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(54) **A structure for reducing the motor noise of a vacuum cleaner**

(57) The present invention discloses a motor denoising structure applied to vacuum cleaners, with a spring device 4 disposed between a motor support 3 and a motor cover 2 to support the motor support 3; in the present

invention the motor cover 2 supports the motor support 3 through the spring device 4, such a flexible connection reducing noise while reducing vibration.

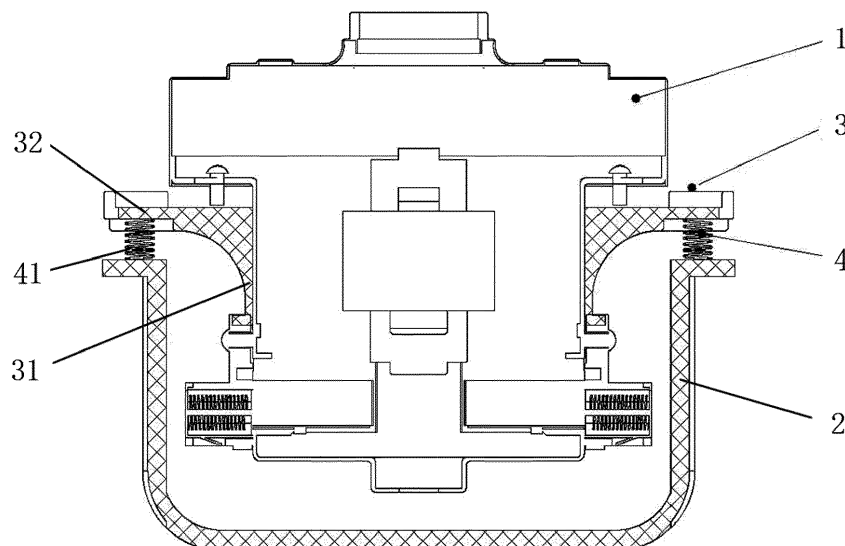


Fig. 1

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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, whose motor cover supports the motor support through a spring device, 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, with a spring device disposed between a motor support and a motor cover to support the motor support.

[0005] A first further technical solution of the present invention is as follows: The motor support comprises an enclosing portion disposed against an outer side of the motor, and a supporting portion extending from the enclosing portion, with the spring device comprising two or

more springs disposed between an upper edge of the motor cover and the supporting portion of the motor support.

[0006] A second further technical solution of the present invention is as follows: 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 spring device, which comprises a flexible support and a spring; the inner end portion of the flexible support is jointed to the corresponding support, and connected and fixed through a screw; the spring extends longitudinally, and is disposed between a lower end face of the outer end portion of the flexible support and the motor cover.

[0007] Furthermore, the motor cover is provided at its upper edge opposite to each of the springs with a mounting groove, respectively; the mounting groove is provided at its central portion with a guide post, outside which is sleeved the spring that is disposed with its lower end against the bottom of the mounting groove, the flexible support being provided at its outer end portion with an opening groove for the above guide post to go through. The flexible support is a flexible metal sheet.

[0008] In the above two technical solutions, 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, i.e., the tail portion of the motor is suspended inside the motor cover and gets in no contact with the motor cover; 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.

[0009] The present invention has the following advantages:

1. The motor cover of the present invention supports the motor support through the spring device, such a flexible connection reducing noise while reducing vibration.

2. The lower portion of the motor in the present invention is preferred to be 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.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] The present invention will be further described below with reference to drawings and examples.

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

Fig. 2 is an assembly drawing of another embodiment of the present invention; and

Fig. 3 is a structural schematic view of Fig. 2 after assembly.

[0011] Wherein:

1. motor;
2. motor cover; 21. mounting groove; 22. guide post;
3. motor support; 31. enclosing portion; 32. supporting portion; 33. support;
4. spring device; 41. spring; 42. flexible support; 421. opening groove; 43. spring;
5. screw; and
6. external motor cover.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0012] Example 1: As shown in Fig. 1, a motor denoising structure applied to vacuum cleaners, comprising a motor 1 and a motor cover 2, the motor 1 is provided at its periphery with a motor support 3 used for fixing the motor, the motor cover 2 supporting the motor support 3 through a spring device 4.

[0013] Furthermore, the motor support 3 comprises an enclosing portion 31 disposed against an outer side of the motor, and a supporting portion 32 extending from the enclosing portion 31, with the spring device 4 comprising two or more springs 41 disposed between an upper edge of the motor cover 2 and the supporting portion 32 of the motor support 3.

