



EP 2 816 232 B1

(12)

## EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention  
of the grant of the patent:

26.09.2018 Bulletin 2018/39

(51) Int Cl.:

F04B 39/00 (2006.01)

F04B 39/14 (2006.01)

(21) Application number: 13749902.6

(86) International application number:

PCT/JP2013/050253

(22) Date of filing: 10.01.2013

(87) International publication number:

WO 2013/121808 (22.08.2013 Gazette 2013/34)

### (54) ELECTRIC COMPRESSOR AND METHOD FOR MANUFACTURING ELECTRIC COMPRESSOR

ELEKTRISCHER KOMPRESSOR UND VERFAHREN ZUR HERSTELLUNG EINES ELEKTRISCHEN  
KOMPRESSORS

COMPRESSEUR ÉLECTRIQUE ET SON PROCÉDÉ DE FABRICATION

(84) Designated Contracting States:

AL AT BE BG CH CY CZ DE DK EE ES FI FR GB  
GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO  
PL PT RO RS SE SI SK SM TR

- MIZUNO, Hisao  
Tokyo 108-8215 (JP)
- KIMATA, Yoshiyuki  
Tokyo 108-8215 (JP)

(30) Priority: 15.02.2012 JP 2012030776

(74) Representative: Intès, Didier Gérard André et al  
Cabinet Beau de Loménie  
158 rue de l'Université  
75340 Paris Cedex 07 (FR)

(43) Date of publication of application:

24.12.2014 Bulletin 2014/52

(73) Proprietor: Mitsubishi Heavy Industries, Ltd.  
Tokyo 108-8215 (JP)

(56) References cited:  
JP-A- H01 159 476 JP-A- H09 158 835  
JP-B2- 3 727 459

(72) Inventors:

- TAKASU, Yogo  
Tokyo 108-8215 (JP)

Note: Within nine months of the publication of the mention of the grant of the European patent in the European Patent Bulletin, any person may give notice to the European Patent Office of opposition to that patent, in accordance with the Implementing Regulations. Notice of opposition shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

## Description

### {Technical Field}

**[0001]** The present invention relates to an electric compressor provided with a compressing section that compresses refrigerant gas and a motor that drives the compressing section, and to a manufacturing method of an electric compressor.

### {Background Art}

**[0002]** In an electric compressor, a compressor and a motor that drives the compressor are accommodated in a metallic housing. By operating the compressor, refrigerant gas in the interior thereof is compressed and discharged. The metallic housing possesses airtightness, and the power for the motor is supplied to the motor from an external power supply part via electric terminals provided at an opening of the housing.

**[0003]** In order to prevent the electric terminals from being exposed to the exterior, a terminal guard, which is a protection member that surrounds the electric terminals, is provided at the external surface of the housing. Patent Literature 1 discloses an invention related to a terminal protection cover of an electric compressor, which shows a technology useful to omit processing work and to make its manufacturing process easier.

### {Citation List}

### {Patent Literature}

**[0004]** {Patent Literature 1} Japanese Examined Utility Model Application, Publication No. S49-23291 JP09-158835 discloses an hermetic type compressor.

### {Summary of Invention}

### {Technical Problem}

**[0005]** When installing a terminal guard made of synthetic resin at an external surface of a housing, it is necessary to ensure sealability, such as waterproofing or the like. Therefore, in the related art, a sealing surface where the terminal guard and the external surface of the housing come into contact is formed in a flat shape. Thus, machining, for example, press processing or the like, is performed for forming the flat shape on the housing having a cylindrical shape or a spherical shape.

**[0006]** In addition, when mounting the terminal guard to the external surface of the housing, the installation direction of the terminal guard is such that the terminal guard is moved and mounted toward the center of the housing (in the normal direction of the external surface of the housing). Accordingly, securing bolts are employed and, in general, the securing bolts are inserted toward the housing from outside the terminal guard. This is why

portions of the securing bolts end up penetrating into the interior of the housing.

**[0007]** In addition, in the case where installation is performed by using the securing bolts, there is no member that can be used to position a sealing member, which is made of rubber or the like and which is to be provided between the terminal guard and the external surface of the housing, with respect to the external surface of the housing. This is why the sealing member is attached to the terminal guard first and is installed on the external surface of the housing together with the terminal guard at the same time. Thus, since the external surface of the housing is wrapped with a noise insulation member made of felt, and since the terminal guard and the sealing member are installed after the noise insulation member is wrapped around the external surface, the noise insulation member may be sandwiched between the sealing member and the external surface of the housing. As a result, it has been difficult to make the sealing member fit inside the external shape of the terminal guard, thus leaving a portion of the sealing member outside the terminal guard.

**[0008]** The present invention is made in light of the above-described circumstances, and an object thereof is to provide an electric compressor with which the need to process an external surface of a housing can be eliminated, making it possible to reduce the time and labor involved in processing, and with which a protection member can easily be mounted to the external surface of the housing, and to provide a manufacturing method of an electric compressor.

### {Solution to Problem}

**[0009]** An electric compressor according to a first aspect of the present invention is defined by claim 1 and comprises: a housing having a curved external surface; an electric terminal provided at the external surface of the housing; a pin-like protrusion that protrudes from the external surface of the housing in a normal direction of the external surface; and a protection member that has an aperture which corresponds to the position and a protruding direction of the protrusion, and that surrounds the electric terminal in a state in which the protrusion is inserted into the aperture.

**[0010]** With this configuration, the pin-like protrusion is provided so as to protrude in the normal direction of the external surface from the curved external surface of the housing, and the aperture of the protection member is formed in correspondence with the position and the protruding direction of the protrusion. Then, by inserting the protrusion into the aperture of the protection member, the protection member is mounted to the housing and surrounds the electric terminal located at the external surface of the housing. Therefore, because the protection member can be mounted at the portion of the housing to which the protection member is mounted without forming a flat portion at the external surface, leaving the curved surface as it is, time and labor for the processing can be

reduced.

**[0011]** In the first aspect of the present invention, two of the protrusions may be arranged in the circumferential direction of the external surface, and the aperture corresponding to the two protrusions may be cut out to open in a lateral direction of the protection member.

**[0012]** With this configuration, because the two protrusions are arranged in the circumferential direction of the external surface of the housing and these protrusions protrude in the normal directions of the curved surface, the two protrusions spread out in an inverted V-shape when viewed in the axial direction of the curved surface. Also, because the aperture of the protection member is cut out in the lateral direction, insertion of the protrusions into the aperture of the protection member is facilitated.

**[0013]** The first aspect of the present invention may be further provided with a sealing member that is installed between the external surface of the housing and the protection member, wherein the protrusions include two first protrusions arranged in the circumferential direction of the external surface and one second protrusion that is provided at a position apart in an axial direction of the external surface with respect to the first protrusions, and two first apertures are formed in the sealing member so that the first apertures individually correspond to one of the first protrusions and the second protrusion and that the sealing member is supported by the two positions.

**[0014]** With this configuration, the two first apertures are formed in the sealing member, and the sealing member is supported at two positions by the first protrusion and the second protrusion that are inserted into the first apertures. Accordingly, when mounting the sealing member to the housing, the sealing member is reliably positioned with respect to the external surface of the housing.

**[0015]** In the first aspect of the present invention, in a case in which a protruding direction of the electric terminal is inclined with respect to a straight portion of a base portion to which the housing is installed, the protection member has an external surface in which a surface is configured to be parallel to the straight portion of the base portion when the protection member is mounted on the housing.

**[0016]** With this configuration, when the protection member is mounted to the housing, the protection member has the external surface that is parallel to the straight portion of the base portion on which the housing is installed. Accordingly, the straight portion of the base portion and the external surface of the protection member become parallel to each other. Therefore, even in the case in which the protruding direction of the electric terminals is inclined with respect to the straight portion of the base portion, the protection member can appropriately be positioned inside the base portion.

**[0017]** A manufacturing method of an electric compressor according to a second aspect of the present invention is defined by claim 4 and is a manufacturing method of an electric compressor, the electric compressor comprising: a housing; an electric terminal provided at

an external surface of the housing; a pin-like protrusion that protrudes from the external surface of the housing; a protection member that surrounds the electric terminal in a state in which the protrusion is inserted into the aperture; and a sealing member that is installed between the external surface of the housing and the protection member, the manufacturing method comprising: a step of providing two of the protrusions arranged in a circumferential direction of the external surface; a step of providing apertures, corresponding to the positions and the protruding directions of the two protrusions, cut out to open in a lateral direction of the protection member; a step of inserting the protrusion through the sealing member; a step of wrapping a noise insulation member on the external surface of the housing after inserting the protrusion through the sealing member; a step of connecting a cable to the electric terminal of the housing that has been wrapped with the noise insulation member; and a step of mounting the protection member to the external surface of the housing in which the cable is connected to the electric terminal.

