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(54) **A vacuum cleaner having a motor denoising structure**

Ein Staubsauger mit einer motorlärmmindernden Struktur

Un aspirateur avec une structure permettant de réduire

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Description

FIELD OF THE INVENTION

[0001] The present invention relates to a vacuum cleaner having a motor denoising structure.

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.

[0003] However, in EP 2 227 998 A1, corresponding to the preamble of claim 1, an electric vacuum cleaner is proposed that can compressively elastically support an electric blower in an electric blower case by a coil spring to isolate noise and vibration, whereby the electric blower has to be clamped within the electric blower case by spring force during assembly.

CONTENTS OF THE INVENTION

[0004] A purpose of the present invention is as follows: Providing an improved vacuum cleaner having a motor denoising structure, whose motor cover supports the motor support through a spring device, such a flexible connection reducing noise while reducing vibration and allowing simplified assembly.

[0005] A technical solution of the present invention is as follows: A vacuum cleaner having a motor denoising structure, with a spring device disposed between a motor

support and a motor cover to support the motor support, wherein the motor support comprises at least one pair of supports engaging each other, between each of the supports and the motor cover being connected a 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 an outer end portion of the flexible support and the motor cover.

[0006] A technical solution, which is not part of the present invention, is as follows: The motor support further 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.

[0007] The motor cover in the present invention 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 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 and allowing simplified assembly.
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 for understanding 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.

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

[0011] Example 1: As shown in Fig. 1 for understanding the present invention, a vacuum cleaner having a motor denoising structure, 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.

[0012] 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.

[0013] Example 2: As shown in Figs. 2 and 3, a vacuum cleaner having a motor denoising structure, 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.

[0014] 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.

[0015] 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, i.e., the tail 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.

[0016] 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.

Claims

1. A vacuum cleaner having a motor denoising structure, whereby a spring device (4) is disposed between a motor support (3) and a motor cover (2) to support the motor support (3), **characterized in that** 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 (2) 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).
2. The vacuum cleaner having a motor denoising structure according to claim 1 **characterized in that:** 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.

3. The vacuum cleaner having a motor denoising structure according to claim 1 **characterized in that**: the flexible support (42) is a flexible metal sheet.
4. The vacuum cleaner having a motor denoising structure according to any of claims 1 -3, **characterized in that**: a lower portion of the motor (1) is suspended inside the motor cover (2).
5. The vacuum cleaner having a motor denoising structure according to any of claims 1 -3, **characterized in that**: the motor cover (2) is provided with an external motor cover (6) fixedly connected thereto.

Patentansprüche

1. Staubsauger mit einer motorlärmmindernden Struktur, bei der eine Federvorrichtung (4) zwischen einer Motorauslage (3) und einer Motorabdeckung (2) angeordnet ist, um die Motorauslage (3) abzustützen, **dadurch gekennzeichnet, dass** die Motorauslage (3) mindestens ein Paar ineinander greifende Stützen (33) umfasst, zwischen jedem der Stützen (41) und der Motorabdeckung (2) eine Federvorrichtung (4) angeschlossen ist, die eine biegsame Stütze (42) und eine Feder (43) umfasst; der innere Endabschnitt der biegsamen Stütze (42) mit der entsprechenden Stütze (33) verbunden ist und durch eine Schraube (5) angeschlossen und befestigt ist; die Feder (43) sich in Längsrichtung erstreckt und zwischen einer unteren Stirnfläche eines äußeren Endabschnitts der biegsamen Stütze (42) und der Motorabdeckung (2) angeordnet ist.
2. Staubsauger mit einer motorlärmmindernden Struktur nach Anspruch 1, **dadurch gekennzeichnet, dass**: die Motorabdeckung (2) an ihrer Oberkante gegenüber jeder der Federn (43) jeweils mit einer Befestigungsnut (21) versehen ist; die Befestigungsnut (21) an ihrem mittleren Abschnitt mit einer Führungssäule (22) versehen ist, deren Äußeres von der Feder (43) umhüllt ist, deren unteres Ende an dem Boden der Befestigungsnut (21) anliegt, die biegsame Stütze (42) an ihrem äußeren Endabschnitt mit einer Öffnungsnut (421) versehen ist, durch die sich die oben erwähnte Führungssäule

(22) erstrecken soll.

