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(54) **FAN STRUCTURE**

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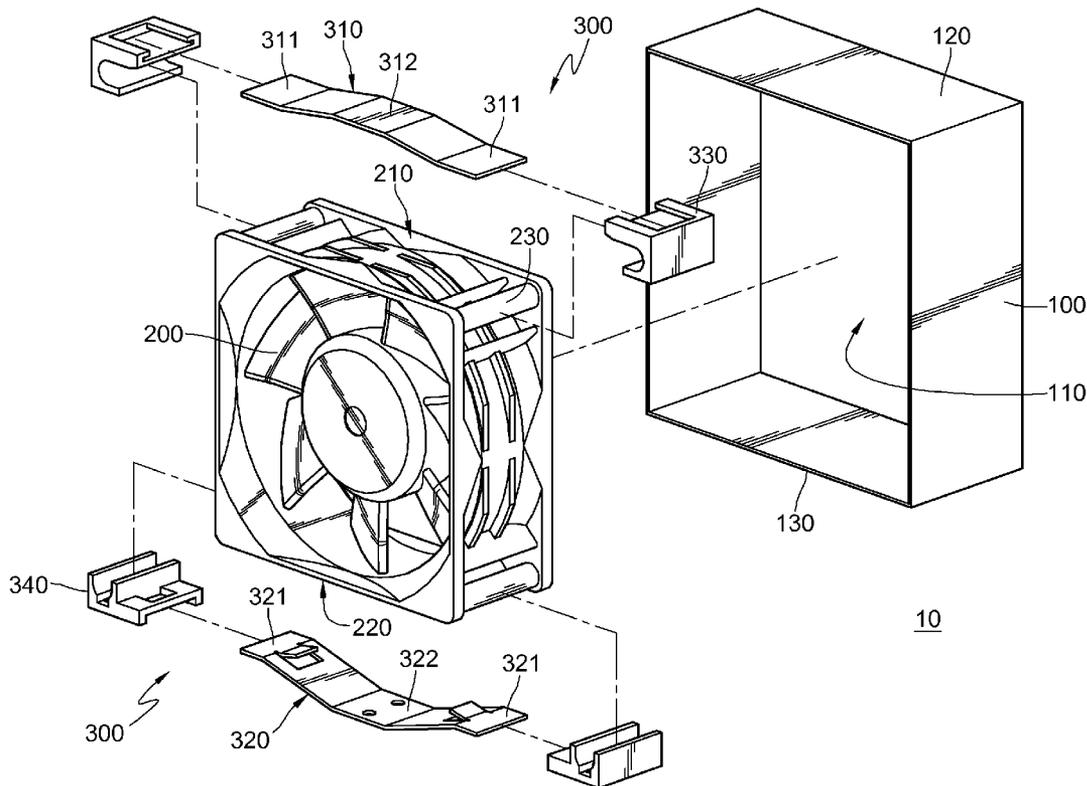
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(57) **ABSTRACT**

A fan structure includes a casing, a fan, and two elastic members. The casing has an accommodation space. The fan is located in the accommodation space. The fan has a first side and a second side opposite to each other. One of the two elastic members is sandwiched between the casing and the first side of the fan. The other one of the two elastic members is sandwiched between the casing and the second side of the fan. The two elastic members normally keep the fan away from the casing, so as to make the fan contact the casing through the two elastic members, thereby achieving a damping effect.

