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(54) **DAMPING STRUCTURE FOR A ROTOR ASSEMBLY OF A MOTOR**

(75) Inventor: **Rong-Hua Bi**, Shalang Town (CN)

Correspondence Address:
Thomas E. Sisson
Jackson Walker, LLP
Suite 2100
112 E. Pecan
San Antonio, TX 78205 (US)

(73) Assignee: **Zhongshan Broad-Ocean Motor Co., Ltd.**

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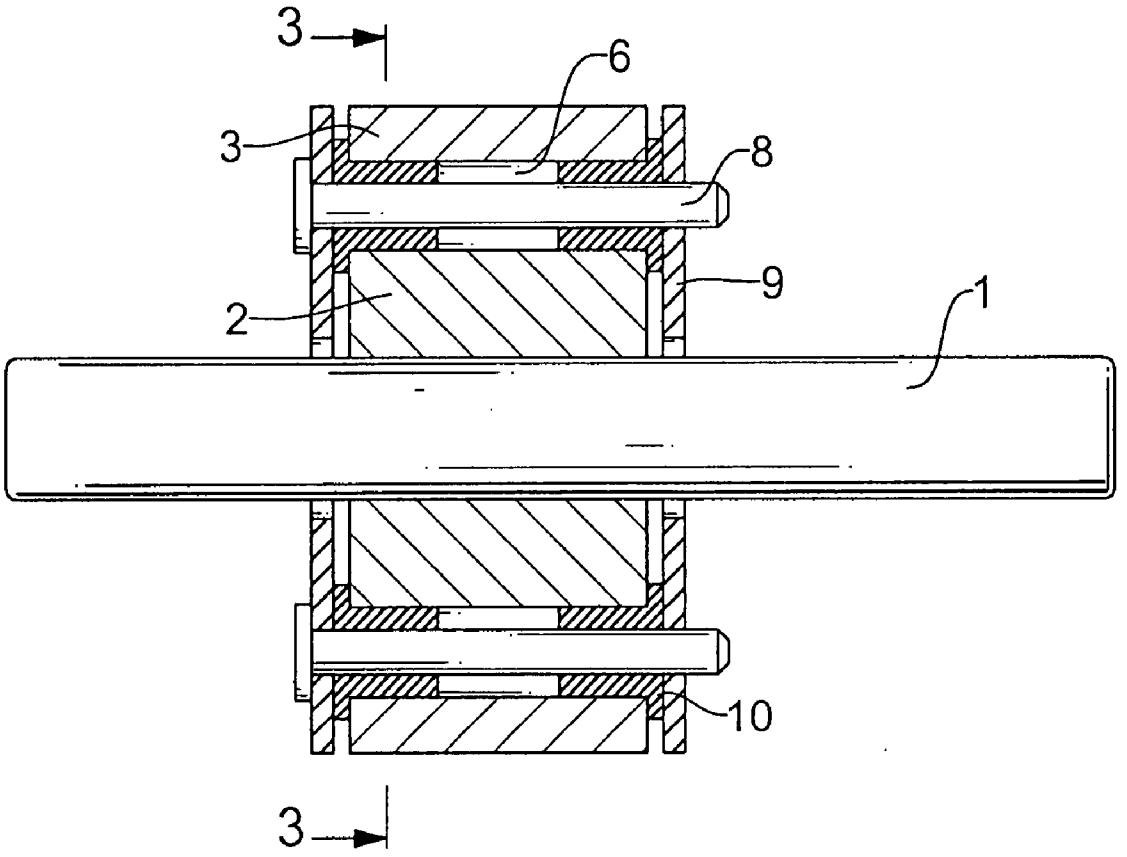
(57) **ABSTRACT**

A damping structure for a rotor assembly includes holes adapted to be defined in an outer periphery of the inner rotor and in an inner periphery of the outer rotor respectively and damping elements inserted into the gap between the inner rotor and the outer rotor. Each damping element is received in a corresponding to one of the holes of the inner rotor and the outer rotor so as to absorb vibration from the outer rotor.