3. Staubsauger mit einer motorlärmmindernden Struktur nach Anspruch 1, **dadurch gekennzeichnet, dass**: die biegsame Stütze (42) ein biegsames Blech ist.
4. Staubsauger mit einer motorlärmmindernden Struktur nach einem der Ansprüche 1 bis 3, **dadurch gekennzeichnet, dass**: ein unterer Abschnitt des Motors (1) im Inneren der Motorabdeckung (2) aufgehängt ist.
5. Staubsauger mit einer motorlärmmindernden Struktur nach einem der Ansprüche 1 bis 3, **dadurch gekennzeichnet, dass**: die Motorabdeckung (2) mit einer externen Motorabdeckung (6) versehen ist, die starr mit ihr verbunden ist.

Revendications

1. Aspirateur pourvu d'une structure de débruitage de moteur, où un dispositif de ressort (4) est disposé entre un support de moteur (3) et un capot de moteur (2) afin de supporter le support de moteur (3), **caractérisé en ce que** le support de moteur (3) comprend au moins une paire de supports (33) s'enclenchant l'un avec l'autre, un dispositif de ressort (4) étant raccordé entre chacun des supports (41) et le capot de moteur (2), lequel comprend un support flexible (42) et un ressort (43) ; la partie d'extrémité intérieure du support flexible (42) est reliée au support (33) correspondant, et raccordée et fixée par une vis (5) ; le ressort (43) s'étend dans le sens de la longueur, et est disposé entre une face d'extrémité inférieure d'une partie d'extrémité extérieure du support flexible (42) et le capot de moteur (2).
2. Aspirateur pourvu d'une structure de débruitage de moteur selon la revendication 1, **caractérisé en ce que** le capot de moteur (2) est pourvu sur son bord supérieur opposé à chacun des ressorts (43) d'une rainure de montage (21) respective ; la rainure de montage (21) présente sur sa partie centrale un tenon de guidage (22), sur lequel est enfilé le ressort (43) disposé contre le fond de la rainure de montage (21) par son extrémité inférieure, le support flexible (42) présentant sur sa partie d'extrémité extérieure une rainure d'ouverture (421) permettant le passage du sommet du tenon de guidage (22).
3. Aspirateur pourvu d'une structure de débruitage de moteur selon la revendication 1, **caractérisé en ce que** le support flexible (42) est une feuille métallique flexible.
4. Aspirateur pourvu d'une structure de débruitage de

moteur selon l'une des revendications 1 à 3, **caractérisé en ce que** qu'une partie inférieure du moteur (1) est suspendue à l'intérieur du capot de moteur (2).

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5. Aspirateur pourvu d'une structure de débruitage de moteur selon l'une des revendications 1 à 3, **caractérisé en ce que** le capot de moteur (2) est pourvu d'un capot de moteur externe (6) qui lui est fixement raccordé.

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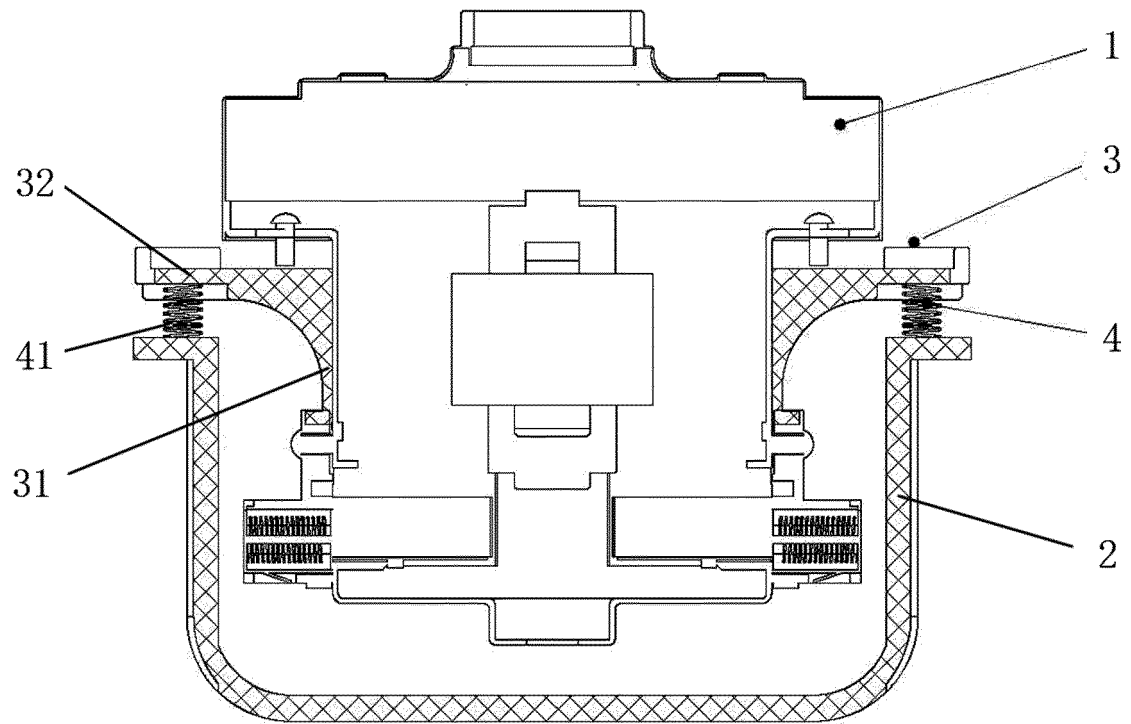


