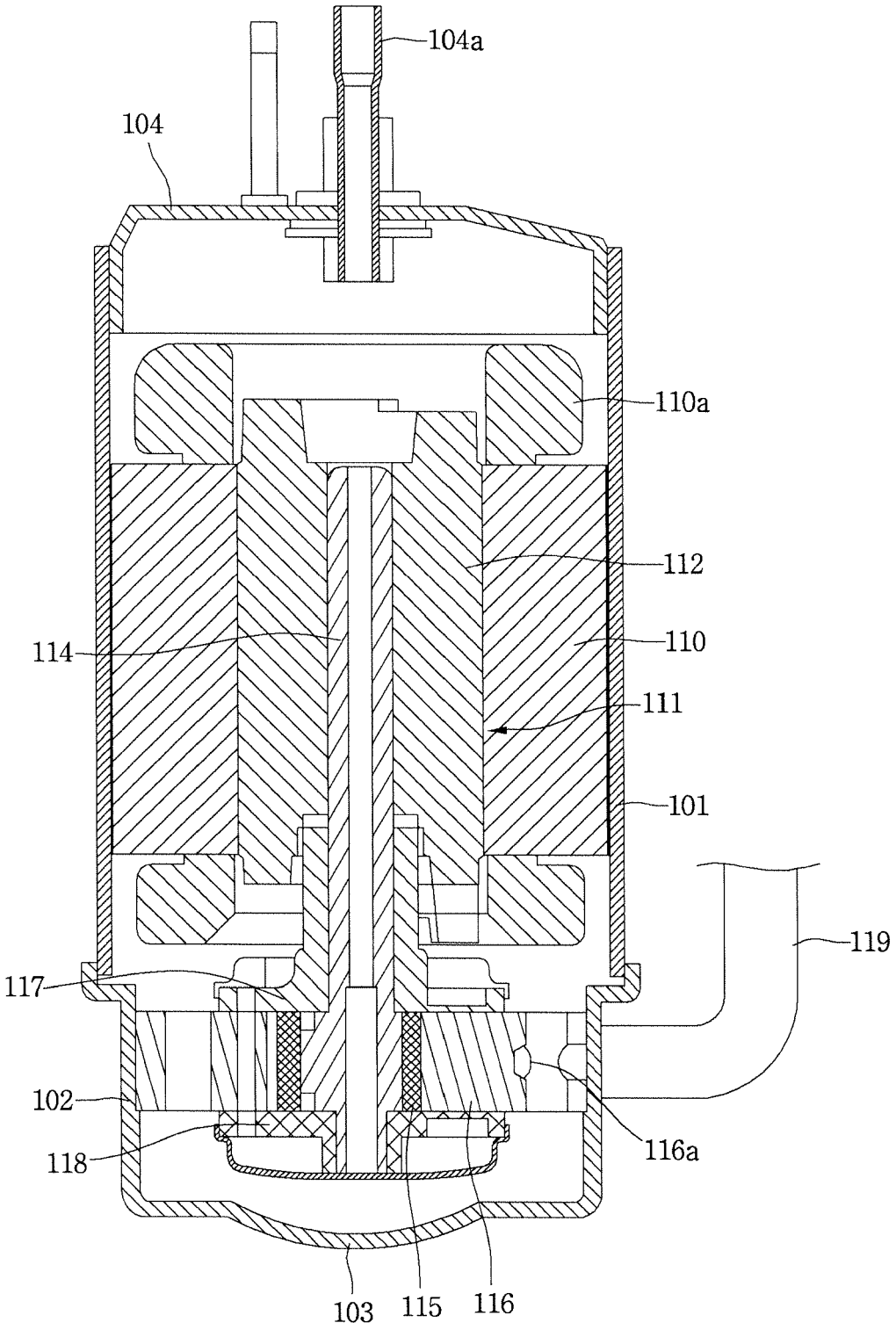

104a
104
110a
112
114
110
111
101
119
117
102
118
116a
103
115
116

FIG. 10

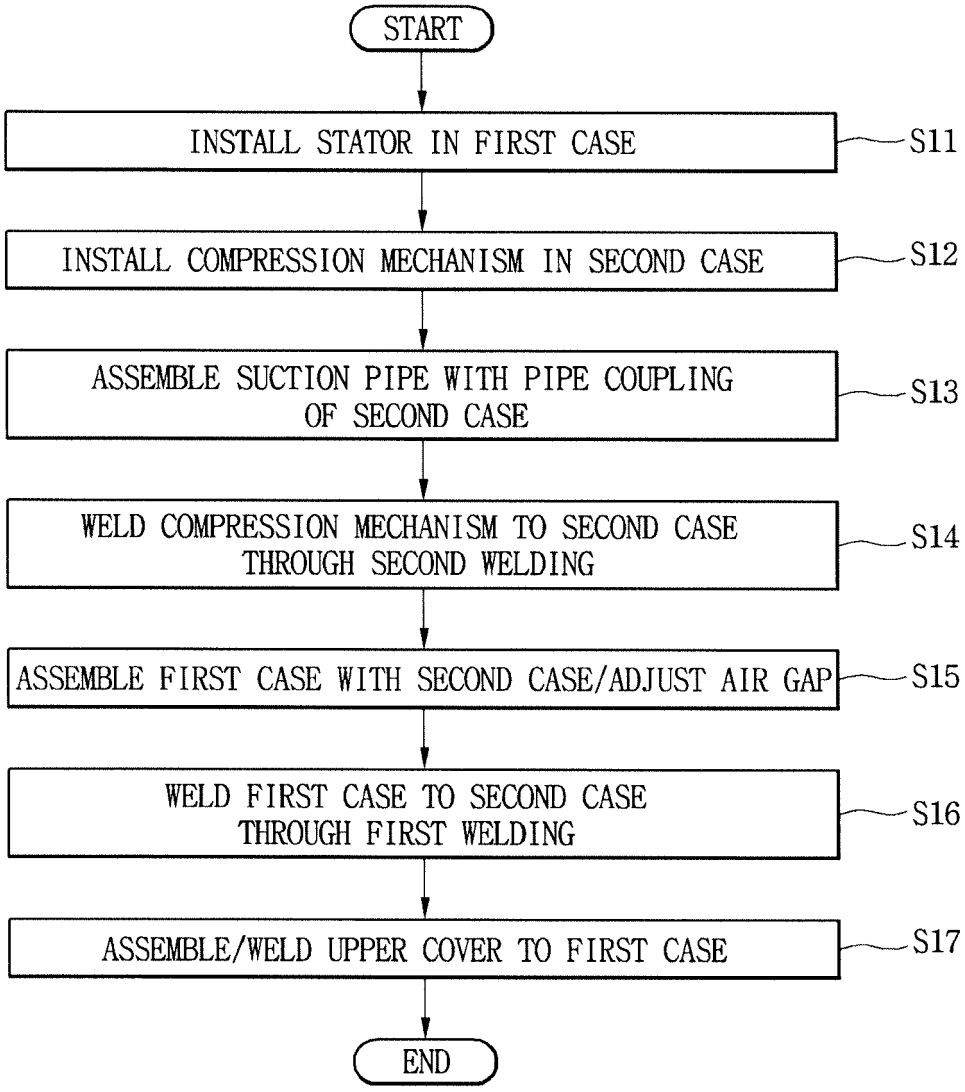

START
INSTALL STATOR IN FIRST CASE
S11
INSTALL COMPRESSION MECHANISM IN SECOND CASE
S12
ASSEMBLE SUCTION PIPE WITH PIPE COUPLING OF SECOND CASE
S13
WELD COMPRESSION MECHANISM TO SECOND CASE THROUGH SECOND WELDING
S14
ASSEMBLE FIRST CASE WITH SECOND CASE/ADJUST AIR GAP
S15
WELD FIRST CASE TO SECOND CASE THROUGH FIRST WELDING
S16
ASSEMBLE/WELD UPPER COVER TO FIRST CASE
S17
END