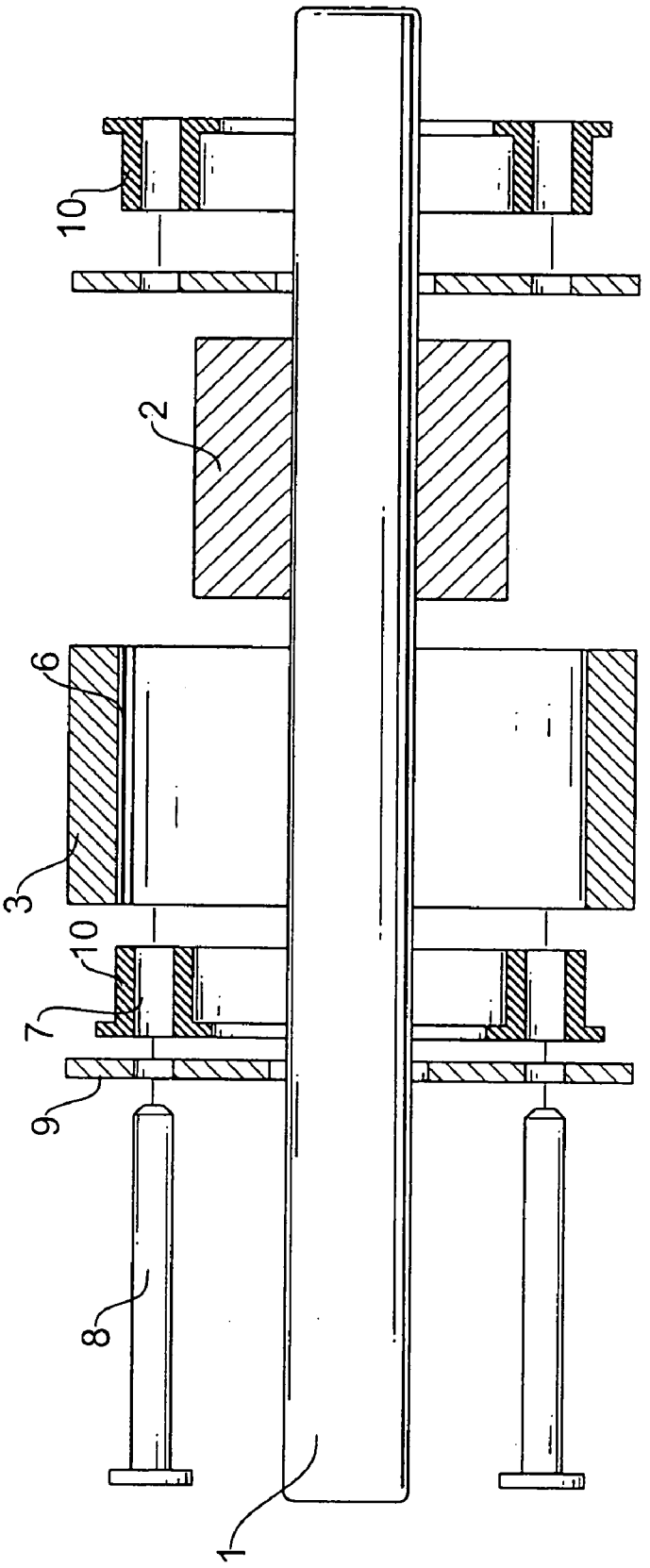


FIG.1

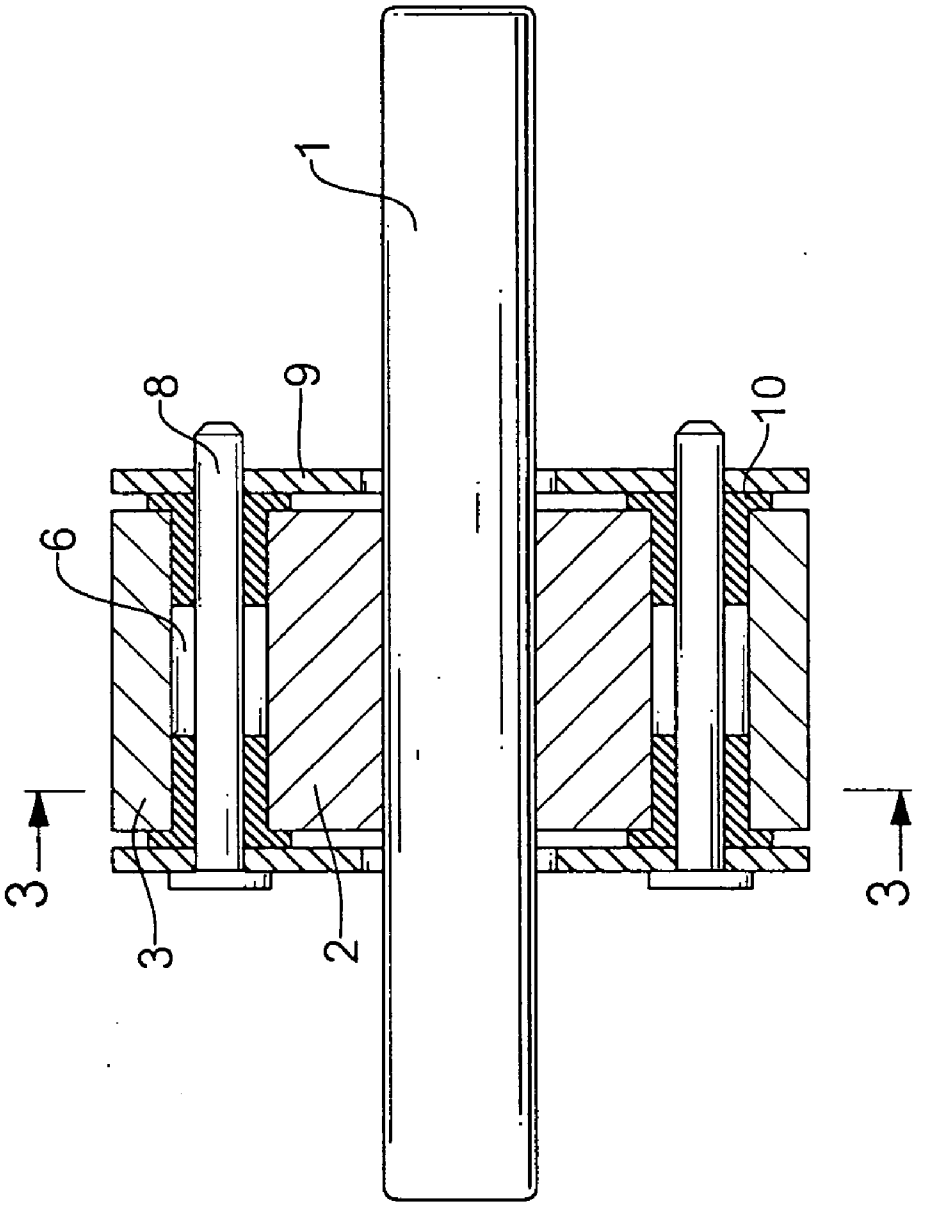


FIG.2

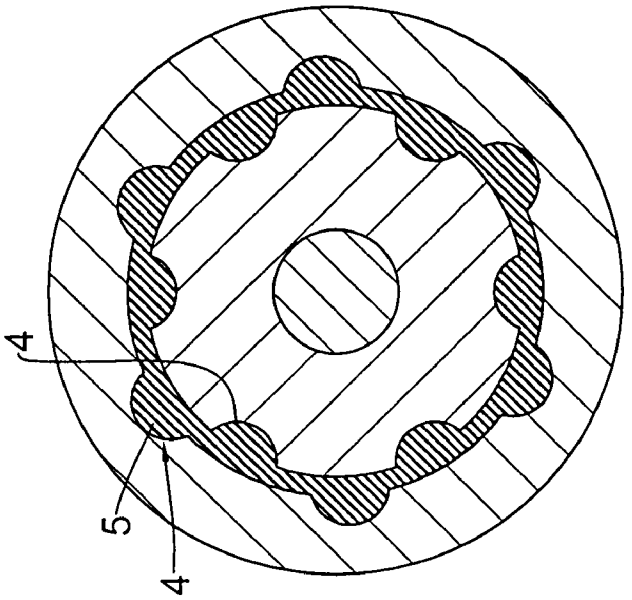


FIG.4

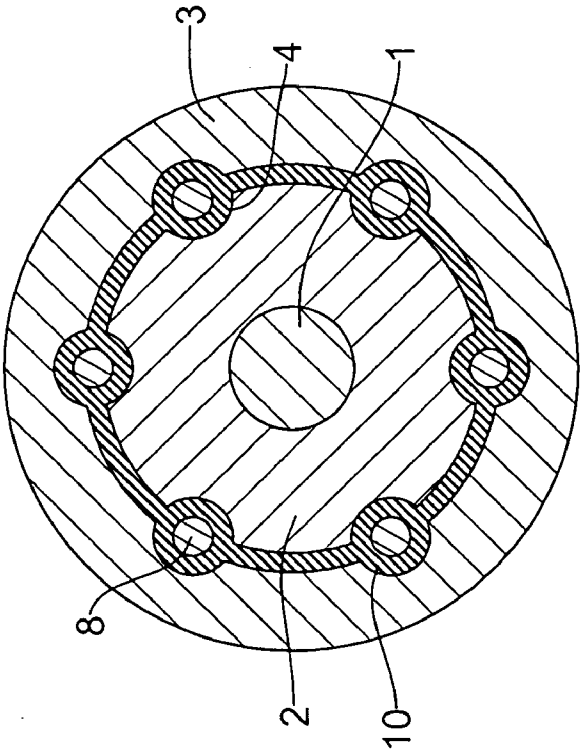


FIG.3

DAMPING STRUCTURE FOR A ROTOR ASSEMBLY OF A MOTOR

BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention

[0002] The present invention relates to a damping structure, and more particularly to a damping structure for a rotor assembly of a motor so that the vibration of the rotor assembly resulted from the high frequency resonance of current is reduced.

[0003] 2. Description of the Prior Art

[0004] A rotor assembly and an axle of a motor are two isolated parts. When the axle is extended into the rotor assembly, there is no connector sandwiched therebetween. Therefore, when the rotor assembly is rotated due to the induced current from the variation of magnetic field, the rotation of the rotor assembly is not smooth due to the high frequency resonance of the induced current. As such, the operation