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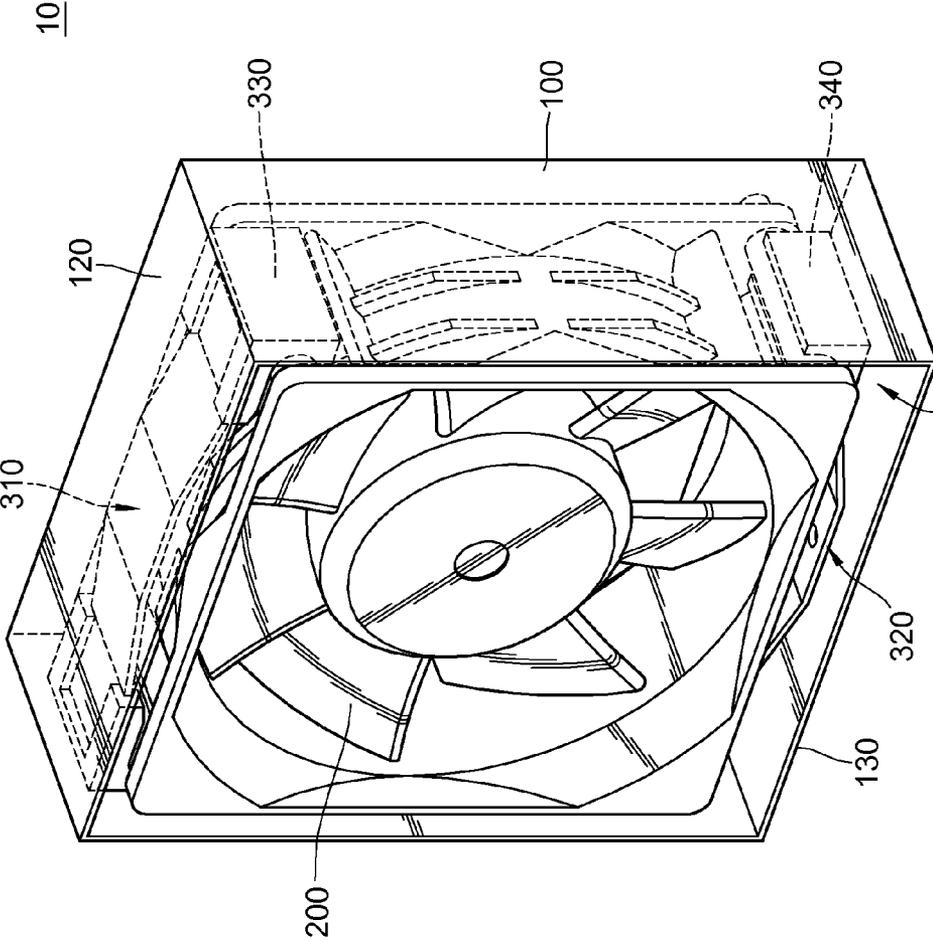


