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(54) **A motor denoising structure applied to vacuum cleaners**

(57) The present invention discloses a motor denoising structure applied to vacuum cleaners, whose motor is mounted and fixed through two or more flexible supports on both sides of the motor; the present invention makes use of the flexible support to connect the motor to the motor cover, such a flexible connection reducing noise while reducing vibration.

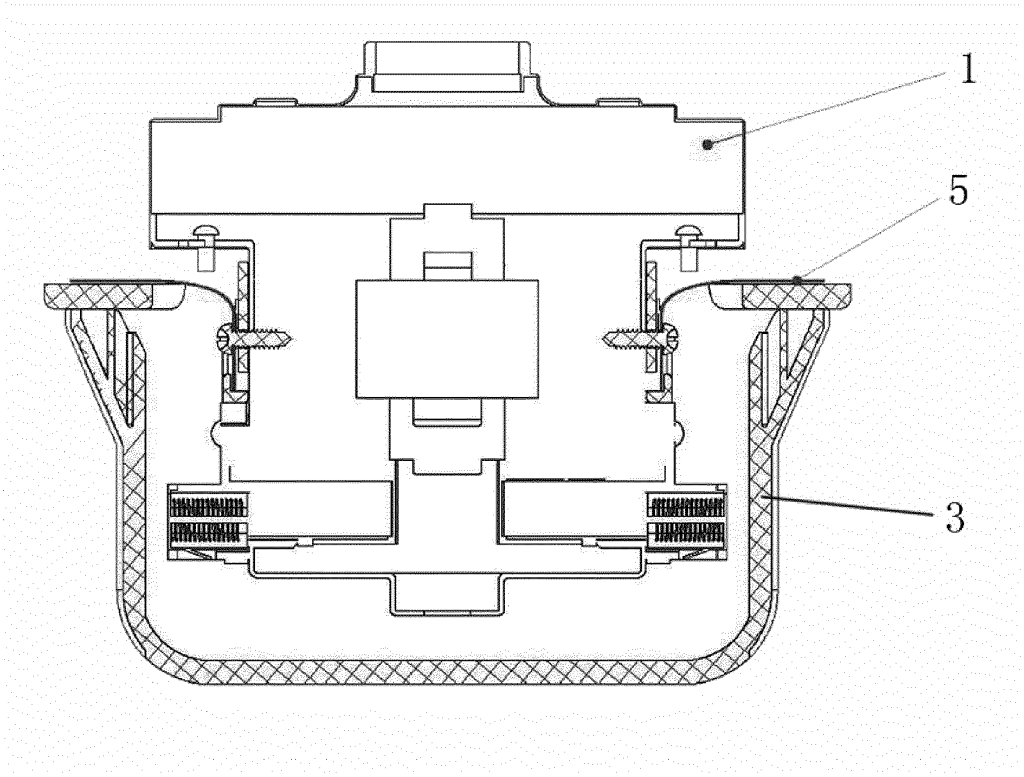

Fig. 1

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Description

FIELD OF THE INVENTION

[0001] The present invention relates to a motor denoising structure applied to vacuum cleaners.

BACKGROUND OF THE INVENTION

[0002] With the motor power of a vacuum cleaner gradually increased, the noise of the vacuum cleaner is also increased. In the prior art, in order to resolve the problem of motor noise of the vacuum cleaner, the manufacturers usually take the following approaches:

1. Making effort on the motor itself, and achieving low noise output by reducing the power consumption while ensuring its work efficiency; however, this approach suffers high cost, with the actual denoising effect not very ideal.

2. Making improvement in the wind channel in the motor housing, such as making improvement in the shape of the dynamic and static wind wheels, or reducing noise by the addition of an anechoic room, a wind pipe and other structures; however, this approach has the disadvantages that the motor housing has complicated structure design, the model is more difficult to be manufactured, and the cost is increased.

3. Since the low-frequency noise of the vacuum cleaner mainly comes from vibration of the motor, in order to reduce vibration of the motor, in the industry the motor is fixed inside the motor cover front and rear with a motor seal ring and a motor pressure seat; however, the prior art motor and motor cover are fixed mostly by rigid connection, which still has a limited silencing effect and may also produce resonance, not able to achieve low noise of the motor.

CONTENTS OF THE INVENTION

[0003] A purpose of the present invention is as follows: A motor denoising structure applied to vacuum cleaners is provided, supporting the motor by a flexible support, such a flexible connection reducing noise while reducing vibration.