**[0018]** With this configuration, after the sealing member is placed so that the protrusion passes therethrough and is mounted to the external surface of the housing, the external surface of the housing is wrapped with the noise insulation member, and, furthermore, the cable is connected to the electric terminal. The protection member is subsequently mounted to the external surface of the housing. Therefore, because the noise insulation member is installed after the sealing member is positioned, processing work is facilitated at the portion where the sealing member and the noise insulation member come together. Accordingly, because the sealing member can reliably be mounted, mounting of the protection member is also facilitated. With a common compressor, because the sealing member is mounted to the external surface of the housing together with the protection member after the noise insulation member is wrapped on the housing, a portion of the sealing member is left outside the external shape of the protection member, which hinders assembly. However, such a problem is less likely to occur with the aforementioned configuration.

#### {Advantageous Effects of Invention}

**[0019]** With the present invention, the need to process an external surface of a housing can be eliminated, making it possible to reduce time and labor involved in processing, and a protection member can easily be mounted to the external surface of the housing.

#### {Brief Description of Drawings}

#### [0020]

{Fig. 1} Fig. 1 is a front view showing an electric compressor according to an embodiment of the present invention.

{Fig. 2} Fig. 2 is a perspective view showing an external surface and a terminal guard of the electric compressor according to the embodiment of the present invention.

{Fig. 3} Fig. 3 is a front view showing the electric compressor before mounting the terminal guard according to the embodiment of the present invention.

{Fig. 4} Fig. 4 is a perspective view showing an external surface, electric terminals, and a gasket of the electric compressor before mounting the terminal guard according to the embodiment of the present invention.

{Fig. 5} Fig. 5 is a cross-sectional view of the electric compressor taken along the A-A line in Fig. 1.

{Fig. 6} Fig. 6 is a cross-sectional view showing the electric compressor according to the embodiment of the present invention, showing a state before mounting the terminal guard and the gasket.

{Fig. 7} Fig. 7 is a front view showing the terminal guard according to the embodiment of the present invention.

{Fig. 8} Fig. 8 is a back view showing the terminal guard according to the embodiment of the present invention.

{Fig. 9} Fig. 9 is a longitudinal sectional view of the terminal guard taken along the C-C line in Fig. 7.

{Fig. 10} Fig. 10 is a longitudinal sectional view of the terminal guard taken along the B-B line in Fig. 9.

{Fig. 11} Fig. 11 is a longitudinal sectional view of the terminal guard taken along the D-D line in Fig. 9.

{Fig. 12} Fig. 12 is a front view showing the gasket according to the embodiment of the present invention.

{Fig. 13} Fig. 13 is a plan view showing the electric compressor and its base portion according to the embodiment of the present invention.

#### {Description of Embodiment}

**[0021]** An embodiment according to the present invention will be described below with reference to the drawings.

**[0022]** First, the configuration of an electric compressor 1 will be described.

**[0023]** In an electric compressor 1, a compressor, a motor that drives the compressor, and so forth are accommodated in a metallic housing 2. By operating the compressor, refrigerant gas in the interior thereof is compressed and discharged. The metallic housing 2 possesses airtightness, and the power for the motor is supplied to the motor from a power source located at the exterior of the housing 2 via electric terminals 3 located in an aperture of the housing 2.

**[0024]** As shown in Figs. 5 and 6, the housing 2 has, for example, a cylindrical shape in the cross section. The axial direction of the cylindrical shape corresponds to the top-to-bottom direction of the electric compressor 1 when the electric compressor 1 is installed.

**[0025]** As shown in Figs. 4 and 6, the electric terminals 3 protrude outward from the external surface of the housing 2. The protruding direction of the electric terminals 3 is, for example, the radial direction of the cylindrical shape of the housing 2, that is, the normal direction of the external surface of the cylindrical shape. The electric terminals 3 are connected to cables (not shown). The cables supply power from the external power source to the motor of the electric compressor 1.

**[0026]** As shown in Figs. 1 and 2, the external surface of the housing 2 of the electric compressor 1 is provided with a terminal guard 5, with a gasket 6 interposed therebetween. In addition, in order to install the terminal guard 5, bolts 4a, 4b, and 4c are provided on the external surface of the housing 2.

**[0027]** The bolts 4a, 4b, and 4c are examples of pin-like protrusions, and protrude outward from the external surface of the housing 2, as shown in Figs. 4 and 5. The bolts 4a, 4b, and 4c are mounted on curved portions without processing the external surface of the housing 2 into a flat shape. The protruding directions of the bolts 4a, 4b, and 4c are, for example, the radial directions of the cylindrical shape of the housing 2, that is, the normal directions of the external surface of the cylindrical shape.

**[0028]** The terminal guard 5 is an example of a protection member and accommodates the electric terminals 3 in the interior thereof by surrounding the electric terminals 3, as shown in Fig. 5. As shown in Fig. 7, apertures 7a, 7b, and 8, which correspond to the positions and protruding directions of the bolts 4a, 4b, and 4c, are formed in the terminal guard 5. As shown in Figs. 10 and 11, a surface 5A of the terminal guard 5, which faces the housing 2 when the terminal guard 5 is installed on the external surface of the housing 2, matches the shape of the external surface of the housing 2. In this embodiment, the cross-section of the surface 5A of the terminal guard 5 has a circular arc shape that has a common axial center O with the housing 2.

**[0029]** The gasket 6 is an example of a sealing member and is installed between the terminal guard 5 and the external surface of the housing 2, as shown in Figs. 1, 2, and 5. The gasket 6 is made of, for example, rubber, and ensures waterproofing between the terminal guard 5 and the external surface of the housing 2.

**[0030]** With this embodiment, the pin-like bolts 4a, 4b, and 4c are provided at the external surface of the housing 2 having the cylindrical shape, so as to protrude in the normal directions of the external surface, and the apertures 7a, 7b, and 8 of the terminal guard 5 are formed in correspondence with the positions and protruding directions of the bolts 4a, 4b, and 4c. Thus, the terminal guard 5 is mounted to the housing 2 by inserting the bolts 4a, 4b, and 4c into the apertures 7a, 7b, and 8 of the terminal guard 5, and the electric terminals 3 provided at the external surface of the housing 2 are surrounded by the terminal guard 5 and are accommodated in the terminal guard 3. Since the bolts 4a, 4b, and 4c are mounted to the external surface of the cylindrical shape without any

modification of the shape of the external surface, and since a flat portion is not formed at the portion of the external surface of the housing 2 where the terminal guard 5 is mounted and the curved surface thereof is left as it is, and because it is possible to mount the terminal guard 5 in this state, it is possible to reduce the time and labor for processing.

**[0031]** Next, the bolts 4a, 4b, and 4c and the terminal guard 5 will be described below.

**[0032]** The bolt 4a and the bolt 4b are installed on the same circumference line on the external surface of the housing 2. The bolt 4a and the bolt 4b are examples of first protrusions. The bolt 4c is provided away from the bolt 4a and the bolt 4b in the axial direction of the housing 2. The bolt 4c is an example of a second protrusion. In this embodiment, the bolt 4c is installed between the bolt 4a and the bolt 4b in the circumferential direction, and above the bolt 4a and the bolt 4b in the housing 2.

**[0033]** In the terminal guard 5, the apertures 7a, 7b, and 8 are formed. As shown in Figs. 7 and 8, the apertures 7a and 7b have shapes formed by cutting out the terminal guard 5 to open in the lateral direction. The aperture 8 is provided on the center axis of the terminal guard 5 and has a circular shape. As shown in Figs. 7 to 9, the terminal guard 5 has an open portion at the bottom portion that is opposite from the aperture 8 at the top portion, and the cables connected to the electric terminals 3 are installed so as to pass through this open portion of the terminal guard 5.

