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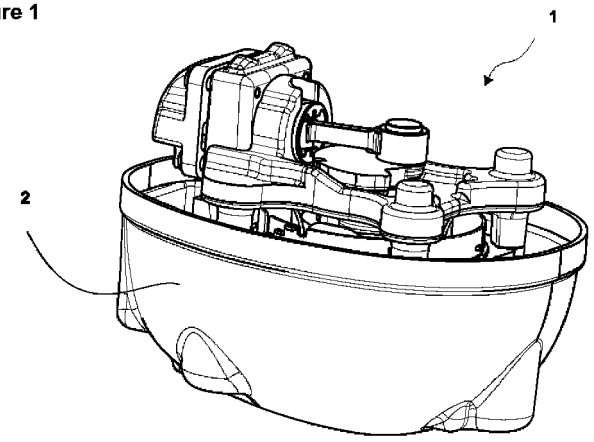
(54) **A HERMETIC COMPRESSOR COMPRISING A SPRING CONNECTION MEMBER**

(57) The present invention relates to a hermetic compressor (1) comprising a lower casing (2), a body (4) placed onto the lower casing (2), a rotor which is disposed in the lower casing (2) and a stator (5) which is positioned around the rotor concentrically with the rotor, and at least one bolt (6) which connects the body (2) and the stator (5) to each other.

Figure 1



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Description

[0001] The present invention relates to a hermetic compressor comprising at least one spring connection member the suspension system of which can be adjusted according to the low or high operational speed.

[0002] In hermetic compressors, the body is connected to the lower casing by means of helical compression springs. Springs limit the movement of the compressor in the entire casing and also form the suspension system which contributes to the lowest possible speed of the compressor in variable speed compressors. In the state of the art compressors, the body is generally connected to the lower casing by using four springs. The spring is fitted over the bolts which connect the body and the stator to each other, thus ensuring the connection of the body of the compressor to the lower casing. However, the use of four springs as standard may cause low operational speed and incompatible spring strength in variable speed compressors. Adjusting the springs providing the suspension according to the lowest operational speed causes noise and mechanical damage during the start-stop of the compressor. The use of springs only in accordance with the desired strength value causes high noise due to mechanical resonance at low rotational speed. Therefore, it is important that the springs in variable speed hermetic compressors provide strength and do not generate noise in accordance with low operational speed.

[0003] In the state of the art Chinese Patent Document No. CN111306042, an adjustable connection member used in automobile compressors is disclosed.

[0004] In another state of the art Chinese Patent Document No. CN111720289, a torsion spring structure is disclosed, which is used to reduce the start-stop noise of a compressor.

[0005] The aim of the present invention is the realization of a hermetic compressor comprising a suspension system which is suitable for high strength and low rpm operational speeds thanks to a variable spring number and arrangement.

[0006] The hermetic compressor of the present invention comprises a connection member which enables the springs to be connected to the lower casing in the desired number and at the desired points. The connection member comprises a first arm, a second arm, at least one compressor connection end, at least one casing connection end, and at least one pin.

[0007] The first arm and the second arm can be angular, asymmetric or symmetric depending on the region where the connection member is positioned in the body.

[0008] The pin has a length and thickness suitable for fitting over the spring. In an embodiment of the present invention, the pin can be a component in the form of a blown pin profile or bolt which provides the connection of the spring.

[0009] In an embodiment of the present invention, the pin is mounted to the connection member by welding.

[0010] The first arm and the second arm which constitute the connection member ensures alignment for carrying load and connecting the spring in the connection between the compressor body and the lower casing.

[0011] The pin on the connection member can be manufactured by blowing the material of the connection member such that at least some part thereof is positioned on the first arm and/or the second arm.

[0012] Moreover, the pin can be mounted to the connection member by welding or mounted by means of a connection means such as bolt, screw, etc. and a mounting tooth on the connection member.

[0013] The pin can be selected so as to allow the placement of a spring at any length and diameter which is corresponds to the speed and strength desired for the operation of the compressor.

[0014] By means of the present invention, a hermetic compressor with the desired strength is realized, wherein the body and the lower casing are connected to each other by means of spring in the desired position and number independently of the bolts connecting the body and the stator, and wherein no noise is generated at low operational speeds.