FIG. 1

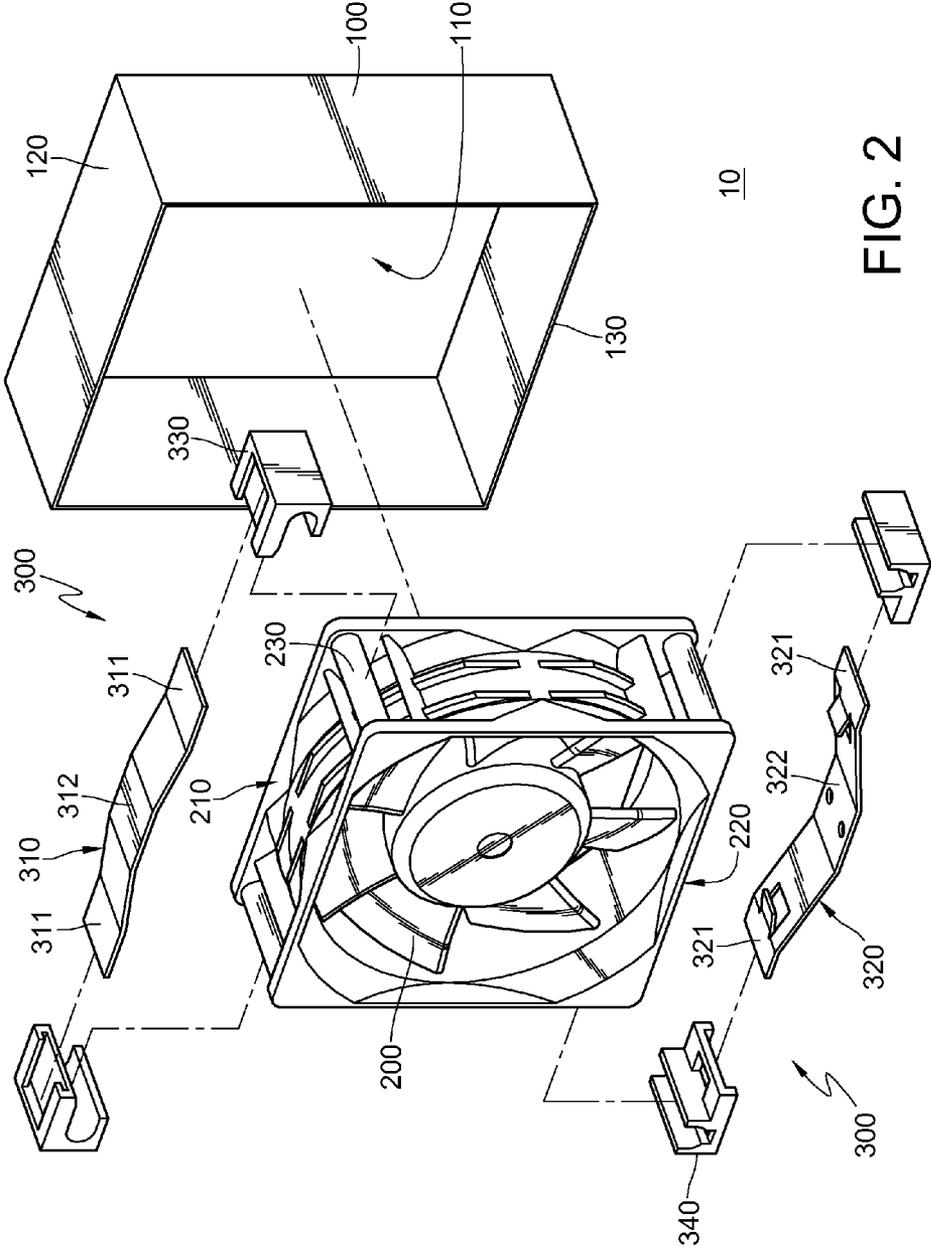
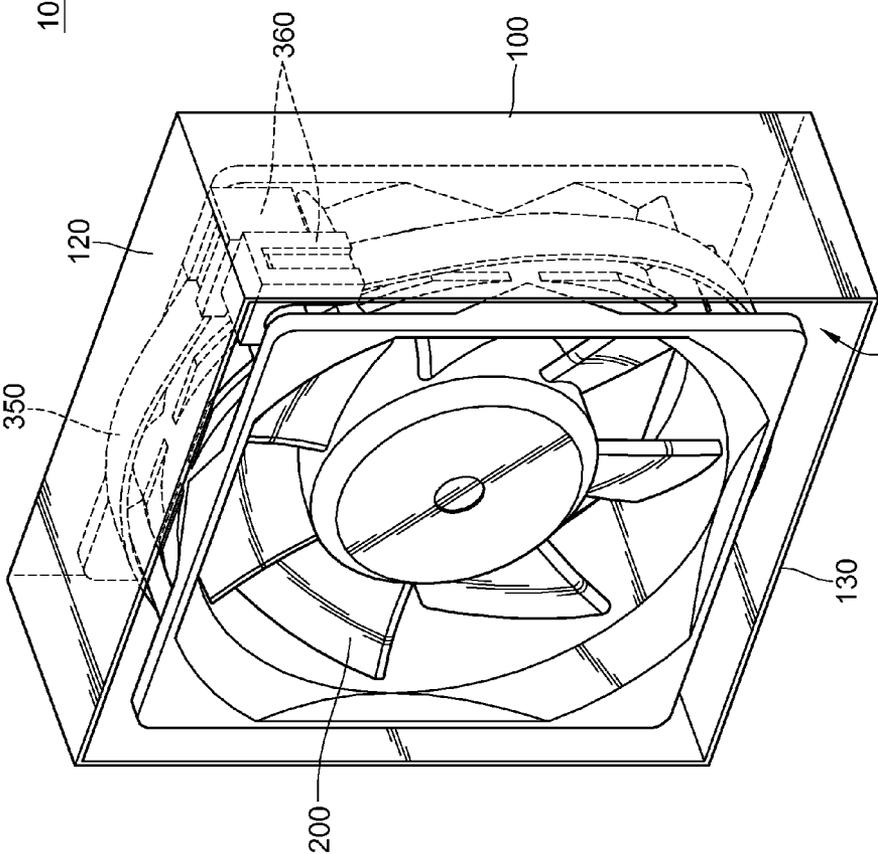