of the axle generates noises and may even cause hazardous resonance. Adding damping elements between the rotor assembly and the axle does do the job of reducing the noise. However, the damping elements are complicated and expensive

[0005] To overcome the shortcomings, the present invention tends to provide an improved damping structure to mitigate the aforementioned problems.

SUMMARY OF THE INVENTION

[0006] The primary objective of the present invention is to provide a damping structure for a rotor assembly of a motor to damp out the vibration caused by the high frequency resonance of current.

[0007] In one aspect of the present invention, the damping structure of the present invention includes multiple first holes defined in an outer periphery of an inner rotor, second holes defined in an inner periphery of an outer rotor and damping elements respectively inserted into the first holes and the second holes.

[0008] In yet another objective of the present invention, the damping elements are connected to one another via a rubber ring.

[0009] A further objective of the present invention is that a rubber ring sandwiched between the inner rotor and the outer rotor has holes to receive therein damping pins each having a diameter larger than that of the hole so that the holes of the rubber ring are expanded by the insertion of the damping pins to accomplish the purpose of shock absorbing.

[0010] Other objects, advantages and novel features of the invention will become more apparent from the following detailed description when taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] FIG. **1** is a schematic side plan view showing parts of the damping structure of the present invention to be applied to a rotor assembly which has an axle extending through the damping assembly;

[0012] FIG. **2** is a schematic cross sectional view showing the assembly of the damping structure with the rotor assembly;

[0013] FIG. **3** is a cross sectional view taken from line **3-3** of FIG. **2**; and