[0015] The model embodiments related to the hermetic compressor realized in order to attain the aim of the present invention are shown in the attached figures, where:

Figure 1 - is the perspective view of the body and the lower casing in the hermetic compressor of the present invention.

Figure 2 - is the front view of the connection of the body, stator and the springs in the hermetic compressor of the present invention.

Figure 3 - is the perspective view of the connection member in the hermetic compressor in an embodiment of the present invention.

Figure 4 - is the perspective view of the asymmetrical connection member in the hermetic compressor in an embodiment of the present invention.

Figure 5 - is the perspective view of the symmetrical connection member in the hermetic compressor in an embodiment of the present invention.

Figure 6 - is the view of three different connection members having the pin formed by different mounting and welding methods in the hermetic compressor of the present invention.

[0016] The following numerals are referred to in the description of the present invention:

1. Hermetic compressor
2. Lower casing
3. Spring
4. Body
5. Stator
6. Bolt
7. Connection member (bracket)
8. Compressor connection end

9. First arm
10. Second arm
11. Casing connection end
12. Pin

[0017] The hermetic compressor (1) comprises a lower casing (2), a body (4) placed onto the lower casing (2), a rotor which is disposed in the lower casing (2) and a stator (5) which is positioned around the rotor concentrically with the rotor, and at least one bolt (6) which connects the body (2) and the stator (5) to each other.

[0018] The hermetic compressor (1) of the present invention comprises a connection member (12) having a first arm (9), a compressor connection end (8) which connects the first arm (9) to the body (4), a casing connection end (11) which connects the first arm (9) to the lower casing (2) and at least one pin (12) at least some part of which is placed onto the first arm (9), the hermetic compressor (1) further comprising a spring (3) which is fitted over the pin (12).

[0019] The hermetic compressor (1) comprises the body (4) which is placed into the lower casing (2), and the stator (5) which is connected to the body (4) and which forms the motor. The stator (5) and the body (4) are connected to each other by means of the bolt (6). The hermetic compressor (1) of the present invention further comprises the at least one connection member (7) for managing the suspension system in the hermetic compressor (1) according to varying needs (speed, strength, etc.). The connection member (7) comprises the at least one first arm (9) and the at least one pin (12) at least some part of which is placed onto the first arm (9). The connection member (7) is connected to the body (4) at the compressor connection end (8), and aligned with the lower casing (2) at the casing connection end (11). Thus, the desired number of springs (3) at the desired positions are fitted over the pins (12), and the hermetic compressor (1) acquires the suspension system desired by the manufacturer independently of the bolts (6) connecting the stator (5) and the body (4).

[0020] In an embodiment of the present invention, the hermetic compressor (1) comprises the connection member (7) having a second arm (10) connected to the first arm (9), and a pin (12) disposed between the first arm (9) and the second arm (10). In this embodiment, the connection member (7) is designed as a two-piece component. By means of the pin (12) disposed between the first arm (9) and the second arm (10), especially the connection member (7) is easily connected to the lower casing (2) at the central regions of the body (4), and the spring (3) can be fitted over at said regions.

[0021] In an embodiment of the present invention, the hermetic compressor (1) comprises a connection member (7) having the second arm (10) which is monolithic with the first arm (9).

[0022] In an embodiment of the present invention, the hermetic compressor (1) comprises the connection member (7) having the second arm (10) with the same length and structure as the first arm (9) and the pin (12) disposed at the middle point of the first arm (9) and the second arm (10), wherein the first arm (9) and the second arm (10) are symmetrical with respect to the pin (12). Thus, the spring (3) can be easily fitted over at long regions where the connection member (7) is desired to be placed.

[0023] In an embodiment of the present invention, the hermetic compressor (1) comprises the connection member (7) having the second arm (10) shorter than and different from the first arm (9), wherein the first arm (9) and the second arm (10) are asymmetrical with respect to the pin (12). Thus, the spring (3) can be more easily fitted over at angular regions.

[0024] In an embodiment of the present invention, the hermetic compressor (1) comprises a pin (12) which is connected to the first arm (9) and/or the second arm (10) by means of a connection means such as bolt, screw, etc. Thus, the pin (12) can be easily mounted to the connection member (7).