**[0034]** The bolt 4a and the bolt 4b are installed on the same circumference line on the external surface of the housing 2 and protrude in the normal directions of the cylindrical shape. Accordingly, as shown in Figs. 5 and 6, the bolt 4a and the bolt 4b are spread out in an inverted V-shape when viewed in the axial direction of the housing 2. Specifically, the space between the tip of the bolt 4a and the tip of the bolt 4b is greater than the space between the proximal portion of the bolt 4a and the proximal portion of the bolt 4b.

**[0035]** When mounting the terminal guard 5 to the external surface of the housing 2, the installation direction of the terminal guard 5 is such that the terminal guard 5 is moved and mounted toward the center of the housing 2 (in the normal direction of the external surface of the housing 2). Accordingly, it is not possible to mount the terminal guard 5 if the apertures 7a and 7b of the terminal guard 5 have, for example, a perfectly circular shape. In this embodiment, because the apertures 7a and 7b of the terminal guard 5 are cut out to open in the lateral direction, insertion of the bolts 4a and 4b into the apertures 7a and 7b of the terminal guard 5 is facilitated. Note that the apertures 7a and 7b may have elongated circular shapes that are elongated in the lateral direction.

**[0036]** Next, the gasket 6 will be described.

**[0037]** As shown in Fig. 12, apertures 11a, 11b, 12, and 13 are formed in the gasket 6. The aperture 11a corresponds to the bolt 4a, and which is cut out to open in the lateral direction. Accordingly, as with the terminal

guard 5, the gasket 6 can be mounted to the bolt 4a and the bolt 4b installed to extend in the normal directions of the external surface of the housing 2. Specifically, because the aperture 11a is cut out to open in the lateral direction, insertion of the gasket 6 at the external surface of the housing 2 is facilitated.

**[0038]** The aperture 11b corresponds to the bolt 4b and has a circular shape. The aperture 12 corresponds to the bolt 4c, and which is cut out to open to the aperture 13. The aperture 13 has a circular shape that surrounds the electric terminals 3. The aperture 11b and the aperture 12 are examples of first apertures.

**[0039]** With the gasket 6, when mounting the gasket 6 to the external surface of the housing 2, first, the bolt 4b is inserted into the aperture 11b and the aperture 12 is hooked on the bolt 4c. By doing so, because the gasket 6 is supported at two points by the bolt 4b and the bolt 4c, the gasket 6 is reliably positioned with respect to the external surface of the housing 2. Accordingly, in the subsequent steps, for example, in a step of wrapping the external surface of the housing 2 with a noise insulation member (not shown), the work is facilitated at a portion where the noise insulation member and the gasket 6 come together.

**[0040]** Next, the external shape of the terminal guard 5 will be described with reference to Fig. 13 and so forth.

**[0041]** Here, as shown in Fig. 13, a leg portion 2A of the housing 2 of the electric compressor 1 is installed on the base portion 10. Also, in the case in which a protruding direction E of the electric terminals 3 is not orthogonal to a straight portion L of the base portion 10 but is inclined with respect to the straight portion L, an external surface 5B of the terminal guard 5 is a surface that is parallel to the straight portion L of the base portion 10 when the terminal guard 5 is mounted to the housing 2.

**[0042]** With this embodiment, when the terminal guard 5 is mounted to the housing 2, the straight portion L of the base portion 10 and the external surface 5B of the terminal guard 5 become parallel to each other. Therefore, even in the case in which the protruding direction E of the electric terminals 3 is not perpendicular to the straight portion L of the base portion 10 but is inclined with the straight portion L, the terminal guard 5 can appropriately be contained with respect to the base portion 10.

**[0043]** Next, a method of mounting the terminal guard 5 on the electric compressor 1 will be described.

**[0044]** First, as shown in Figs. 3 and 4, the gasket 6 is placed so that the bolts 4a, 4b, and 4c pass therethrough. Subsequently, the external surface of the housing 2 is wrapped with the noise insulation member (not shown). The noise insulation member is made of, for example, felt. Then, cables (not shown) are connected to the electric terminals 3 of the housing 2 that has been wrapped with the noise insulation member. Next, as shown in Figs. 1 and 5, the terminal guard 5 is mounted to the external surface of the housing 2 in which the cables have been connected to the electric terminals 3. The terminal guard

5 is secured by using nuts fitted to the bolts 4a, 4b, and 4c.

**[0045]** With this embodiment, after the gasket 6 is placed so that the bolts 4a, 4b, and 4c pass therethrough and is mounted on the external surface of the housing 2, the external surface of the housing 2 is wrapped with the noise insulation member, and, furthermore, the cables are connected to the electric terminals 3. The terminal guard 5 is subsequently mounted to the external surface of the housing 2. Therefore, because the noise insulation member is installed after the gasket 6 is positioned, processing work can be facilitated at the portion where the gasket 6 and the noise insulation member come together. Accordingly, because the gasket 6 can reliably be mounted, mounting of the terminal guard 5 is also facilitated. With a common technique, because the gasket is mounted to the external surface of the housing together with the terminal guard after the noise insulation member is wrapped on the housing, a portion of the gasket may be left outside the external shape of the terminal guard, which hinders assembly. However, such a problem is less likely to occur with the aforementioned embodiment.

**[0046]** Note that this mounting method is not limited to the terminal guard 5 and the external surface of the housing 2 of this embodiment described above. For example, mounting in the same manner is possible even in the case in which, at a portion to which the terminal guard is mounted, the external surface of the housing is formed in a flat shape with bolts protruding from the external surface of the housing, as in a common compressor. Thus, in this case also, the same operational advantages as this mounting method are afforded.

#### {Reference Signs List}

#### [0047]

- 1 electric compressor
- 2 housing
- 3 electric terminal
- 4a, 4b, 4c bolt (protrusion)
- 5 terminal guard (protection member)
- 6 gasket (sealing member)
- 7a, 7b, 8, 11a, 11b, 12, 13 aperture
- 10 base portion
- 14 nut

#### Claims

##### 1. An electric compressor (1) comprising:

a housing (2) having a curved external surface; an electric terminal (3) provided at the external surface of the housing (2); pin-like protrusions (4a, 4b, 4c) that protrude from the external surface of the housing (2) in a normal direction of the external surface; and

5 a protection member (5) that has apertures (7a, 7b, 8) which correspond to the positions and the protruding direction of the protrusions (4a, 4b, 4c), and that surrounds the electric terminal (3) in a state in which the protrusions are inserted into the apertures (7a, 7b, 8),

**characterized in that** two of the protrusions (4a, 4b) are arranged in a circumferential direction of the external surface, and the apertures (7a, 7b) corresponding to the two protrusions (4a, 4b) are cut out to open in a lateral direction of the protection member (5).

##### 2. The electric compressor according to Claim 1, further comprising:

a sealing member (6) that is installed between the external surface of the housing and the protection member (5),

wherein the protrusions (4a, 4b, 4c) include two first protrusions (4a, 4b) arranged in the circumferential direction of the external surface and one second protrusion (4c) that is provided at a position apart in an axial direction of the external surface with respect to the first protrusions (4a, 4b), and

two first apertures (11b, 12) are formed in the sealing member (6) so that the first apertures (11b, 12) individually correspond to one of the first protrusions (4a, 4b) and the second protrusion (4c) and that the sealing member is supported by the two positions.

##### 3. The electric compressor according to Claim 1 or 2, wherein, in a case in which a protruding direction of the electric terminal (3) is configured to be inclined with respect to a straight portion (L) of a base portion (10) on which the housing (2) is configured to be installed, the protection member (5) has an external surface in which a surface is configured to be parallel to the straight portion (L) of the base portion (10) when the protection member (5) is mounted on the housing (2).

##### 4. A manufacturing method of an electric compressor, the electric compressor (1) comprising: a housing (2); an electric terminal (3) provided at an external surface of the housing (2); pin-like protrusions (4a, 4b, 4c); a protection member (5) that surrounds the electric terminal (3) in a state in which the protrusions are inserted into the apertures (7a, 7b, 8); and a sealing member (6) that is installed between the external surface of the housing (2) and the protection member (5), the manufacturing method comprising:

55 a step of providing two of the protrusions (4a, 4b, 4c) arranged in a circumferential direction of the external surface;

a step of providing apertures (7a, 7b, 8), corresponding to the positions and the protruding directions of the two protrusions (4a, 4b, 4c), cut out to open in a lateral direction of the protection member (5);  
5  
a step of inserting the protrusions (4a, 4b, 4c) through the sealing member (6);  
a step of wrapping a noise insulation member on the external surface of the housing (2) after inserting the protrusions (4a, 4b, 4c) through the sealing member (6);  
10  
a step of connecting cables to the electric terminal (3) of the housing (2) that has been wrapped with the noise insulation member; and  
a step of mounting the protection member (5) to the external surface of the housing (2) in which the cables are connected to the electric terminal(3).