[0004] A technical solution of the present invention is as follows: A motor denoising structure applied to vacuum cleaners, whose motor is mounted and fixed through two or more flexible supports on both sides of the motor.

[0005] The flexible support is a resilient support having a supporting function.

[0006] A further technical solution of the present invention is as follows: This motor denoising structure further comprises a motor cover, the flexible support on both sides of the motor being connected and fixed on the motor cover.

[0007] In order to better damp vibration and reduce noise, the lower portion of the motor in the present invention is suspended inside the motor cover, and certainly other cushioning parts (e.g. a damping pad and a spring) can also be disposed between the tail portion of the motor and the motor cover, so as to achieve the corresponding damping effect. The solution that the lower portion of the motor is suspended inside the motor cover is preferred in the present invention, thereby preventing the lower portion of the motor from contacting the motor cover to make the motor vibration transferred to the motor cover, which can better reduce noise and the production cost as well.

[0008] Furthermore, the motor is provided at its periphery with a motor support used for fixing the motor, the flexible support being disposed between the motor cover and the motor support.

[0009] The specific mounting structure of the flexible support is as follows: The motor cover is provided at its upper edge opposite to each of the flexible supports with a positioning groove, respectively, inside which is mounted the first cushion that is provided inside with a mounting groove used for embedding an outer end portion of the flexible support; the motor cover is provided with an external motor cover fixedly connected thereto, with a second cushion being disposed between the external motor cover and the motor cover; the second cushion has a projecting portion corresponding to the mounting groove, inside which is embedded the outer end of the flexible support, that is pressed tight and fixed by the projecting portion of the second cushion. The motor support comprises at least one pair of supports engaging each other, between each of the supports and the motor cover being connected the flexible support, the inner end portion of the flexible support being jointed to the corresponding support and connected and fixed through a screw.

[0010] The flexible support is a flexible metal sheet.

[0011] The present invention has the following advantages:

1. The present invention makes use of the flexible support to connect the motor support and the motor cover, such a flexible connection reducing noise while reducing vibration.

2. The lower portion of the motor in the present invention is preferably suspended inside the motor cover, thereby preventing the lower portion of the motor from contacting the motor cover to make the motor vibration transferred to the motor cover, which can better reduce noise and the production cost as well.

3. The outer end of the flexible support in the present invention is embedded inside the mounting groove of the first cushion, and clamped and fixed by the first cushion and the second cushion, such a mount-

ing method better reducing the vibration between the flexible support and the motor cover and external motor cover thus better reducing the noise.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] The present invention will be further described below with reference to drawings and examples.

Fig. 1 is a schematic view of the present invention;

Fig. 2 is a structural schematic view of the present invention;

Fig. 3 is a partial enlarged view of Fig. 1;

Fig. 4 is an assembly drawing of the present invention;

Fig. 5 is a sectional schematic view of the present invention when the external motor cover is not mounted;

Fig. 6 is a sectional view of the present invention when being applied to a vacuum cleaner; and

Fig. 7 is another sectional view of the present invention when being applied to a vacuum cleaner.

[0013] Wherein: 1. motor;

2. external motor cover;
3. motor cover; 31. positioning groove;
4. motor support; 41. support;
5. flexible support;
6. first cushion; 61. mounting groove;
7. second cushion; 71. projecting portion;
8. screw.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0014] Example: As shown in Figs. 1-7, a motor denoising structure applied to vacuum cleaners, comprising a motor 1 and a motor cover 3, the motor 1 being provided at its periphery with a motor support 4 used for fixing the motor, the motor support 4 and the motor cover 3 being connected and fixed through two or more flexible supports 5 having a supporting function. In this example, there are two flexible supports 5, which are correspondingly disposed on both sides of the motor support 4, the flexible support 5 being a flexible metal sheet.

[0015] In order to better damp vibration and reduce noise, the lower portion of the motor 1 in the present invention is suspended inside the motor cover 3, and certainly other cushioning parts (e.g. a damping pad and a spring) can also be disposed between the tail portion of the motor 1 and the motor cover 3, so as to achieve the corresponding damping effect. The solution that the lower portion of the motor 1 is suspended inside the motor cover is preferred in this example, thereby preventing the lower portion of the motor 1 from contacting the motor cover 3 to make vibration of the motor 1 transferred to the motor cover 3, which can better reduce noise and the production cost as well.