FIG. 11

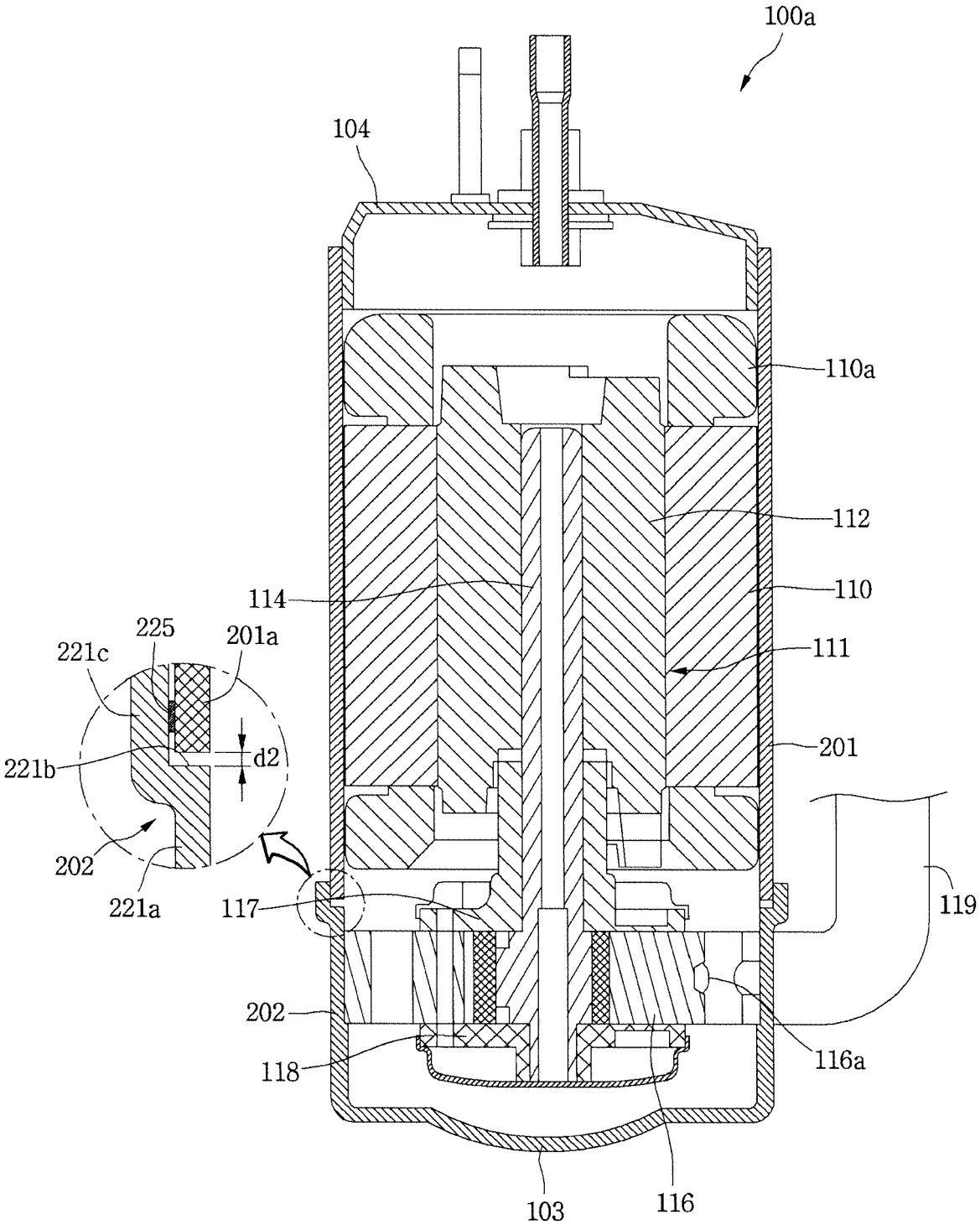
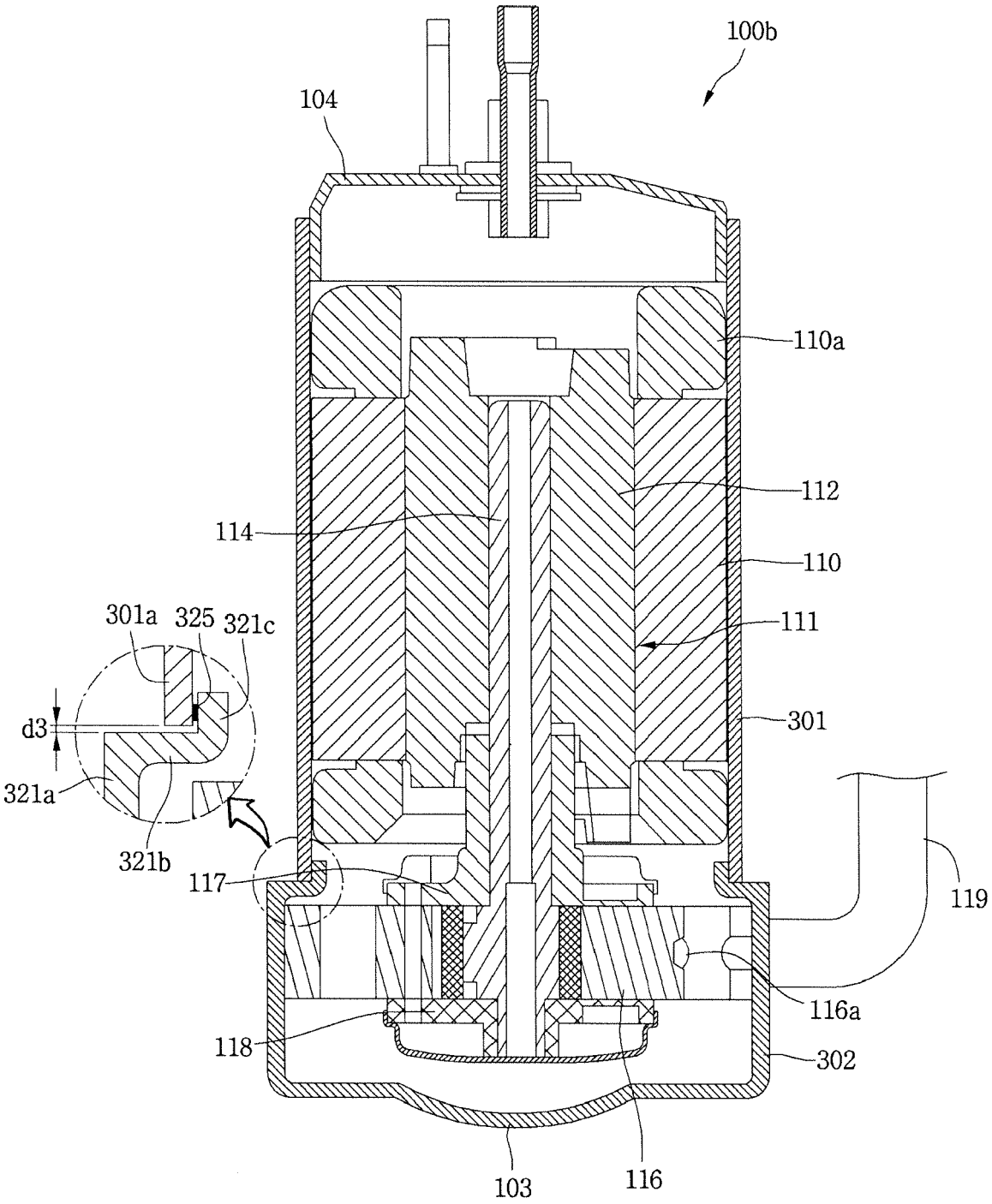

100a
104
110a
112
114
110
111
225
201a
221c
201
221b
d2
202
221a
117
119
202
118
116a
103
116

FIG. 12


100b
104
110a
112
114
110
111
301a
325
321c
301
d3
321a
321b
117
119
116a
118
302
103
116

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EUROPEAN SEARCH REPORT

Application Number
EP 16 16 8068

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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Y	JP H08 61273 A (TOSHIBA CORP) 8 March 1996 (1996-03-08) * figure 5 *	3	
Y	JP 2009 115018 A (SANYO ELECTRIC CO) 28 May 2009 (2009-05-28) * figure 1 *	10,11,14	
			TECHNICAL FIELDS SEARCHED (IPC) F04C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	16 September 2016	Grilli, Muzio

CATEGORY OF CITED DOCUMENTS

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E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

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16-09-2016

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82