FIG. 2



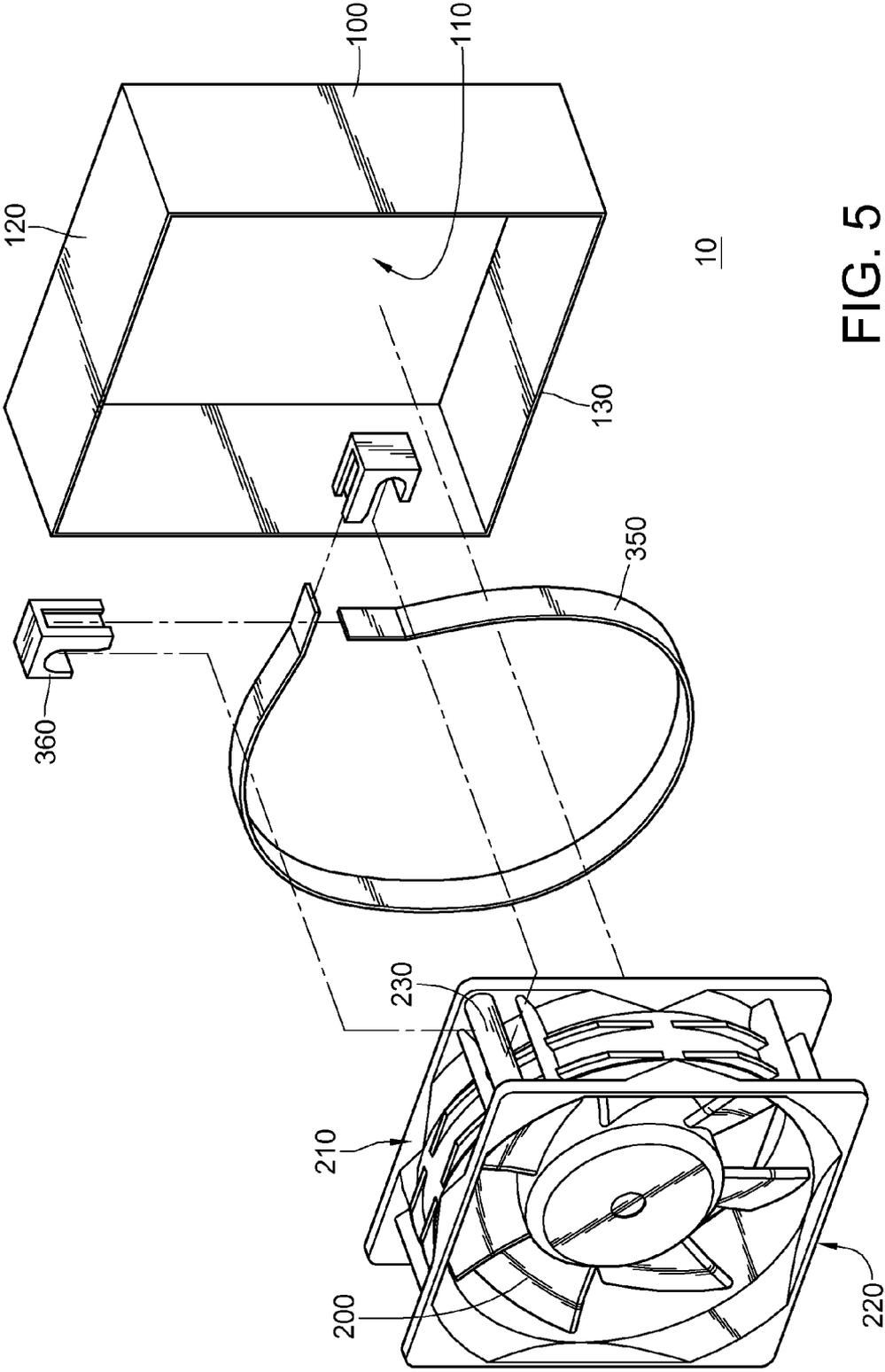


FIG. 5