[0025] By means of the present invention, a hermetic compressor (1) is realized, comprising springs in numbers and regions different than standards, which connect the body (4) and the lower casing (2) to each other.

Claims

1. A hermetic compressor (1) comprising a lower casing (2), a body (4) placed onto the lower casing (2), a rotor which is disposed in the lower casing (2) and a stator (5) which is positioned around the rotor concentrically with the rotor, and at least one bolt (6) which connects the body (2) and the stator (5) to each other, **characterized by** a connection member (7) having a first arm (9), a compressor connection end (8) which connects the first arm (9) to the body (4), a casing connection end (11) which connects the first arm (9) to the lower casing (2) and at least one pin (12) at least some part of which is placed onto the first arm (9), and by a spring (3) which is fitted over the pin (12).

2. A hermetic compressor (1) as in Claim 1, **characterized by** the connection member (7) having a second arm (10) connected to the first arm (9), and a pin (12) disposed between the first arm (9) and the second arm (10).

3. A hermetic compressor (1) as in Claim 2, **characterized by** a connection member (7) having the second arm (10) which is monolithic with the first arm (9).

4. A hermetic compressor (1) as in Claim 2 or 3, **characterized by** the connection member (7) having the second arm (10) with the same length and structure as the first arm (9) and the pin (12) disposed at the middle point of the first arm (9) and the second arm

(10), wherein the first arm (9) and the second arm (10) are symmetrical with respect to the pin (12).

5. A hermetic compressor (1) as in Claim 2 or 3, **characterized by** the connection member (7) having the second arm (10) shorter than and different from the first arm (9), wherein the first arm (9) and the second arm (10) are asymmetrical with respect to the pin (12).

6. A hermetic compressor (1) as in any one of the above claims, **characterized by** a pin (12) which is connected to the first arm (9) and/or the second arm (10) by means of a connection means such as bolt, screw, etc.