## Patentansprüche

### 1. Elektrischer Kompressor (1), umfassend:

ein Gehäuse (2), das eine gekrümmte Außenfläche aufweist,  
25  
einen elektrischen Anschluss (3), derauf der Außenfläche des Gehäuses (2) angeordnet ist, stiftartige Vorsprünge (4a, 4b, 4c), die von der Außenfläche des Gehäuses (2) in einer normalen Richtung der Außenfläche vorragen, und ein Schutzelement (5), das Öffnungen (7a, 7b, 8) aufweist, die den Positionen und der Vorstehrichtung der Vorsprünge (4a, 4b, 4c) entsprechen, und das den elektrischen Anschluss (3) in einem Zustand umgibt, in dem die Vorsprünge in die Öffnungen (7a, 7b, 8) eingesetzt sind,  
30  
**dadurch gekennzeichnet, dass** zwei der Vorsprünge (4a, 4b) in einer Umfangsrichtung der Außenfläche angeordnet sind und die Öffnungen (7a, 7b), die den zwei Vorsprüngen (4a, 4b) entsprechen, so ausgeschnitten sind, dass sie sich in einer seitlichen Richtung des Schutzelements (5) öffnen.  
35  
40  
45

### 2. Elektrischer Kompressor nach Anspruch 1, ferner umfassend:

ein Dichtungselement (6), das zwischen der Außenfläche des Gehäuses und dem Schutzelement (5) installiert ist,  
50  
wobei die Vorsprünge (4a, 4b, 4c) zwei erste Vorsprünge (4a, 4b), die in der Umfangsrichtung der Außenfläche angeordnet sind, und einen zweiten Vorsprung (4c) enthalten, der an einer Position angeordnet ist, die in einer axialen Richtung der Außenfläche in Bezug auf die ersten Vorsprünge (4a, 4b) entfernt liegt, und  
55

zwei erste Öffnungen (11b, 12) in dem Dichtungselement (6) so ausgebildet sind, dass die ersten Öffnungen (11b, 12) jeweils einem der ersten Vorsprünge (4a, 4b) und dem zweiten Vorsprung (4c) entsprechen und dass das Dichtungselement an beiden Stellen gestützt wird.

3. Elektrischer Kompressor nach Anspruch 1 oder 2, wobei in einem Fall, in dem eine Vorstehrichtung des elektrischen Anschlusses (3) so konfiguriert ist, dass sie in Bezug auf einen geraden Abschnitt (L) eines Basisabschnitts (10), an dem das Gehäuse (2) zur Installation vorgesehen ist, geneigt ist, das Schutzelement (5) eine Außenfläche hat, bei der eine Fläche so konfiguriert ist, dass sie zu dem geraden Abschnitt (L) des Basisabschnitts (10) parallel verläuft, wenn das Schutzelement (5) an dem Gehäuse (2) montiert ist.
- 20 4. Herstellungsverfahren für einen elektrischen Kompressor, wobei der elektrische Kompressor (1) umfasst: ein Gehäuse (2), einen elektrischen Anschluss (3), der an einer Außenfläche des Gehäuses (2) angeordnet ist, stiftartige Vorsprünge (4a, 4b, 4c), ein Schutzelement (5), das den elektrischen Anschluss (3) in einem Zustand umgibt, in dem die Vorsprünge in die Öffnungen (7a, 7b, 8) eingesetzt sind, und ein Dichtungselement (6), das zwischen der Außenfläche des Gehäuses (2) und dem Schutzelement (5) installiert ist,  
wobei das Herstellungsverfahren umfasst:

einen Schritt des Bereitstellens von zwei der Vorsprünge (4a, 4b, 4c), angeordnet in einer Umfangsrichtung der Außenfläche,  
einen Schritt des Bereitstellens von Öffnungen (7a, 7b, 8), die den Positionen und den Vorstehrichtungen der zwei Vorsprünge (4a, 4b, 4c) entsprechen, so ausgeschnitten, dass sie sich in einer seitlichen Richtung des Schutzelements (5) öffnen,  
einen Schritt des Einführens der Vorsprünge (4a, 4b, 4c) durch das Dichtungselement (6),  
einen Schritt des Aufwickelns eines Schalldämmungselement auf die Außenfläche des Gehäuses (2) nach dem Einführen der Vorsprünge (4a, 4b, 4c) durch das Dichtungselement (6),  
einen Schritt des Verbindens von Kabeln mit dem elektrischen Anschluss (3) des Gehäuses (2), das mit dem Schalldämmungselement umwickelt wurde, und  
einen Schritt des Montierens des Schutzelements (5) an der Außenfläche des Gehäuses (2), in dem die Kabel mit dem elektrischen Anschluss (3) verbunden sind.

**Revendications****1. Compresseur électrique (1) comprenant :**

un boîtier (2) ayant une surface externe incurvée ;  
 une borne électrique (3) prévue au niveau de la surface externe du boîtier (2) ;  
 des saillies en forme de broche (4a, 4b, 4c) qui font saillie de la surface externe du boîtier (2) dans une direction normale de la surface externe ; et  
 un élément de protection (5) qui a des ouvertures (7a, 7b, 8) qui correspondent aux positions et à la direction en saillie des saillies (4a, 4b, 4c) et qui entoure la borne électrique (3) dans un état dans lequel les saillies sont insérées dans les ouvertures (7a, 7b, 8),  
**caractérisé en ce que** deux des saillies (4a, 4b) sont agencées dans une direction circonférentielle de la surface externe, et les ouvertures (7a, 7b) correspondant aux deux saillies (4a, 4b) sont coupées pour s'ouvrir dans une direction latérale de l'élément de protection (5). 25

**2. Compresseur électrique selon la revendication 1, comprenant en outre :**

un élément d'étanchéité (6) qui est installé entre la surface externe du boîtier et l'élément de protection (5), dans lequel les saillies (4a, 4b, 4c) comprennent deux premières saillies (4a, 4b) agencées dans la direction circonférentielle de la surface externe et une seconde saillie (4c) qui est prévue dans une position à distance dans une direction axiale de la surface externe par rapport aux premières saillies (4a, 4b), et deux premières ouvertures (11b, 12) sont formées dans l'élément d'étanchéité (6) de sorte que les premières ouvertures (11b, 12) correspondent individuellement à l'une parmi les premières saillies (4a, 4b) et la seconde saillie (4c) et en ce que l'élément d'étanchéité est supporté par les deux positions. 40

**3. Compresseur électrique selon la revendication 1 ou 2, dans lequel, dans un cas dans lequel une direction en saillie de la borne électrique (3) est configurée pour être inclinée par rapport à une partie droite (L) d'une partie de base (10) sur laquelle le boîtier (2) est configuré pour être installé, l'élément de protection (5) a une surface externe dans laquelle une surface est configurée pour être parallèle à la partie droite (L) de la partie de base (10) lorsque l'élément de protection (5) est monté sur le boîtier (2). 55****4. Procédé de fabrication d'une compresseur électrique, le compresseur électrique (1) comprenant : un boîtier (2) ; une borne électrique (3) prévue au niveau d'une surface externe du boîtier (2) ; des saillies en forme de broche (4a, 4b, 4c) ; un élément de protection (5) qui entoure la borne électrique (3) dans un état dans lequel les saillies sont insérées dans les ouvertures (7a, 7b, 8) ; et un élément d'étanchéité (6) qui est installé entre la surface externe du boîtier (2) et l'élément de protection (5), le procédé de fabrication comprenant :**

une étape de fourniture de deux des saillies (4a, 4b, 4c) agencées dans une direction circonférentielle de la surface externe ;  
 une étape de fourniture d'ouvertures (7a, 7b, 8) correspondant aux positions et aux directions en saillie des deux saillies (4a, 4b, 4c) découpées pour s'ouvrir dans une direction latérale de l'élément de protection (5) ;  
 une étape d'insertion des saillies (4a, 4b, 4c) dans l'élément d'étanchéité (6) ;  
 une étape d'enroulement d'un élément d'isolation acoustique sur la surface externe du boîtier (2) après l'insertion des saillies (4a, 4b, 4c) dans l'élément d'étanchéité (6) ;  
 une étape de raccordement de câbles à la borne électrique (3) du boîtier (2) qui a été enveloppée avec l'élément d'isolation acoustique ; et  
 une étape de montage de l'élément de protection (5) sur la surface externe du boîtier (2) dans lequel les câbles sont raccordés à la borne électrique (3). 25