[0016] As shown in Fig. 4, the flexible support 5 has the following specific mounting structure: The motor cover 3 is provided at its upper edge opposite to each of the flexible supports 5 with a positioning groove 31, respectively, inside which is mounted the first cushion 6 that is provided inside with a mounting groove 61 used for embedding an outer end portion of the flexible support 5; the motor cover 3 is provided with an external motor cover 2 fixedly connected thereto, with a second cushion 7 being disposed between the external motor cover 2 and the motor cover 3; the second cushion 7 has a projecting portion 71 corresponding to the mounting groove 61, inside which is embedded the outer end of the flexible support 5, that is pressed tight and fixed by the projecting portion 71 of the second cushion 7. The motor support 4 comprises at least one pair of supports 41 engaging each other, between each of the supports 41 and the motor cover 3 being connected the flexible support 5, the inner end portion of the flexible support 5 being jointed to the corresponding support 41 and connected and fixed through a screw 8. Such a mounting method better reduces the vibration between the flexible support 5 and the motor cover 3 and external motor cover 2, and thus better reduces the noise.

[0017] Wherein at least a part of the flexible support 5 is accommodated by the motor cover 3, with its outer end and inner end portion intersecting at a right angle having a gradually transitional arc; the outer end of the flexible support 5 is disposed between the first cushion 6 and the second cushion 7 and far away from the motor center direction, and provided with two supporting points, the inner end portion being provided with a single fixing point and close to the motor center direction. The upper surface of the first cushion 6 is substantially flush with the upper surface of the motor cover 3. The centerline of the motor 1 is perpendicular to the horizontal plane, with the head portion of the motor 1 disposed above the tail portion. The positioning groove 31 is provided with a positioning post, while the first cushion 6 is provided with a positioning hole that allows the positioning post to go through, with at least a part of the side of the two supporting points on the outer end contacting against the projection of the first cushion 6. The first cushion 6 is in a block form, while the second cushion 7 is in a closed annular form.

[0018] The present invention makes use of the flexible support 5 to connect the motor support 4 and the motor cover 3, and meanwhile ensures that lower portion of the motor 1 is suspended, with the corresponding first cushion 6 and second cushion 7 disposed between the outer end portion of the flexible support 5 and the motor cover 3 and external motor cover 2; the above multiple damping structures reduce vibration and greatly reduce noise of

the motor, achieving low noise of the vacuum cleaner.

[0019] What is described above is only a specific application example of the present invention, and cannot limit the scope of protection of the present invention. In addition to the above example, the present invention can also have other embodiments. Any technical solution based on equal substitution or equivalent alteration all falls within the scope seeking protection in the present invention.

Claims

1. A motor denoising structure applied to vacuum cleaners, **characterized in that**: a motor (1) is mounted and fixed through two or more flexible supports on both sides of the motor (1).

2. The motor denoising structure applied to vacuum cleaners according to claim 1, wherein the flexible support is a resilient support (5) having a supporting function.

3. The motor denoising structure applied to vacuum cleaners according to claim 2, wherein the flexible support (5) is mounted on a first cushion (6).

4. The motor denoising structure applied to vacuum cleaners according to claim 3, wherein this motor denoising structure further comprises a motor cover (3), the flexible support (5) on both sides of the motor (1) being connected and fixed on the motor cover (3).

5. The motor denoising structure applied to vacuum cleaners according to claim 4, wherein the motor cover (3) is provided at its upper edge opposite to each of the flexible supports (5) with a positioning groove (31), respectively, inside which is mounted the first cushion (6) that is provided inside with a mounting groove (61) used for embedding an outer end portion of the flexible support (5); the motor cover (3) is provided with an external motor cover (2) fixedly connected thereto, with a second cushion (7) being disposed between the external motor cover (2) and the motor cover (3); the second cushion (7) has a projecting portion (71) corresponding to the mounting groove (61), inside which is embedded the outer end of the flexible support (5) that is pressed tight and fixed by the projecting portion (71) of the second cushion (7).

6. The motor denoising structure applied to vacuum cleaners according to claim 4, wherein a lower portion of the motor (1) is suspended inside the motor cover (3).

7. The motor denoising structure applied to vacuum cleaners according to claim 4, wherein the motor (1) is provided at its periphery with a motor support (4) used for fixing the motor, the flexible support (5) being disposed between the motor cover (3) and the motor support (4).