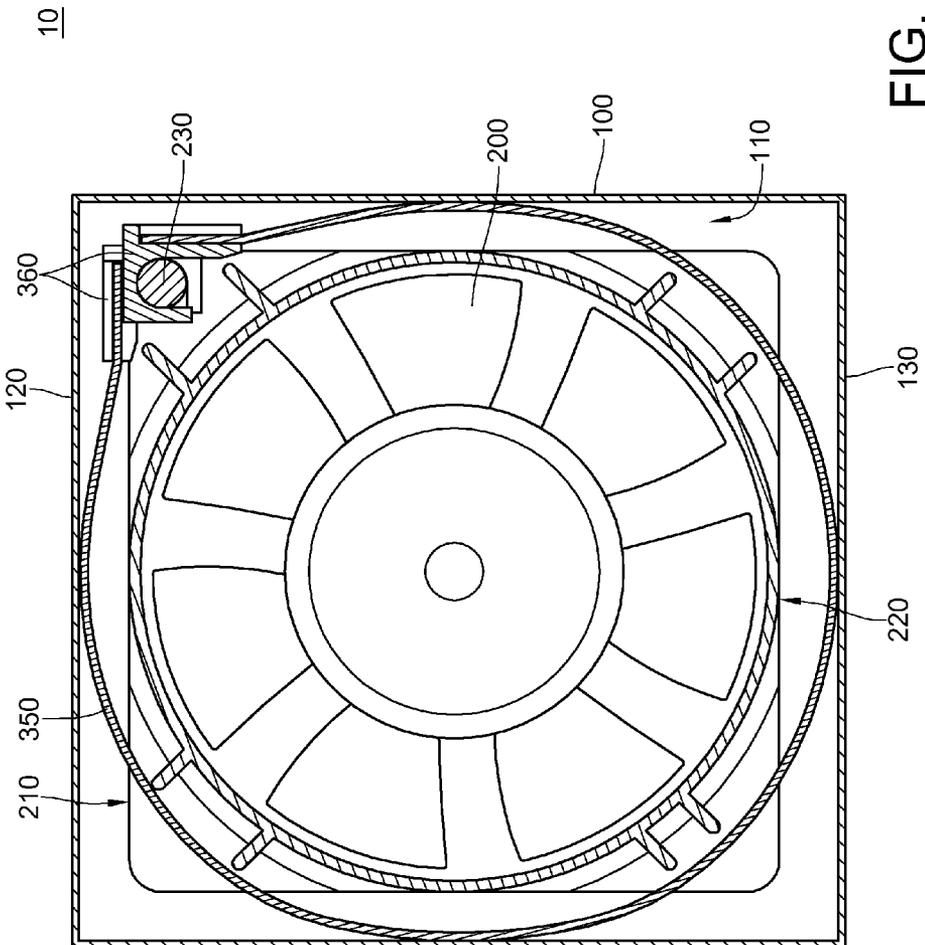
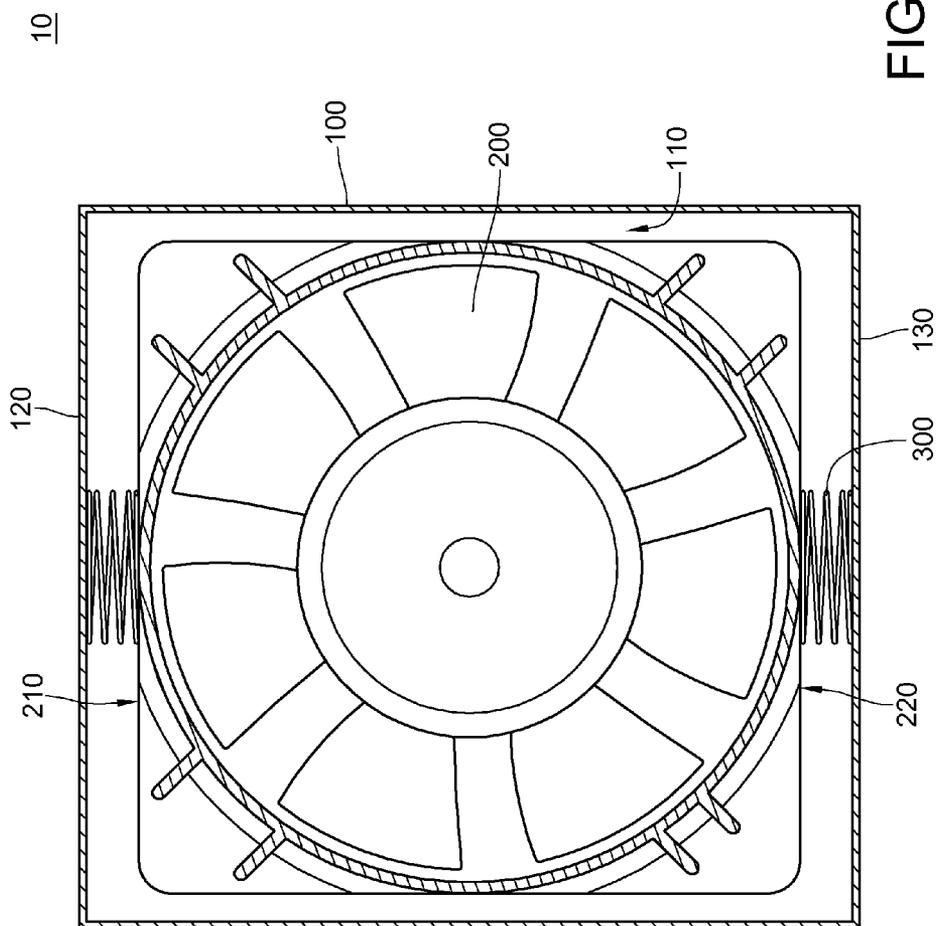


