A fan vibration damping structure includes a main body and a stator assembly. The main body has a bearing cup protruding from one face of the main body. The stator assembly has a through hole, whereby the stator assembly is fitted around the bearing cup. An elastic body is disposed between the bearing cup and the stator assembly. The elastic body is able to effectively absorb the vibration of the main body.
Fig. 1

Fig. 2
FAN VIBRATION DAMPING STRUCTURE

BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention
[0002] The present invention relates generally to a fan vibration damping structure, which is able to reduce the vibration of the fan in operation.
[0003] 2. Description of the Related Art
[0004] In the current electronic devices, the electronic components will generate heat in operation. The heat must be dissipated in time to avoid rise of temperature. In general, a radiating fin assembly or a heat sink is disposed to contact the electronic component so as to enlarge the heat dissipation area and enhance the heat dissipation performance. However, the increase of the heat dissipation performance is still limited. As a result, the heat generated by the electronic component can be hardly lowered to a value under a standard so as to avoid burnout of the electronic component. Accordingly, a cooling fan is generally additionally disposed to forcibly dissipate the heat of the heat sink or the radiating fin assembly so as to enhance the heat dissipation performance thereof. The cooling fan can forcibly conduct the airflow to effectively dissipate the heat generated by the electronic component. When assembled, the stator of the fan is fixed around the bearing cup by means of press fit or adhesion. However, due to unbalance or after a long period of operation, a gap may be formed between the components to cause vibration of the fan. Under such circumstance, the fan will make noise in operation of the electronic device. In some more serious cases, the other sophisticated components of the electronic device, such as the hard disc, may damage due to vibration. Therefore, it is a critical topic how to reduce the vibration of the fan of the electronic device.

SUMMARY OF THE INVENTION

[0005] It is therefore a primary object of the present invention to provide a fan vibration damping structure, which can reduce the vibration of the fan.
[0006] To achieve the above and other objects, the fan vibration damping structure of the present invention includes a main body and a stator assembly. The main body has a bearing cup protruding from one face of the main body. The stator assembly has a through hole, whereby the stator assembly is fitted around the bearing cup. An elastic body is disposed between the bearing cup and the stator assembly.
[0007] The elastic body is able to effectively absorb the vibration of the fan in operation so that the other electronic components in an electronic device are prevented from being damaged due to the vibration.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] The structure and the technical means adopted by the present invention to achieve the above and other objects can be best understood by referring to the following detailed description of the preferred embodiments and the accompanying drawings, wherein:
[0009] FIG. 1 is a sectional exploded view of a first embodiment of the fan vibration damping structure of the present invention;
[0010] FIG. 2 is a sectional assembled view of the first embodiment of the fan vibration damping structure of the present invention;
[0011] FIG. 3 is a sectional assembled view of a second embodiment of the fan vibration damping structure of the present invention;
[0012] FIG. 4 is a sectional exploded view of a third embodiment of the fan vibration damping structure of the present invention;
[0013] FIG. 5 is a sectional assembled view of the third embodiment of the fan vibration damping structure of the present invention;
[0014] FIG. 6 is a sectional exploded view of a fourth embodiment of the fan vibration damping structure of the present invention; and
[0015] FIG. 7 is a sectional assembled view of the fourth embodiment of the fan vibration damping structure of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0016] Please refer to FIGS. 1 and 2. FIG. 1 is a sectional exploded view of a first embodiment of the fan vibration damping structure of the present invention. FIG. 2 is a sectional assembled view of the first embodiment of the fan vibration damping structure of the present invention. According to the first embodiment, the fan vibration damping structure of the present invention includes a main body 11 and a stator assembly 12.
[0017] The main body 11 has a bearing cup 111 protruding from one face of the main body 11. The bearing cup 111 has a bearing hole 1111 and a receiving space 1112 in communication with the bearing hole 1111.
[0018] The stator assembly 12 has a through hole 121, whereby the stator assembly 12 is fitted around the bearing cup 111. An elastic body 2 (for absorbing or damping the vibration) is disposed between the bearing cup 111 and the stator assembly 12. The stator assembly 12 includes multiple silicon steel sheets 122 and multiple windings 123. The silicon steel sheets 122 are stacked and the windings 123 are wound around the silicon steel sheets 122.
[0019] In this embodiment, the elastic body 2 is disposed between the bearing cup 111 and the stator assembly 12 to fill up the gap therebetween. This can greatly restrain the vibration or resonance.
[0020] Please now refer to FIG. 3, which is a sectional assembled view of a second embodiment of the fan vibration damping structure of the present invention. The second embodiment is partially identical to the first embodiment in structure and thus will not be repeatedly described hereinafter. The second embodiment is different from the first embodiment in that the elastic body 2 is integrally formed with the bearing cup 111. When the bearing cup 111 is formed, the elastic body 2 is integrally formed with the bearing 111 by means of injection molding or any other suitable processing method.
[0021] Please now refer to FIGS. 4 and 5. FIG. 4 is a sectional exploded view of a third embodiment of the fan vibration damping structure of the present invention. FIG. 5 is a sectional assembled view of the third embodiment of the fan vibration damping structure of the present invention. The third embodiment is partially identical to the first embodiment in structure and thus will not be repeatedly described hereinafter. The third embodiment is different from the first embodiment in that the bearing cup 111 further has a first recess 1113 annularly formed on an outer circumference of the bearing cup 111 corresponding to the stator assembly 12.
The elastic body 2 is disposed in the first recess 1113 and attached to the bearing cup 111 and the stator assembly 12. The elastic body 2 is partially received in the first recess 1113 of the bearing 111 and partially raised from the first recess 1113 into contact with the stator assembly 12 to fill up the gap between the stator assembly 12 and the bearing cup 111 to avoid vibration.