8. The motor denoising structure applied to vacuum cleaners according to claim 7, wherein the motor support (4) comprises at least one pair of supports (41) engaging each other, between each of the supports (41) and the motor cover (3) being connected the flexible support (5), the inner end portion of the flexible support (5) being jointed to the corresponding support (41) and connected and fixed through a screw (8).

9. The motor denoising structure applied to vacuum cleaners according to claim 2, 3, 4, 5, 6, 7 or 8, wherein the flexible support (5) is a flexible metal sheet.

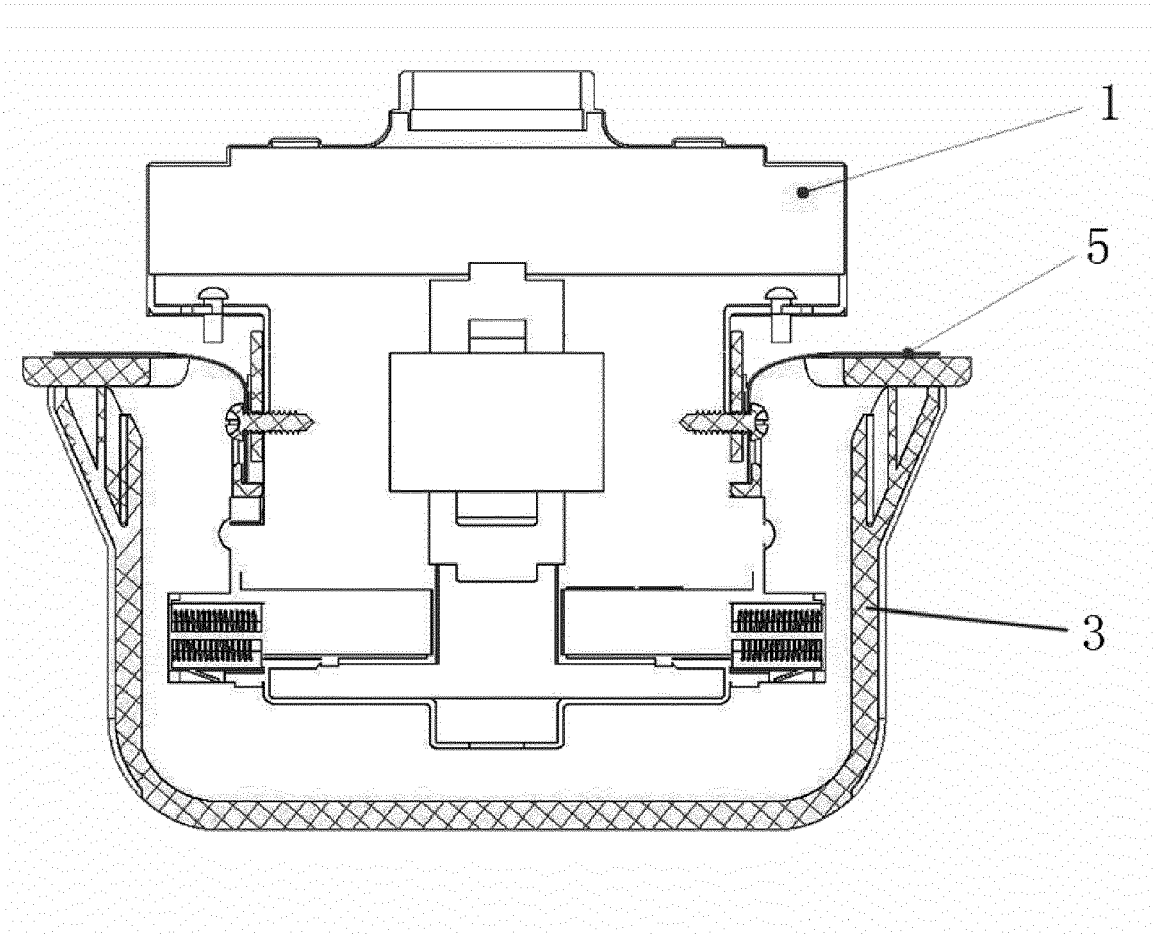

Fig. 1