FIG. 6



FAN STRUCTURE

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This non-provisional application claims priority under 35 U.S.C. §119(a) on Patent Application No(s). 201210426170.7 filed in China on Oct. 31, 2012, the entire contents of which are hereby incorporated by reference.

BACKGROUND OF THE INVENTION

[0002] 1. Field of the Invention

[0003] The disclosure relates to a heat dissipation device, and more particularly to a fan structure.

[0004] 2. Description of the Related Art

[0005] When a computer system (such as a personal computer and a server host) operates, waste heat is generated correspondingly. The quantity of waste heat varies according to the operating time and operating efficiency of the computer system. As the waste heat gradually accumulates in the computer system, the internal temperature of the computer system increases, which may affect the performance of the computer system, or even lead to a breakdown of the computer system. Therefore, a heat dissipation device (such as a fan) is generally arranged in the computer system to remove the waste heat generated during the operation of the computer system.

[0006] However, rotation of the fan causes vibration, and as the rotational speed of the fan increases, the amplitude of vibration increases. The vibration may affect the performance of electronic elements inside the computer system. Taking a server for example, the fan is generally fixed on the housing of the server, and vibration caused by high speed rotation of the fan is transmitted by the housing to peripheral devices, such as a hard disk, mounted on the housing, which affects the performance of the peripheral devices such as the hard disk, or even damages the peripheral devices such as the hard disk. Therefore, the vibration problem incurred by the rotation of the fan is required to be solved.

SUMMARY OF THE INVENTION

[0007] The disclosure relates to a fan structure, so as to prevent the vibration problem caused by the fan structure.

[0008] In one embodiment, a fan structure comprises a casing, a fan, and two elastic members. The casing has an accommodation space. The fan is located in the accommodation space.

[0009] The fan has a first side and a second side opposite to each other. One of the two elastic members is sandwiched between the casing and the first side of the fan. The other one of the two elastic members is sandwiched between the casing and the second side of the fan. The two elastic members bias the fan away from the casing, so as to make the casing support the fan through the two elastic members.