FIG. 1

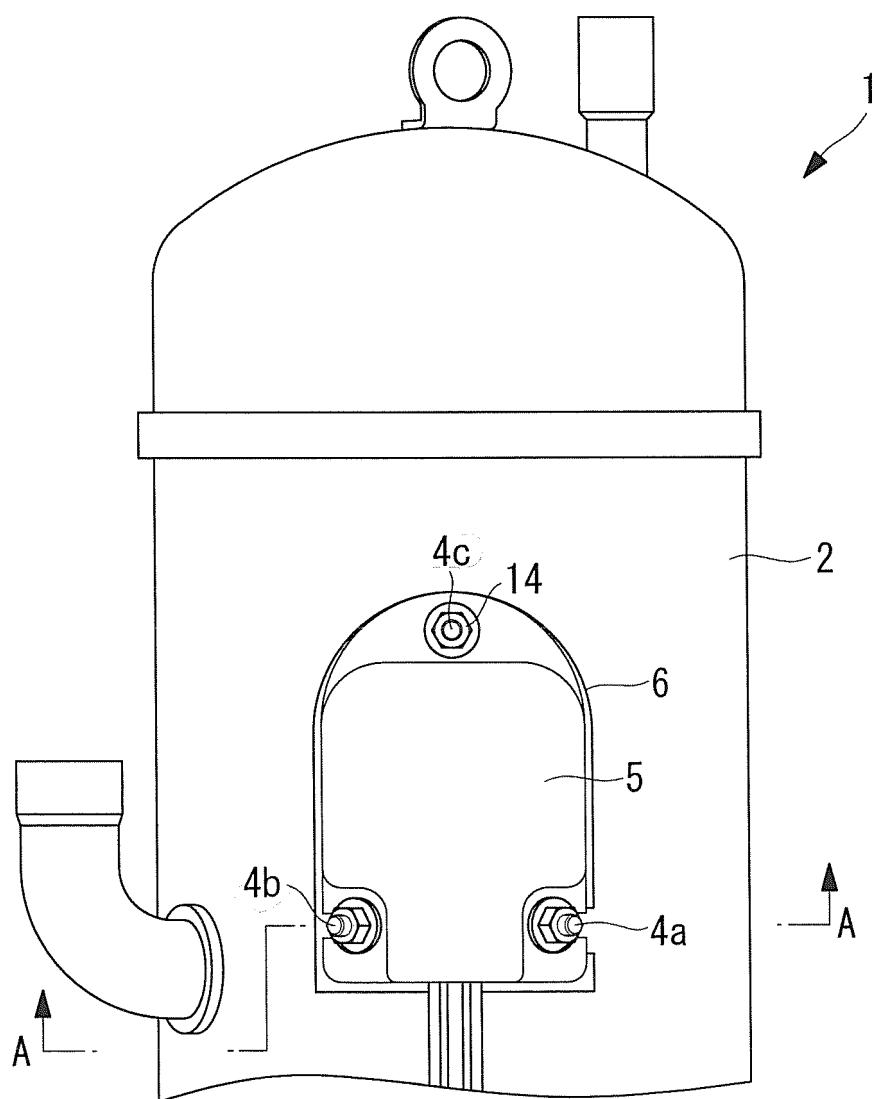


FIG. 2

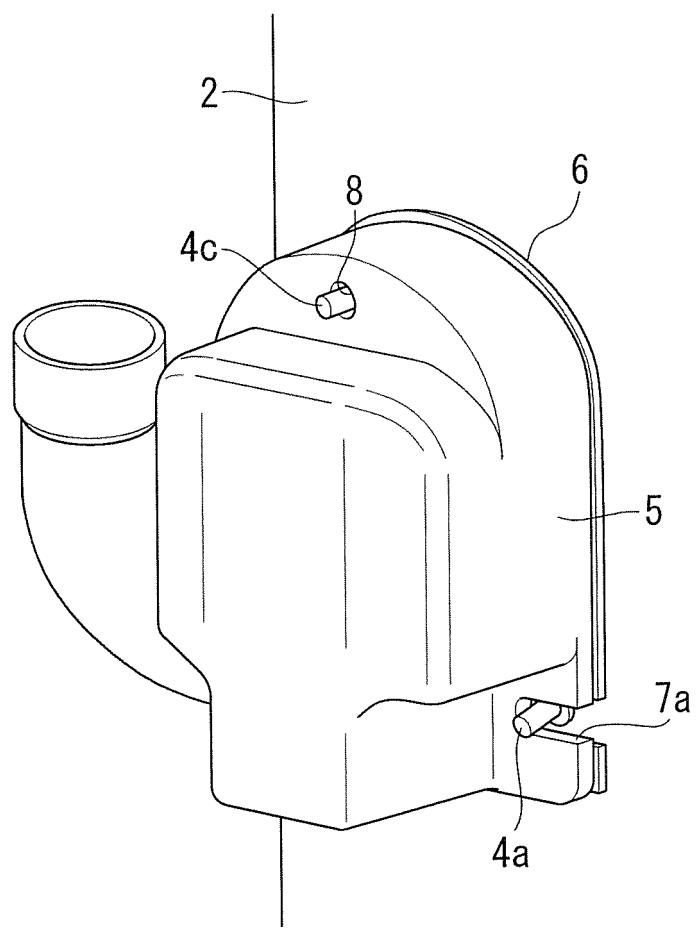


FIG. 3

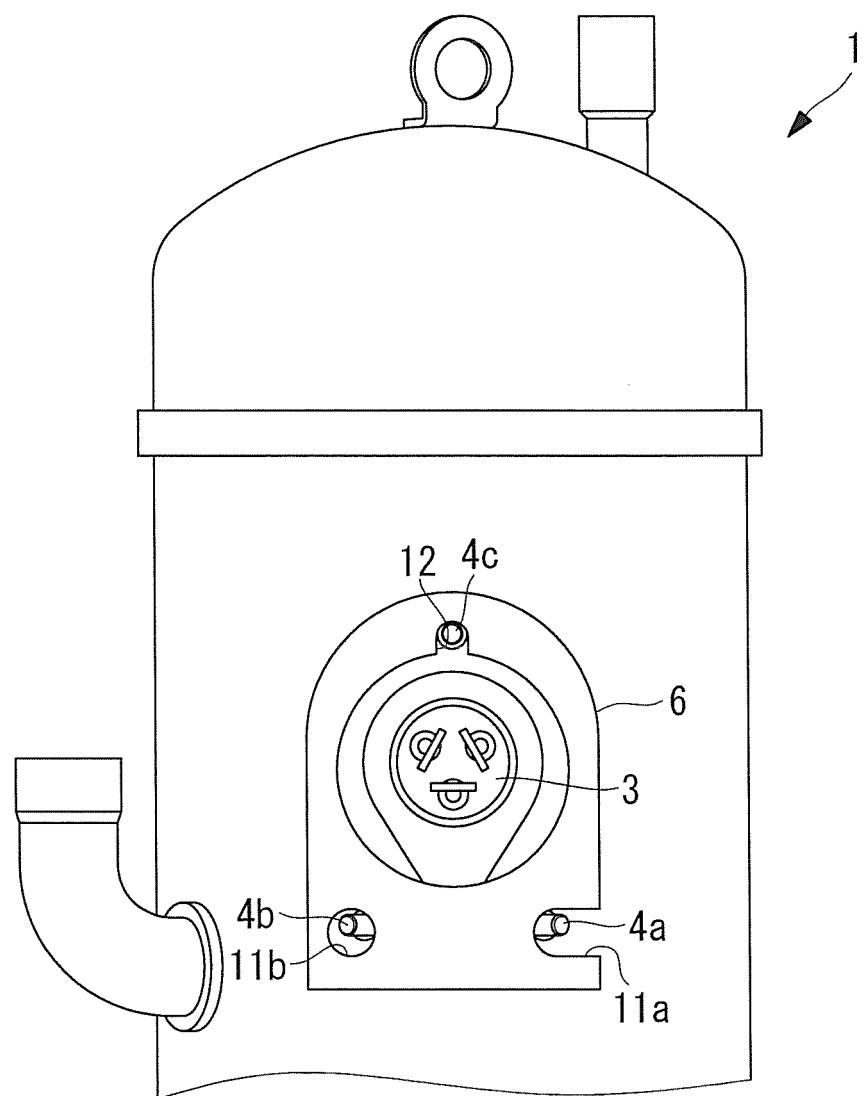


FIG. 4

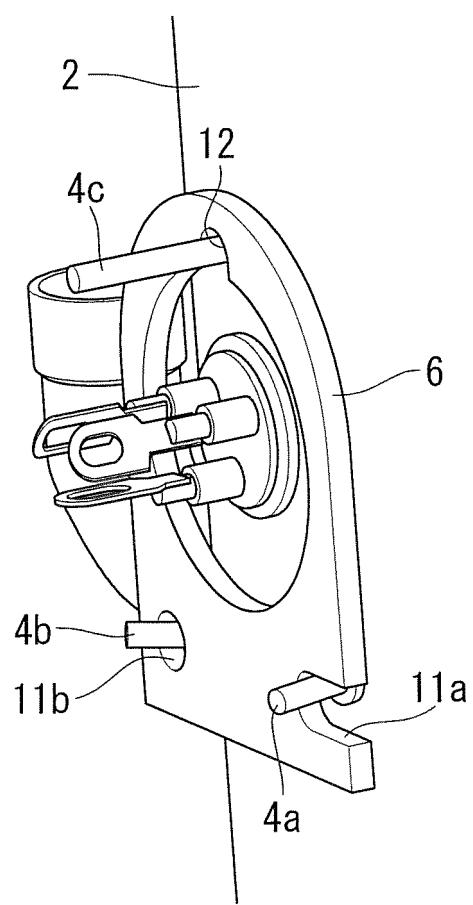


FIG. 5