Figure 1

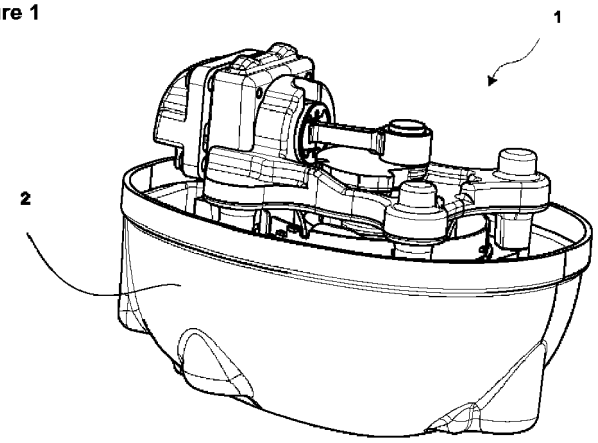


Figure 2

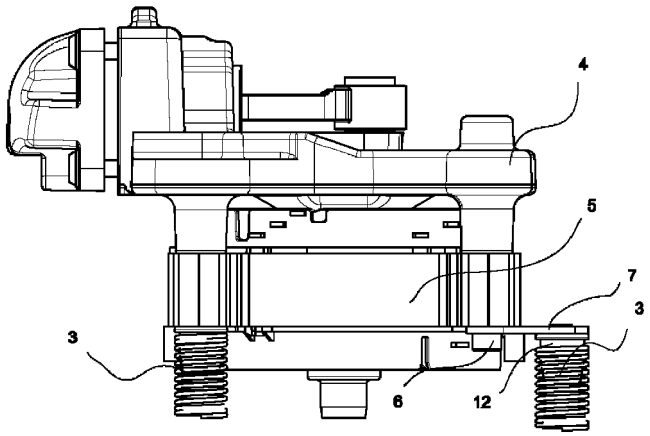


Figure 3

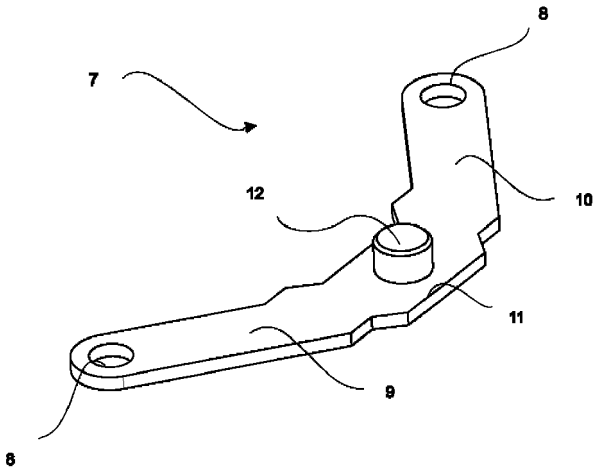


Figure 4

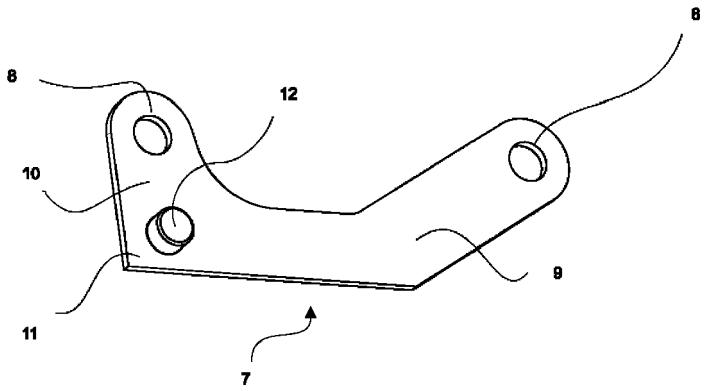


Figure 5

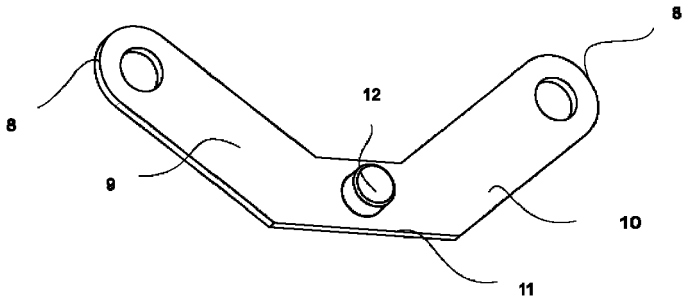
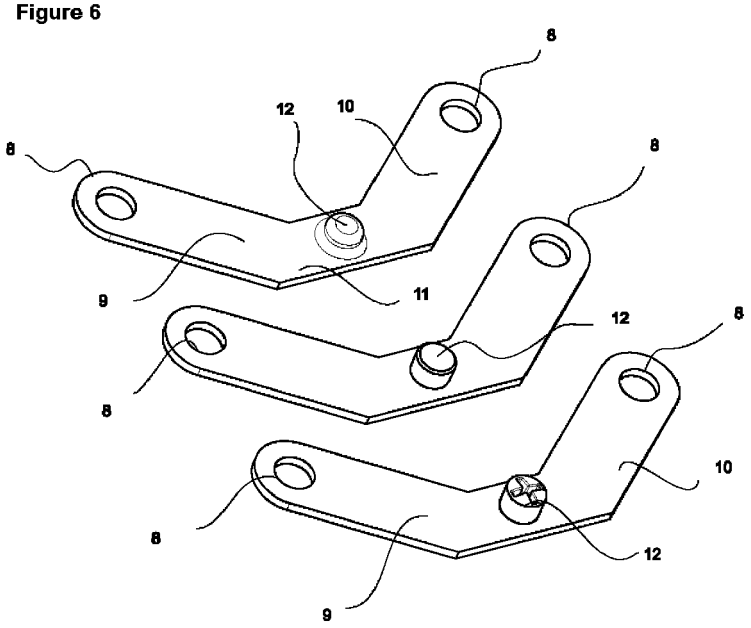


Figure 6



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EUROPEAN SEARCH REPORT

Application Number
EP 22 15 8702

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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A	* figures 1-4 * * column 1, line 15 - column 2, line 36 * * column 3, line 13 - column 4, line 17 *	4	F04B39/12
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A	* figures 2-4 * * paragraph [0032] - paragraph [0043] *	2,4,5	
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TECHNICAL FIELDS SEARCHED (IPC)

F04B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	29 September 2022	Gnüchtel, Frank

CATEGORY OF CITED DOCUMENTS

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

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- CN 111720289 **[0004]**