[0010] In another embodiment, a fan structure of the disclosure comprises a casing, a fan, and an elastic member. The casing has a first side wall and a second side wall opposite to each other. The fan is located between the first side wall and the second side wall. The fan has a mounting portion. The elastic member has a middle segment surrounding the fan, and two ends assembled to the mounting portion respectively, so as to make the fan be located in the elastic member. The elastic member is urged against the first side wall and the second side wall respectively, so as to make the casing support the fan through the elastic member.

[0011] In these embodiments, at least one elastic member is sandwiched between the casing and the fan, so as to make the fan be suspended in the casing, thereby achieving a damping effect.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] The disclosure will become more fully understood from the detailed description given herein below for illustration only, and thus are not limitative of the disclosure, wherein:

[0013] FIG. 1 is a schematic three-dimensional view of a fan structure according to an embodiment of the disclosure;

[0014] FIG. 2 is a partial exploded view of FIG. 1;

[0015] FIG. 3 is a schematic sectional view of FIG. 1;

[0016] FIG. 4 is a schematic three-dimensional view of a fan structure according to another embodiment of the disclosure;

[0017] FIG. 5 is a partial exploded view of FIG. 4;

[0018] FIG. 6 is a schematic sectional view of FIG. 4; and

[0019] FIG. 7 is a schematic sectional view of a fan structure according to another embodiment of the disclosure.

DETAILED DESCRIPTION

[0020] Referring to FIG. 1 to FIG. 3, FIG. 1 is a schematic three-dimensional view of a fan structure according to an embodiment of the disclosure, FIG. 2 is a partial exploded view of FIG. 1, and FIG. 3 is a schematic sectional view of FIG. 1. A fan structure 10 of this embodiment is suitable for being mounted on an electronic device, and is used for removing heat generated by a heat source in the electronic device. The electronic device is, for example, a server. Generally, the server includes electronic elements such as a hard disk for storing data, a central processing unit, and a display card.

[0021] The fan structure 10 of this embodiment comprises a casing 100, a fan 200, and two elastic members 300. The casing 100 has an accommodation space 110, a first side wall or mounting region 120, and a second side wall or mounting region 130. The accommodation space 110 locates between the first side wall 120 and the second side wall 130. When the fan 200 rotates, vibration waves are generated. The fan 200 is located in the accommodation space 110, and the fan 200 and the casing 100 are spaced apart by a distance. Specifically, the fan 200 has a first side 210 and a second side 220 opposite to each other. In the embodiment depicted in FIGS. 1-3, the first side 210 and second side 220 are part of a fan shroud that give peripheral support to the fan. One of the two elastic members 300 is sandwiched between the first side wall 120 of the casing 100 and the first side 210 of the fan 200. The other one of the two elastic members 300 is sandwiched between the second side wall 130 of the casing 100 and the second side 220 of the fan 200. The two elastic members 300 are in contact with both the fan 200 and the casing 100 and press against the fan 200 and the casing 100.

[0022] Specifically, the first side 210 and the second side 220 of the fan 200 each comprise two mounting portions 230, such as posts, spaced apart from each other by a distance. The two elastic members 300 comprise a first elastic piece 310, a second elastic piece 320, two first assembling pieces 330, and two second assembling pieces 340. The first elastic piece 310 comprises a bent segment 312 and connecting segments 311 extending from two opposite ends of the bent segment 312. The two first assembling pieces 330 are connected to the two connecting segments 311 of the first elastic piece 310 respec-

tively. The two first assembling pieces **330** are mounted on the two mounting portions **230** on the first side **210** of the fan **200**. The first elastic piece **310** protrudes outwards from the first side **210** of the fan **200**, so that the bent segment **312** of the first elastic piece **310** is urged against the first side wall **120** of the casing **100**. The second elastic piece **320** comprises a bent segment **322** and connecting segments **321** extending from two opposite ends of the bent segment **322**. The two second assembling pieces **340** are connected to the two connecting segments **321** of the second elastic piece **320** respectively. The two second assembling pieces **340** are mounted on the two mounting portions **230** on the second side **220** of the fan **200**. The second elastic piece **320** protrudes outwards from the second side **220** of the fan **200**, so that the bent segment **322** of the second elastic piece **320** is urged against the second side wall **130** of the casing **100**. Therefore, the fan **200** is in contact with the casing **100** through the first elastic piece **310** and the second elastic piece **320** respectively, so that the fan **200** is suspended in the casing **100**, thereby achieving a damping effect.