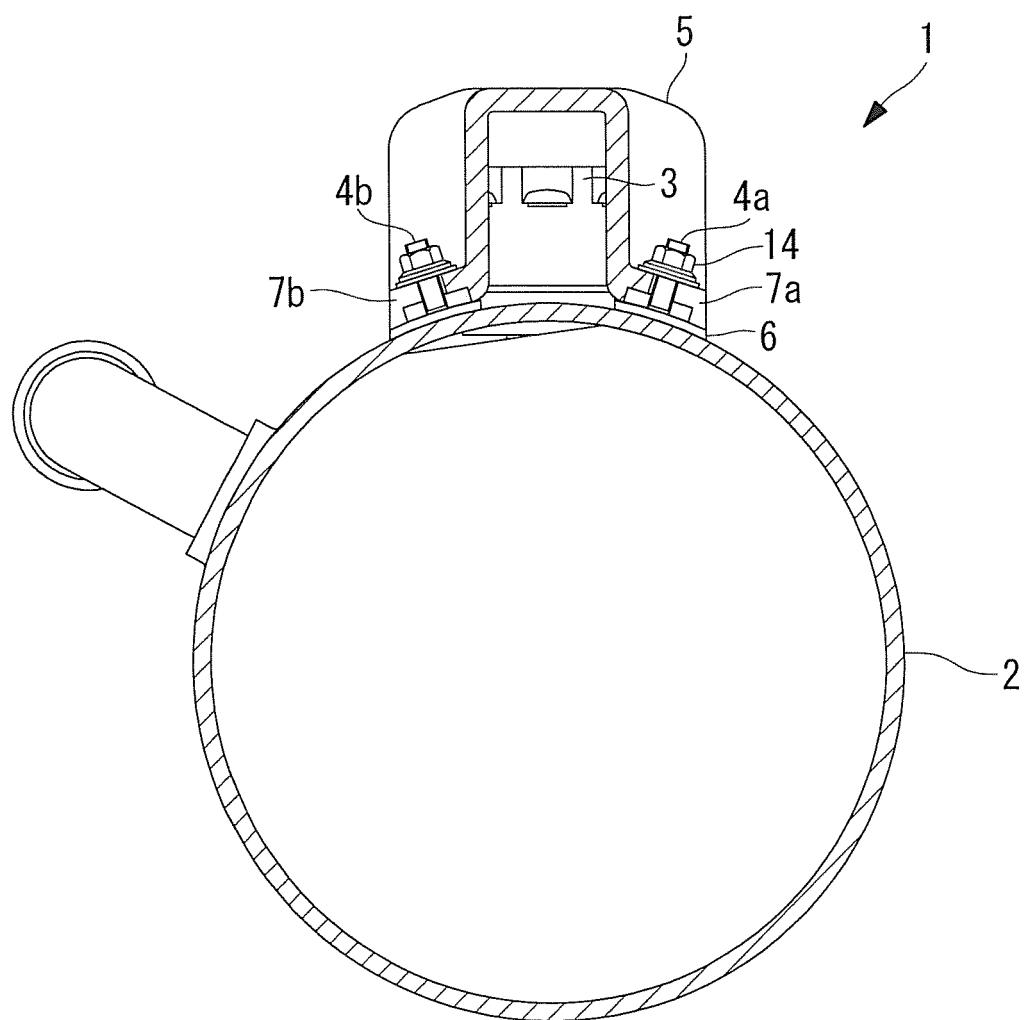


FIG. 6

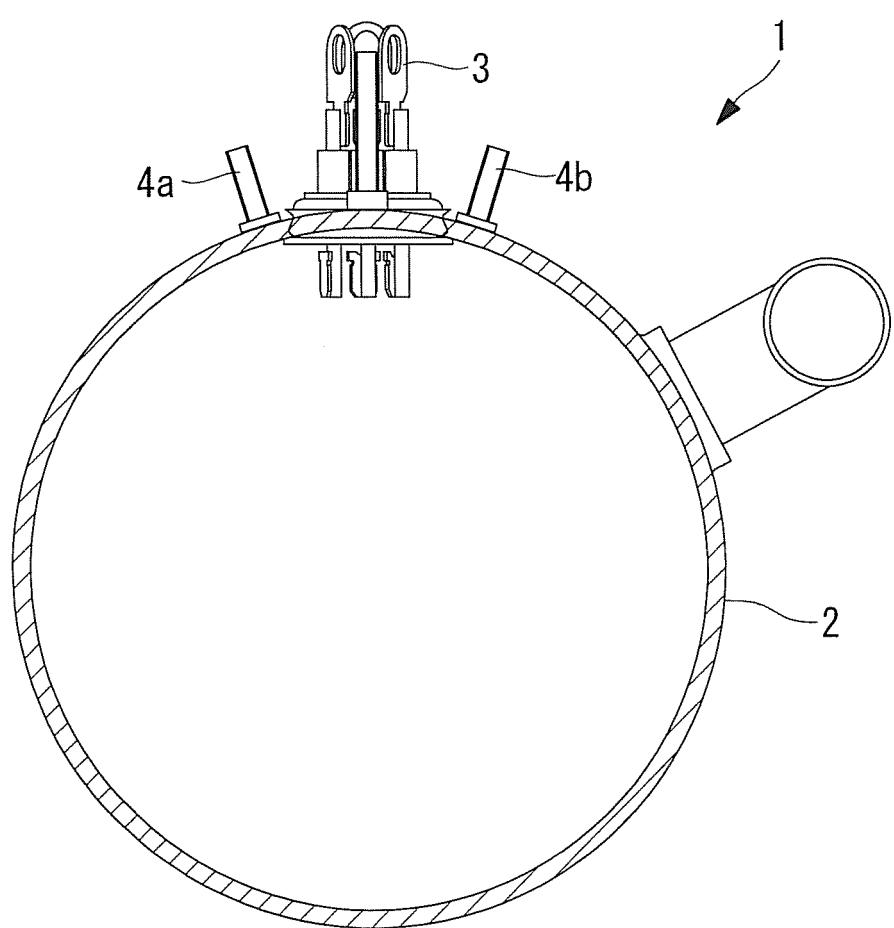


FIG. 7

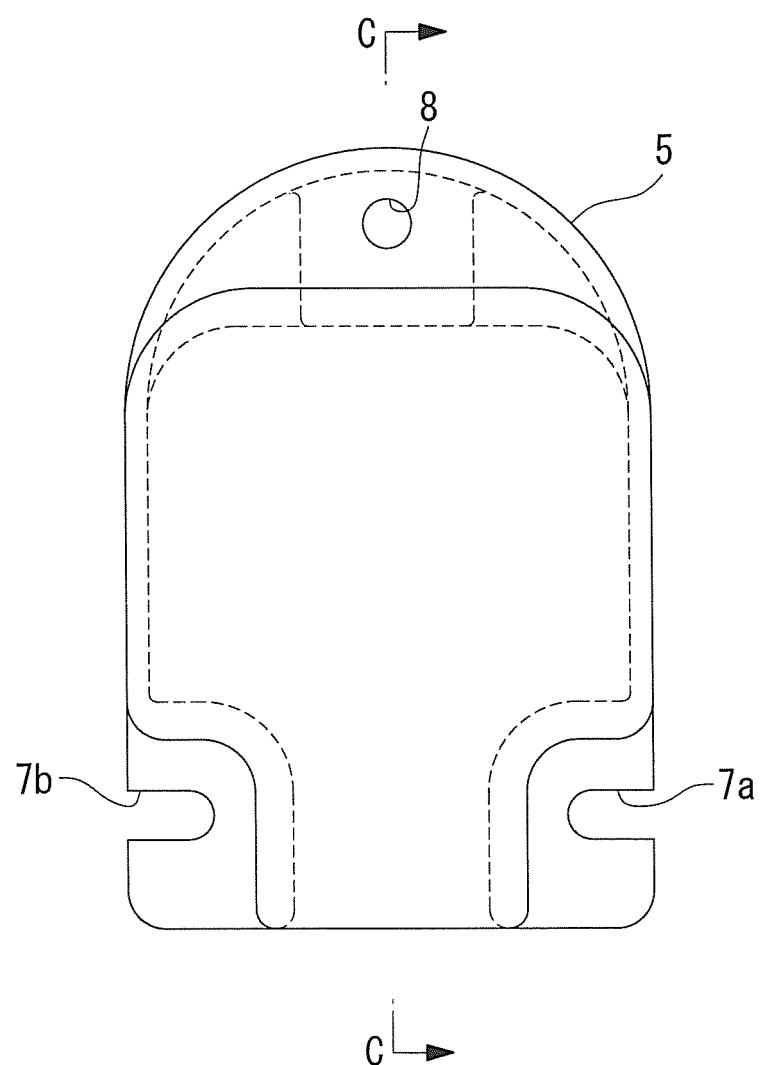


FIG. 8

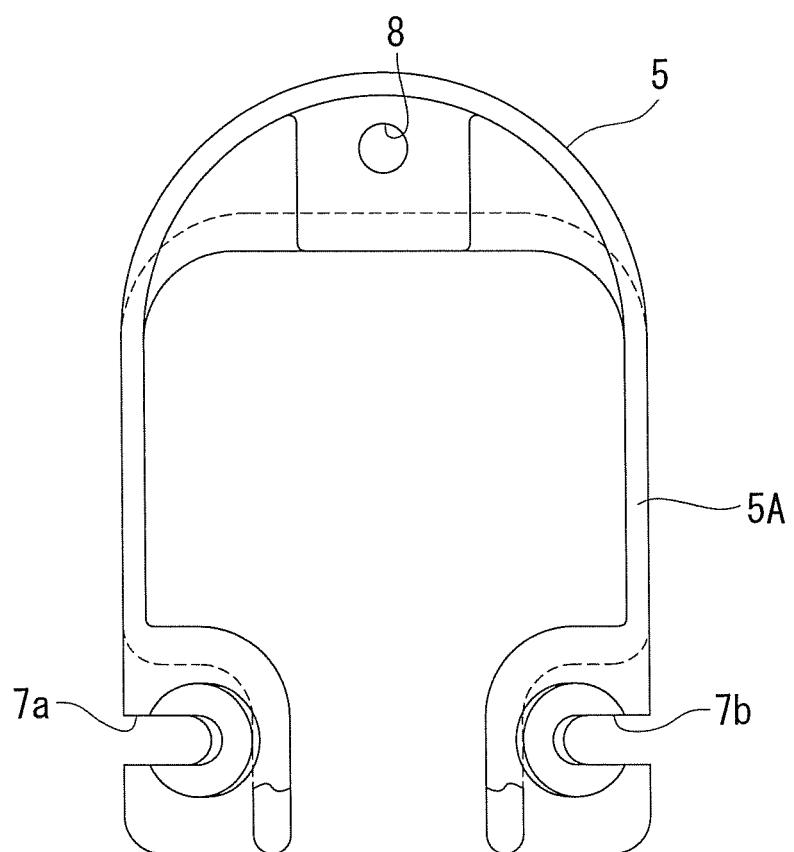


FIG. 9