[0022] Please now refer to FIGS. 6 and 7. FIG. 6 is a sectional exploded view of a fourth embodiment of the fan vibration damping structure of the present invention. FIG. 7 is a sectional assembled view of the fourth embodiment of the fan vibration damping structure of the present invention. The fourth embodiment is partially identical to the first embodiment in structure and thus will not be repeatedly described hereinafter. The fourth embodiment is different from the first embodiment in that an inner wall face of the through hole 121 of the stator assembly 12 is formed with a second recess 1211 corresponding to the bearing cup 111. The elastic body 2 is disposed in the second recess 1211 and attached to the bearing cup 111 and the stator assembly 12. In this embodiment, the elastic body 2 is partially received in the second recess 1211 and partially raised from the second recess 1211 to fill up the gap between the stator assembly 12 and the bearing cup 111 to avoid vibration.

[0023] In the first to fourth embodiments of the present invention, the elastic body 2 is made of a material selected from a group consisting of rubber, plastic and foam material. Alternatively, the elastic body 2 can be any structure body that can elastically restore to its original state after the applied external force disappears.

[0024] According to the above arrangement, the gap between the bearing cup 111 and the stator assembly 12 is filled up with the elastic body 2 to avoid vibration of the fan in operation. In this case, the fan will not make noise in operation.

[0025] The present invention has been described with the above embodiments thereof and it is understood that many changes and modifications in the above embodiments can be carried out without departing from the scope and the spirit of the invention that is intended to be limited only by the appended claims.

What is claimed is:
1. A fan vibration damping structure comprising:
   a main body having a bearing cup protruding from one face of the main body;
   a stator assembly having a through hole, whereby the stator assembly is fitted around the bearing cup, an elastic body being disposed between the bearing cup and the stator assembly.

2. The fan vibration damping structure as claimed in claim 1, wherein the elastic body is integrally formed with the bearing cup.

3. The fan vibration damping structure as claimed in claim 1, wherein the bearing cup further has a first recess annularly formed on an outer circumference of the bearing cup corresponding to the stator assembly, the elastic body being disposed in the first recess and attached to the bearing cup and the stator assembly.

4. The fan vibration damping structure as claimed in claim 1, wherein the elastic body is made of a material selected from a group consisting of rubber, plastic and foam material.

5. The fan vibration damping structure as claimed in claim 1, wherein an inner wall face of the through hole of the stator assembly is formed with a second recess corresponding to the bearing cup, the elastic body being disposed in the second recess and attached to the bearing cup and the stator assembly.

6. The fan vibration damping structure as claimed in claim 1, wherein the stator assembly includes multiple silicon steel sheets and multiple windings.

7. The fan vibration damping structure as claimed in claim 1, wherein the bearing cup has a bearing hole and a receiving space in communication with the bearing hole.

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