Fig. 1

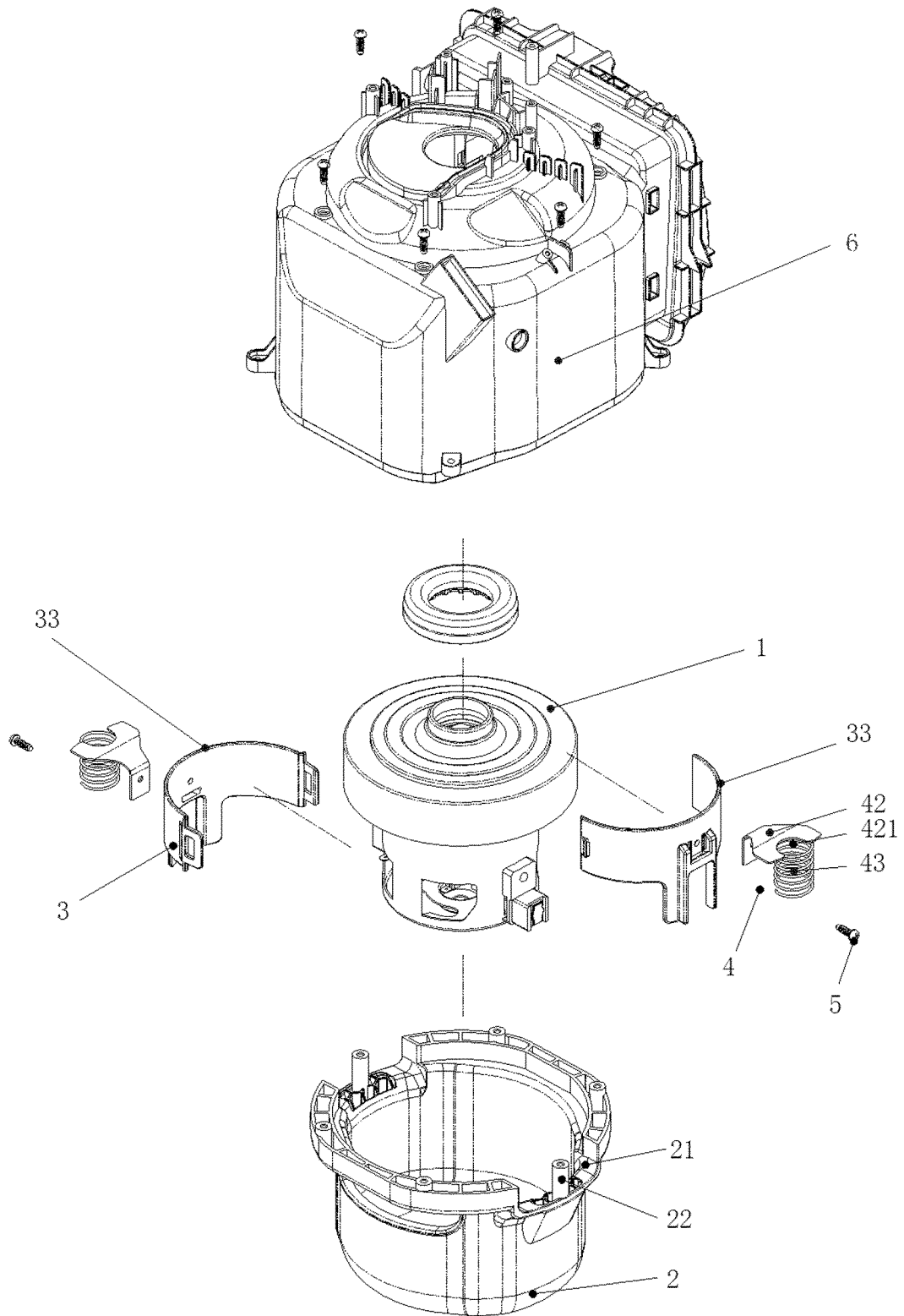


Fig. 2

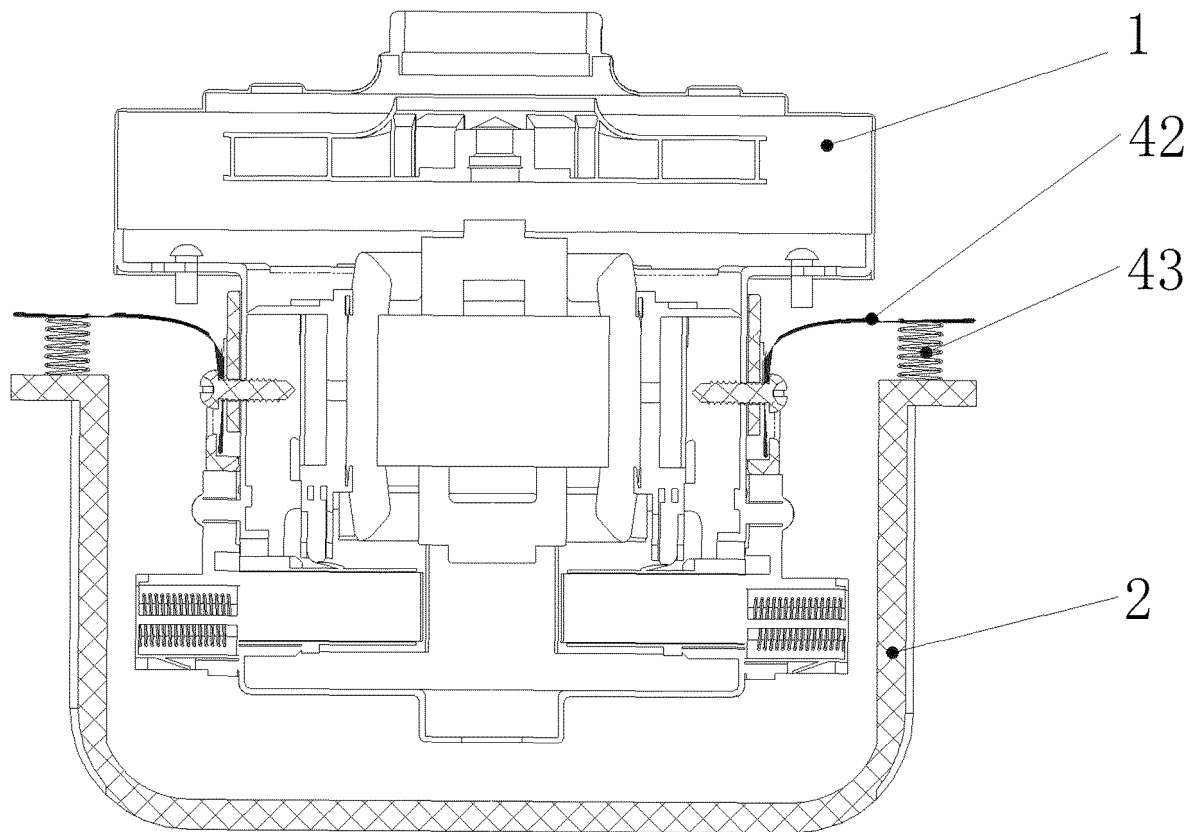


Fig. 3

REFERENCES CITED IN THE DESCRIPTION

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