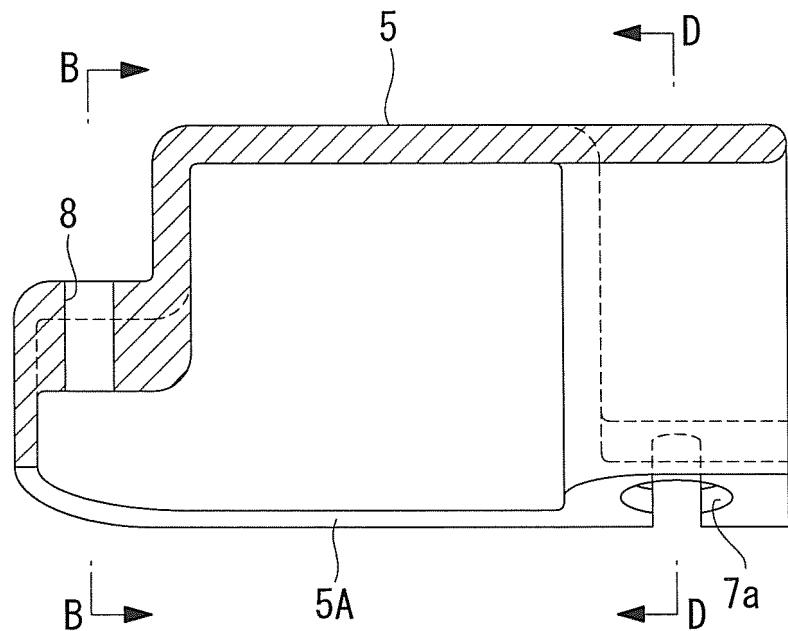


FIG. 10

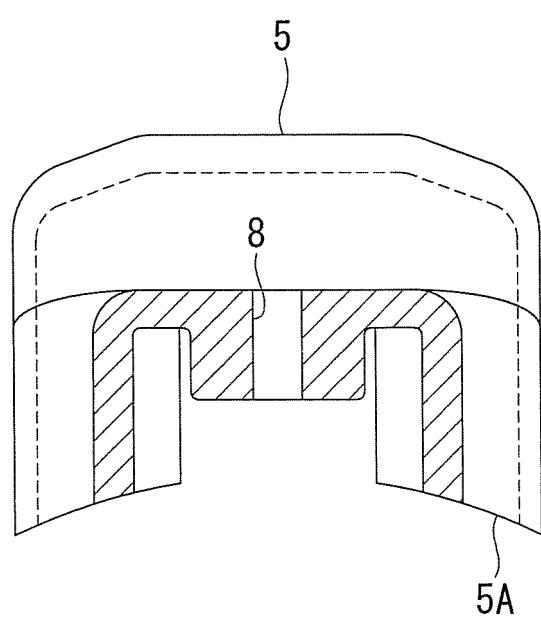


FIG. 11

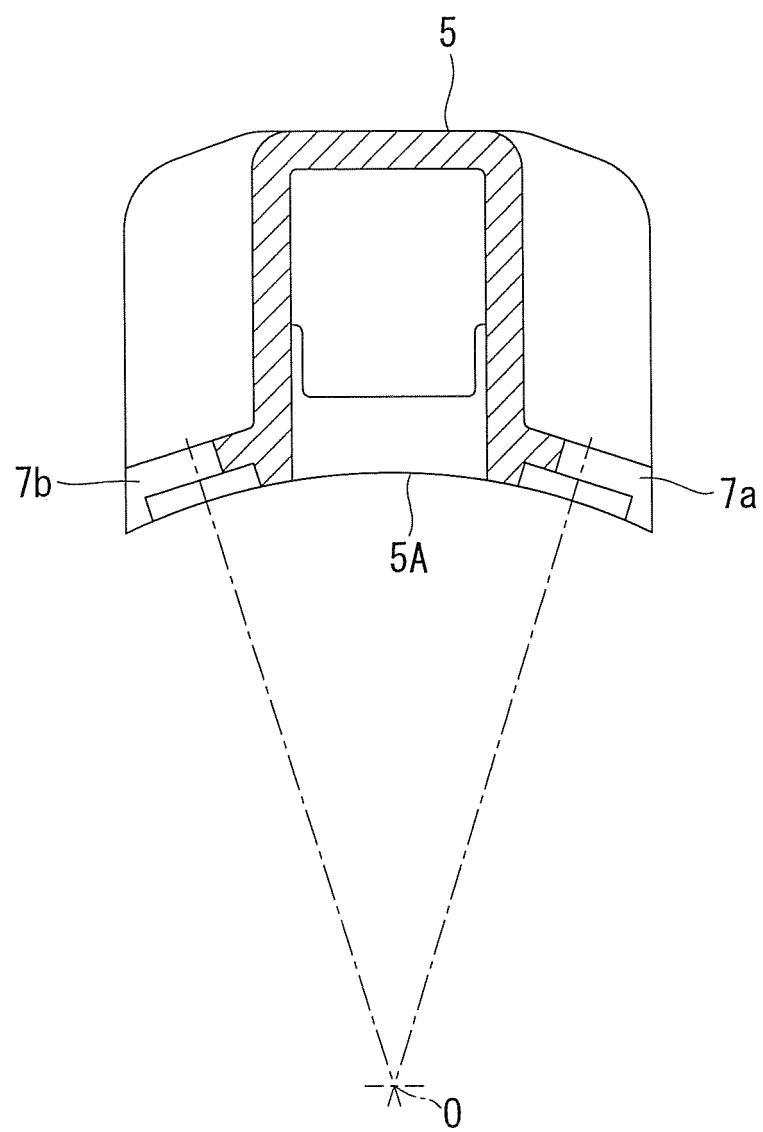


FIG. 12

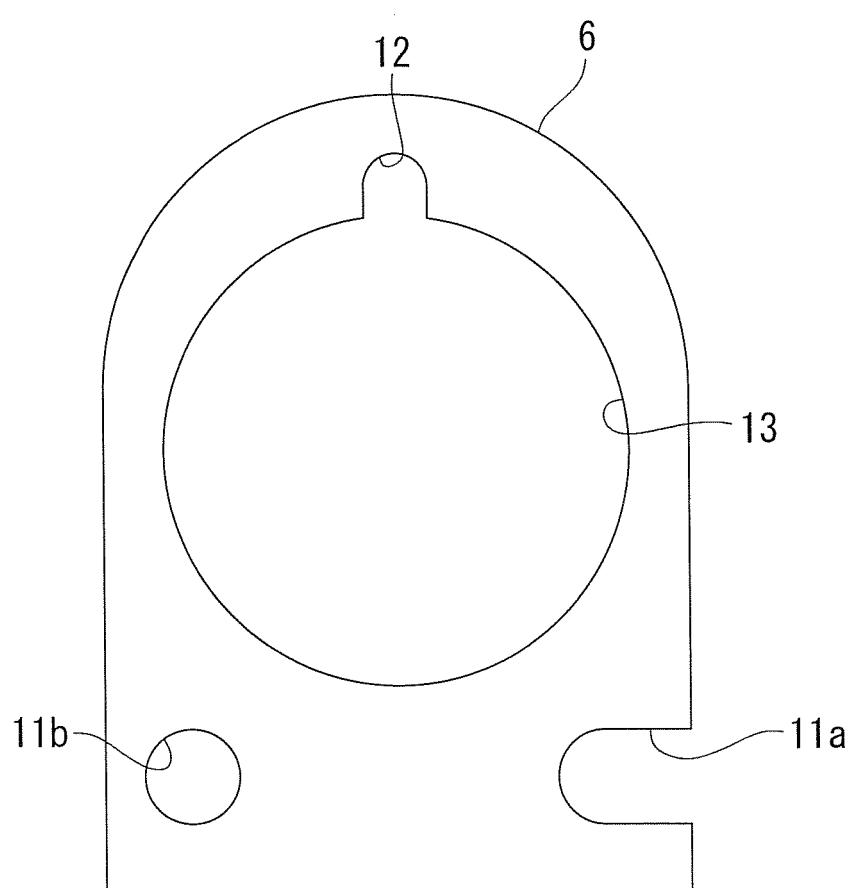
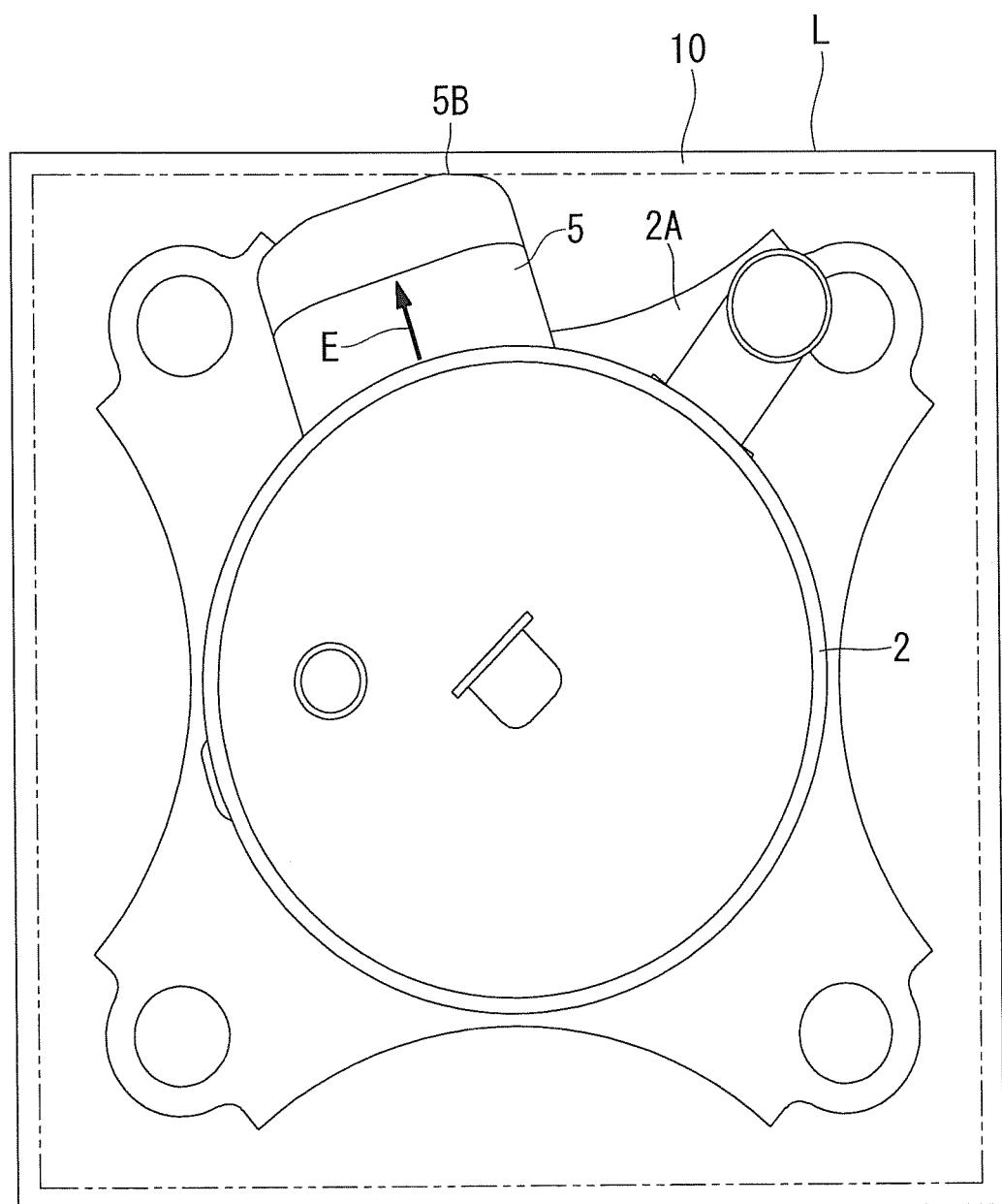


FIG. 13



**REFERENCES CITED IN THE DESCRIPTION**

*This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.*

**Patent documents cited in the description**

- JP S4923291 B [0004]
- JP 9158835 A [0004]