[0014] Example 2: As shown in Figs. 2 and 3, a motor denoising structure applied to vacuum cleaners, comprising a motor 1, a motor cover 2, and an external motor cover 6 connected and fixed to the motor cover 2, the motor 1 being provided at its periphery with a motor support 3 used for fixing the motor, the motor cover 2 supporting the motor support 3 through a spring device 4.

[0015] The motor support 3 comprises at least one pair of supports 33 engaging each other, between each of the supports 33 and the motor cover 2 being connected the spring device 4, which comprises a flexible support 42 and a spring 43; the inner end portion of the flexible support 42 is jointed to the corresponding support 33, and connected and fixed through a screw 5; the spring 43 extends longitudinally, and is disposed between a lower end face of the outer end portion of the flexible support 42 and the motor cover 2. In this example, the motor cover 2 is provided at its upper edge opposite to each of

the springs 43 with a mounting groove 21, respectively; the mounting groove 21 is provided at its central portion with a guide post 22, outside which is sleeved the spring 43 that is disposed with its lower end against the bottom of the mounting groove 21, the flexible support 42 being provided at its outer end portion with an opening groove 421 for the above guide post 22 to go through. The flexible support 42 is a flexible metal sheet, at least a part of which is accommodated by the motor cover 2, with its outer end portion and inner end portion intersecting at a right angle having a gradually transitional arc.

[0016] In the above examples, in order to better damp vibration and reduce noise, a lower portion of the motor 1 is suspended inside the motor cover 2 and gets in no contact with the motor cover 2; 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 2, 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 the example.

[0017] In the present invention, the motor cover 2 supports the motor support 3 through the spring device 4, such a flexible connection reducing noise while reducing vibration. Meanwhile, ensuring that the lower portion of the motor 1 is suspended can prevent 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.

[0018] 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 examples, 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 spring device (4) is disposed between a motor support (3) and a motor cover (2) to support the motor support (3).
2. The motor denoising structure applied to vacuum cleaners according to claim 1, wherein the motor support (3) comprises an enclosing portion (31) disposed against an outer side of the motor, and a supporting portion (32) extending from the enclosing portion (31), with the spring device (4) comprising two or more springs (41) disposed between an upper edge of the motor cover (2) and the supporting portion (32) of the motor support (3).
3. The motor denoising structure applied to vacuum

cleaners according to claim 1, wherein the motor support (3) comprises at least one pair of supports (33) engaging each other, between each of the supports (41) and the motor cover (3) being connected a spring device (4), which comprises a flexible support (42) and a spring (43); the inner end portion of the flexible support (42) is jointed to the corresponding support (33), and connected and fixed through a screw (5); the spring (43) extends longitudinally, and is disposed between a lower end face of an outer end portion of the flexible support (42) and the motor cover (2).

4. The motor denoising structure applied to vacuum cleaners according to claim 3, wherein the motor cover (2) is provided at its upper edge opposite to each of the springs (43) with a mounting groove (21), respectively; the mounting groove (21) is provided at its central portion with a guide post (22), outside which is sleeved the spring (43) that is disposed with its lower end against the bottom of the mounting groove (21), the flexible support (42) being provided at its outer end portion with an opening groove (421) for the above guide post (22) to go through.
5. The motor denoising structure applied to vacuum cleaners according to claim 3, wherein the flexible support (42) is a flexible metal sheet.
6. The motor denoising structure applied to vacuum cleaners according to any of claims 1-5, wherein a lower portion of the motor (1) is suspended inside the motor cover (2).
7. The motor denoising structure applied to vacuum cleaners according to any of claims 1-5, wherein the motor cover (2) is provided with an external motor cover (6) fixedly connected thereto.