[0014] FIG. **4** is a schematic cross sectional view showing a different embodiment of the damping structure.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0015] With reference to FIGS. **1** and **2**, it is noted that the damping structure in accordance with the present invention is applied to a rotor assembly including an inner rotor (**2**) and an outer rotor (**3**) incorporated with an axle (**1**) extending through the inner rotor (**2**) and the outer rotor (**3**). A gap (**6**) is defined between the inner rotor (**2**) and the outer rotor (**3**). Multiple holes (**4**) are respectively defined in an outer periphery of the inner rotor (**2**) and in an inner periphery of the outer rotor (**3**) so as to receive therein a damping element, as shown in FIG. **3**. In one preferred embodiment of the present invention, the damping element may be a rubber block (**5**), as shown in FIG. **4**. In a different embodiment of the present invention, the damping element may be a rubber ring (**10**) having apertures (**7**) which are defined in the rubber ring (**10**) to receive therein a damping pin (**8**) and to correspond to the holes (**4**) of the inner rotor (**2**) and the outer rotor (**3**) respectively. The quantity of the holes (**4**) of the inner rotor (**2**) and the outer rotor (**3**) is between 2~60. The shape of the hole (**4**) may be circular or rectangular such that the shape of the damping element may also be circular or rectangular to match the shape of the holes (**4**). Also, the holes (**4**) of the inner rotor (**2**) may or may not communicate with the holes (**4**) of the outer rotor (**3**) so that different embodiments of the present invention are applied to adapt to the variation of the communication status of the holes (**4**) of the inner rotor (**2**) and the outer rotor (**3**). A connection plate (**9**) is provided at ends of the inner rotor (**2**) and of the outer rotor (**3**) to secure position of the inner rotor (**2**) and the outer rotor (**3**).

[0016] Preferably, the diameter of the damping pin (**8**) is larger than that of the aperture (**7**) such that after the damping pin (**8**) is inserted into a corresponding one of the apertures (**7**), the aperture (**7**) is expanded in dimension and the rubber ring (**10**) is deformed so that a damping effect is able to provide between the inner rotor (**2**) and the outer rotor (**3**).

[0017] As a consequence of the provision of the damping structure to the rotor assembly, it is noted that when the outer rotor (**3**) is rotated and vibrated due to the high frequency resonance from the current, because the damping structure, i.e. the rubber blocks (**5**) in the holes (**4**) or the rubber ring (**10**) with damping pins (**8**) received in the apertures (**7**), exists between the inner rotor (**2**) and the outer rotor (**3**), the vibration from the outer rotor (**3**) is effectively damped so that the force transmitted to the axle (**1**) is smooth and thus noise generated by the axle is effectively reduced.

[0018] It is to be understood, however, that even though numerous characteristics and advantages of the present invention have been set forth in the foregoing description, together with details of the structure and function of the invention, the disclosure is illustrative only, and changes

may be made in detail, especially in matters of shape, size, and arrangement of parts within the principles of the invention to the full extent indicated by the broad general meaning of the terms in which the appended claims are expressed.

What is claimed is:

1. A damping structure for a rotor assembly having an inner rotor and an outer rotor incorporated with an axle extending through the inner rotor and the outer rotor, the damping structure comprising:

a gap adapted to be defined between the inner rotor and the outer rotor;

holes adapted to be defined in an outer periphery of the inner rotor and in an inner periphery of the outer rotor respectively; and

damping elements inserted into the gap and each received in a corresponding one of the holes of the inner rotor and the outer rotor so as to absorb vibration from the outer rotor.

2. The damping structure as claimed in claim 1, wherein the damping elements include a plurality of damping blocks.

3. The damping structure as claimed in claim 1, wherein the damping elements include a rubber ring with apertures to correspond to the holes of the inner rotor and the outer rotor respectively and damping pins respectively inserted into a corresponding one of the apertures and the holes of the inner rotor and the outer rotor.

4. The damping structure as claimed in claim 3, wherein the damping pin has a diameter larger than a diameter of the corresponding aperture such that insertion of the damping pins into the apertures expands dimension of the apertures and a damping effect is provided between the inner rotor and the outer rotor.

5. The damping structure as claimed in claim 3, wherein shape of the hole is circular.

6. The damping structure as claimed in claim 3, wherein shape of the hole is rectangular.

7. The damping structure as claimed in claim 3, wherein a quantity of the holes is between 2~60.

8. The damping structure as claimed in claim 4, wherein a quantity of the holes is between 2~60.

9. The damping structure as claimed in claim 5, wherein a quantity of the holes is between 2~60.

10. The damping structure as claimed in claim 6, wherein a quantity of the holes is between 2~60.

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