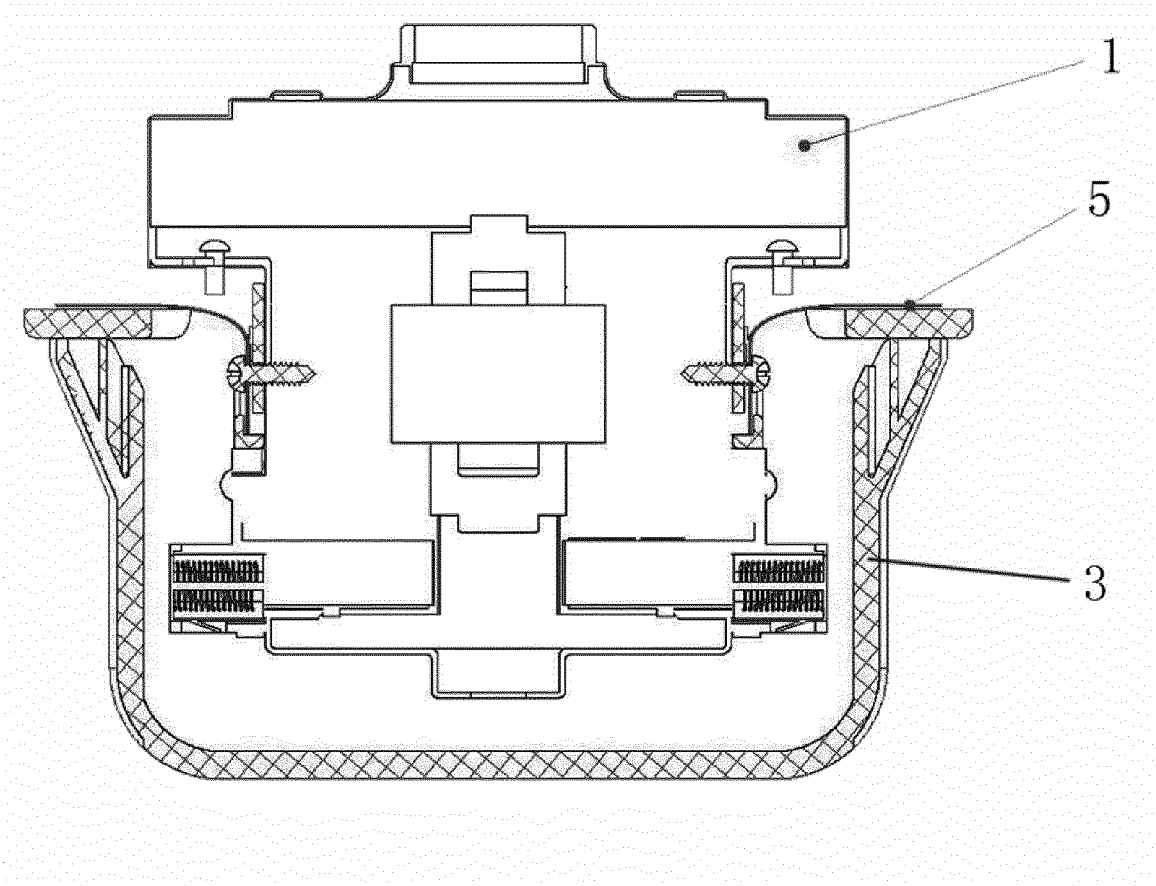

Fig. 2

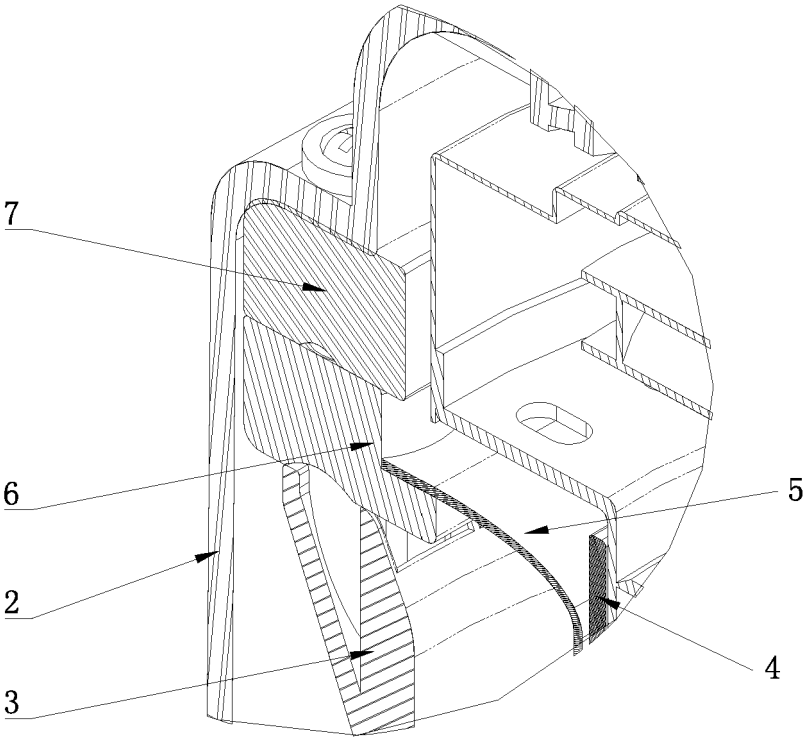

Fig. 3

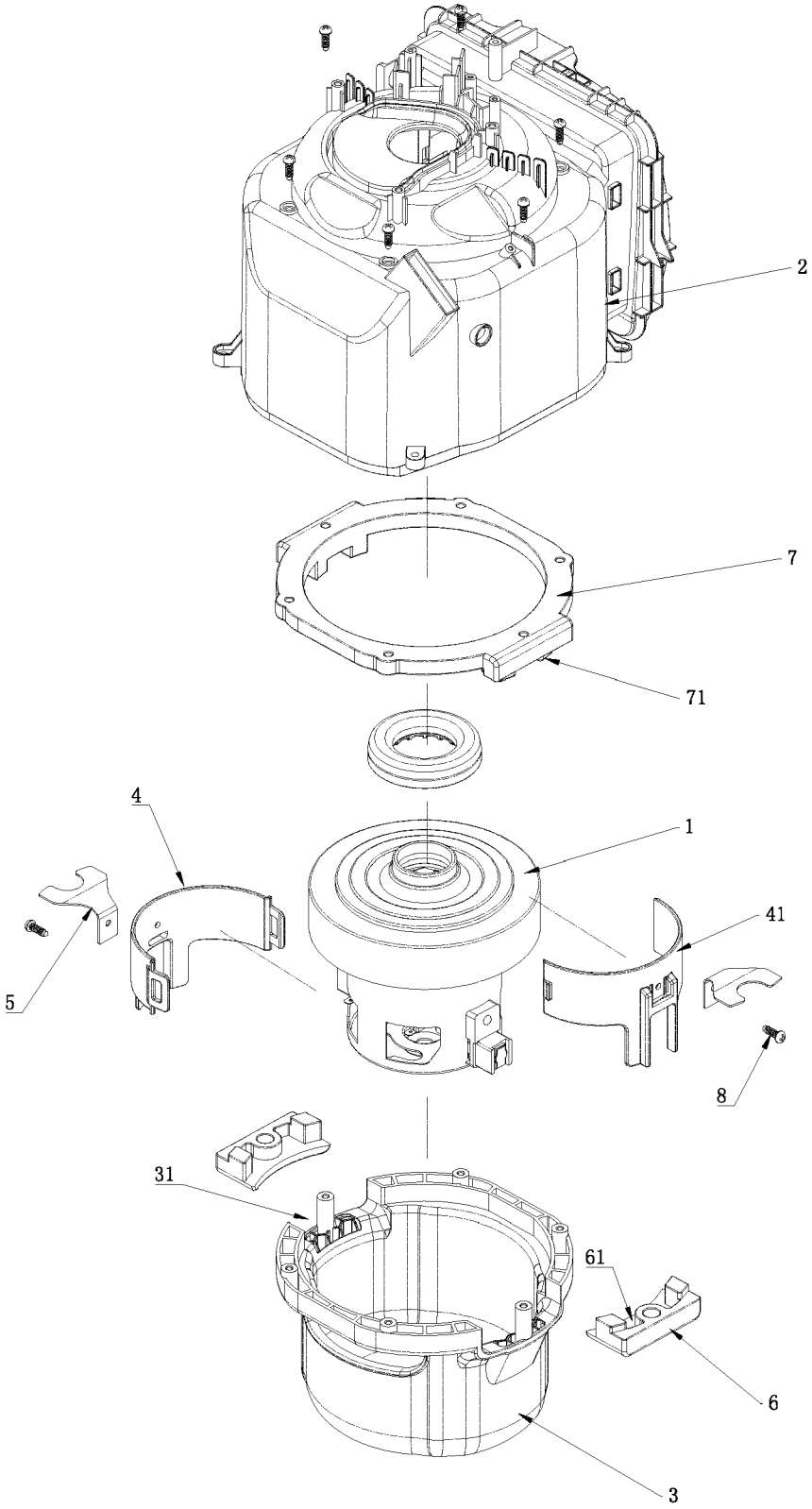

Fig. 4

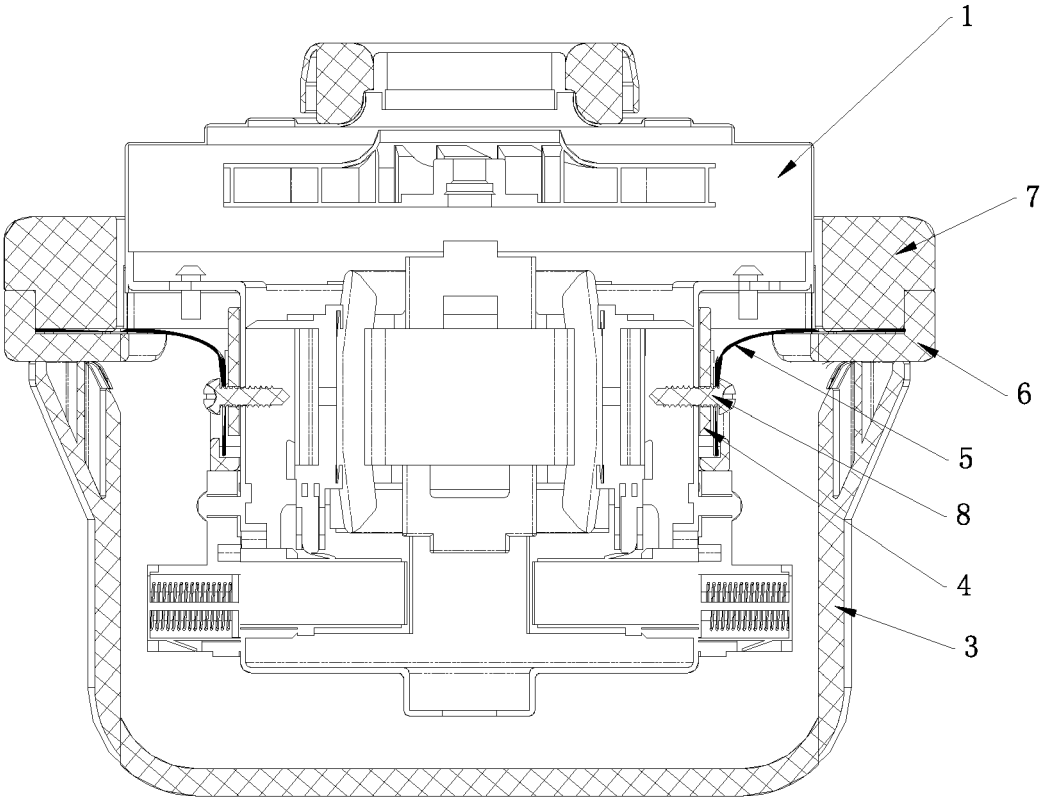

Fig. 5

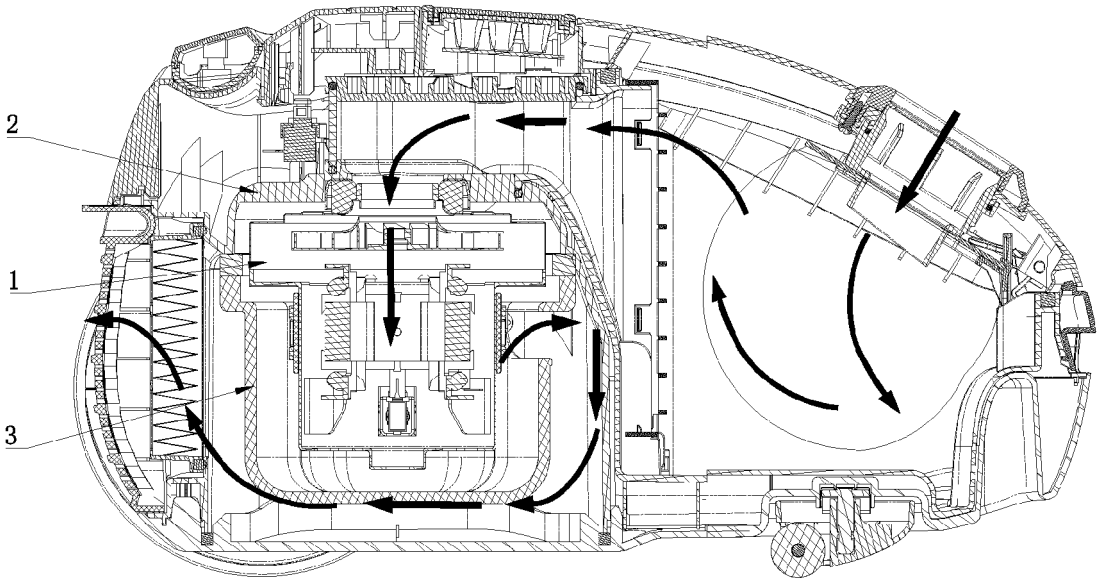

Fig. 6

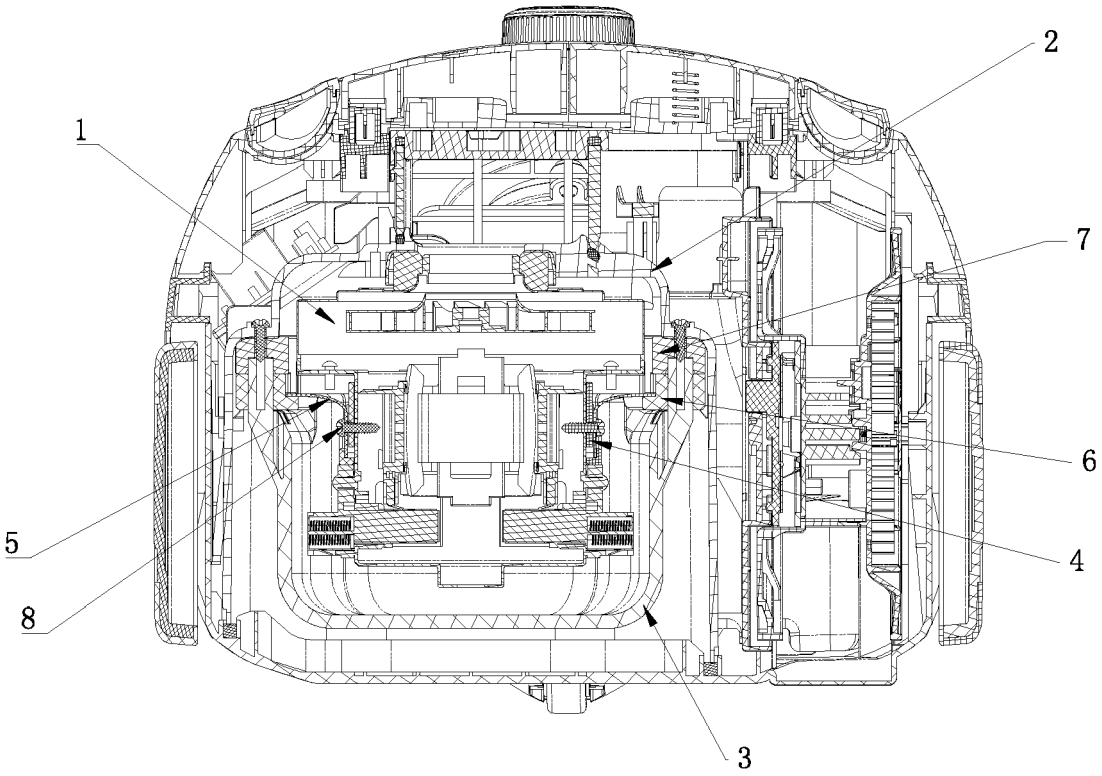

Fig. 7

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EUROPEAN SEARCH REPORT

Application Number
EP 14 19 3331

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	EP 2 436 291 A1 (TOSHIBA KK [JP]; TOSHIBA CONSUMER ELECT HOLDING [JP]; TOSHIBA HOME APP) 4 April 2012 (2012-04-04) * paragraphs [0031], [0039]; figure 1 * -----	1-9	INV. A47L9/00 A47L9/22
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TECHNICAL FIELDS SEARCHED (IPC)

A47L

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	6 February 2015	Trimarchi, Roberto

CATEGORY OF CITED DOCUMENTS

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06-02-2015

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