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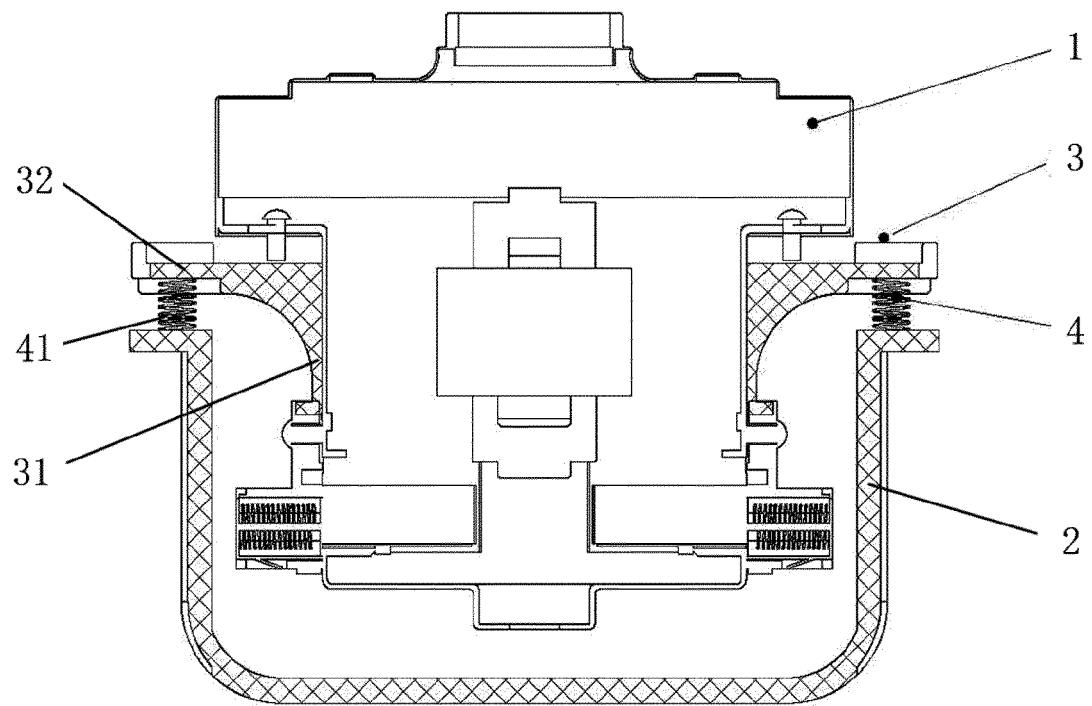


Fig. 1

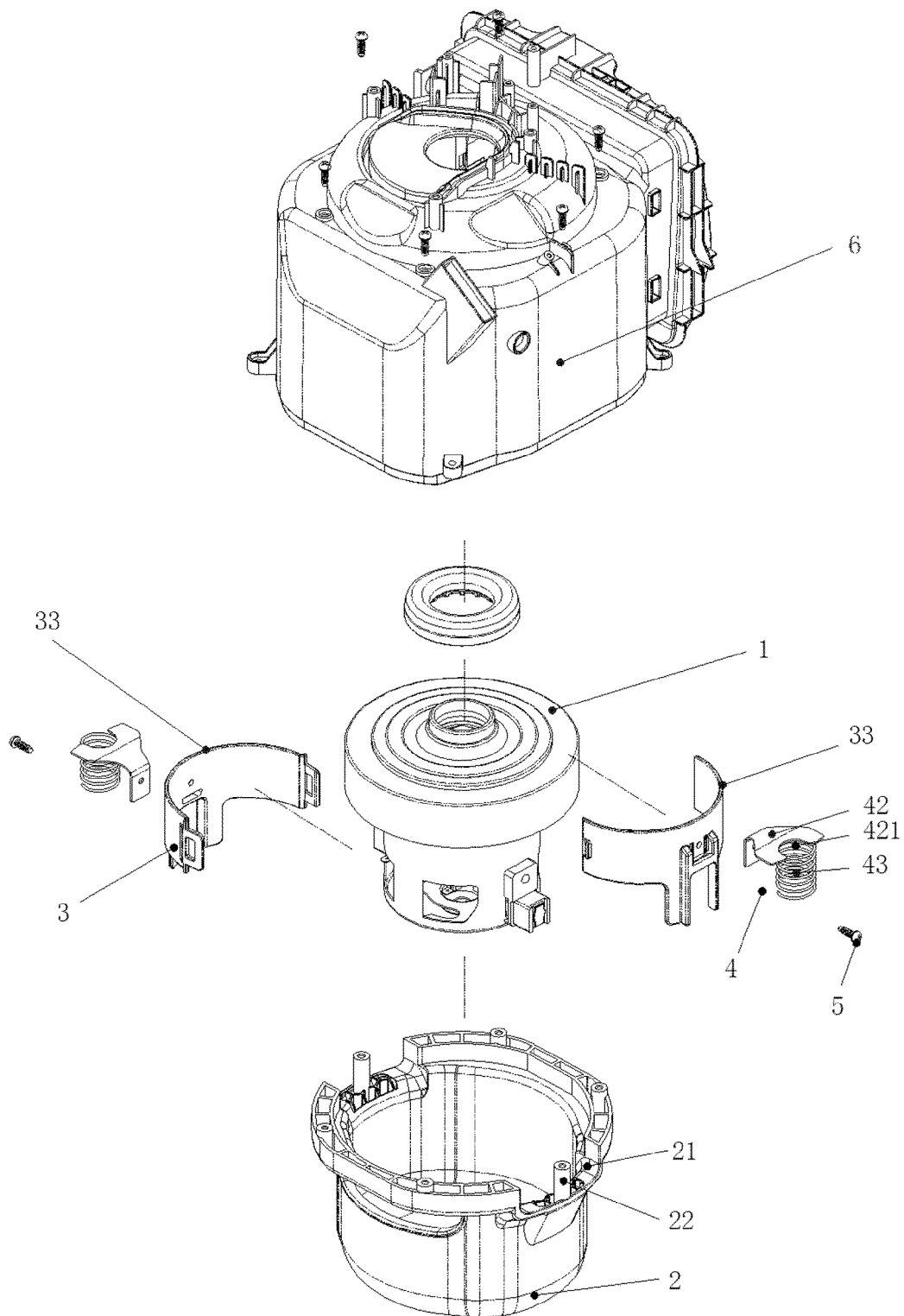


Fig. 2

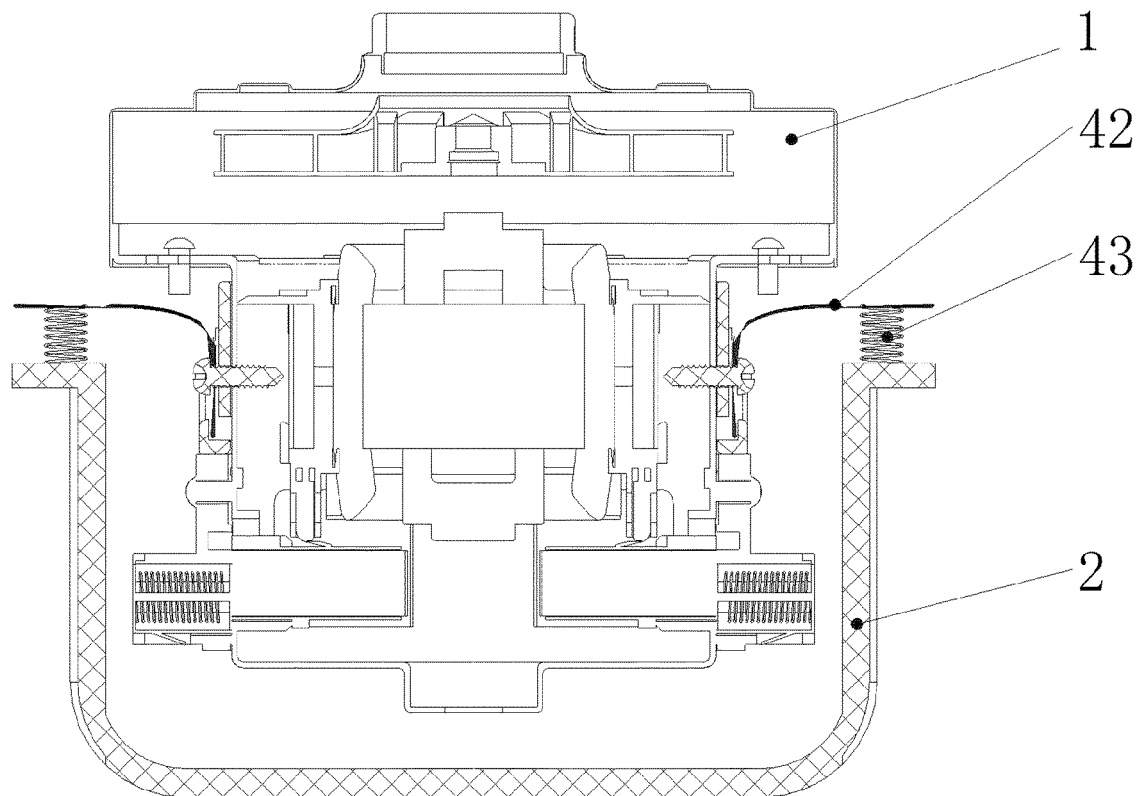


Fig. 3



EUROPEAN SEARCH REPORT

Application Number
EP 14 19 3320

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 2 227 998 A1 (TOSHIBA KK [JP]; TOSHIBA CONSUMER ELECT HOLDING [JP]; TOSHIBA HOME APP) 15 September 2010 (2010-09-15) * figures 2,3,9,11 *	1,2,6,7	INV. A47L9/00 A47L9/22
X	WO 2009/101775 A1 (TOSHIBA KK [JP]; TOSHIBA CONSUMER ELECT HOLDING [JP]; TOSHIBA HOME APP) 20 August 2009 (2009-08-20) * figures 1,2,10,11 *	1,2,6	
			TECHNICAL FIELDS SEARCHED (IPC)
			A47L
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 30 January 2015	Examiner Masset, Markus
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention 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	

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 14 19 3320

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The members are as contained in the European Patent Office EDP file on
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30-01-2015

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