[0023] When an electronic device is provided with the fan structure **10** of this embodiment, most vibration waves are damped by the elastic members **300**, so that the vibration waves transmitted to the hard disk in the electronic device are reduced, thereby reducing the impact of the vibration on the hard disk and enabling the hard disk to perform properly. In a related embodiment, the elastic members **300** comprise leaf springs.

[0024] The elastic members **300** of this embodiment comprise the first elastic piece **310** and the second elastic piece **320**, but the disclosure is not limited thereto. In some other embodiments, the fan structure comprises only one elastic member **300** comprising only one elastic piece.

[0025] Referring to FIG. 4 to FIG. 6, FIG. 4 is a schematic three-dimensional view of a fan structure according to another embodiment of the disclosure, FIG. 5 is a partial exploded view of FIG. 4, and FIG. 6 is a schematic sectional view of FIG. 4. This embodiment is similar to the embodiment of FIG. 1, so that only differences are illustrated.

[0026] A fan structure **10** of this embodiment comprises a casing **100**, a fan **200**, and an elastic member **300**. The casing **100** has a first side wall **120** and a second side wall **130** opposite to each other. The fan **200** is located between the first side wall **120** and the second side wall **130**. The fan **200** has a mounting portion **230**. The elastic member **300** comprises a third elastic piece **350** and two third assembling pieces **360**. The two third assembling pieces **360** are connected to two opposite ends of the third elastic piece **350** respectively. The third elastic piece **350** is disposed along the periphery of the fan **200**, and the two third assembling pieces **360** are mounted on the mounting portion **230** of the fan **200** respectively, so that a middle segment of the third elastic piece **350** surrounds the fan **200**. The fan **200** is urged against the first side wall **120** and the second side wall **130** respectively through the third elastic piece **350**, and therefore the fan **200** contacts the first side wall **120** and the second side wall **130** through the third elastic piece **350**, so that the fan **200** is suspended in the casing **100**, thereby achieving a damping effect.

[0027] In other embodiments, the elastic member **300** is not limited to the form of an elastic piece. Referring to FIG. 7, FIG. 7 is a schematic sectional view of a fan structure according to another embodiment of the disclosure.

[0028] A fan structure **10** of this embodiment comprises a casing **100**, a fan **200**, and two elastic members **300**. The

casing **100** has an accommodation space **110**, a first side wall **120**, and a second side wall **130**. The accommodation space **110** is located between the first side wall **120** and the second side wall **130**. When the fan **200** rotates, vibration waves are generated. The fan **200** is located in the accommodation space **110**, and the fan **200** and the casing **100** are spaced apart by a distance. Specifically, the fan **200** has a first side **210** and a second side **220** opposite to each other. Further, one of the two elastic members **300** has one end mounted on the first side **210** of the fan **200**, and the other end mounted on the first side wall **120** of the casing **100**. The other one of the two elastic members **300** has one end mounted on the second side **220** of the fan **200**, and the other end mounted on the second side wall **130** of the casing **100**. Therefore, the fan **200** contacts the first side wall **120** and the second side wall **130** through the two elastic members **300** respectively, so that the fan **200** is suspended in the casing **100**, thereby achieving a damping effect. The elastic members **300** of this embodiment are compression springs, and more particularly, coil springs.

[0029] According to the fan structure of the disclosure, the fan is suspended in the casing through at least one elastic piece, so as to achieve a damping effect. For example, when the number of the elastic piece is one, the elastic piece surrounds the fan, and contacts the two opposite side walls of the casing, so that the fan is suspended in the casing. When the number of the elastic pieces is two, the two elastic pieces are mounted on the two opposite sides of the fan respectively, and the two elastic pieces contact the two opposite side walls of the casing respectively, so that the fan is suspended between the two opposite side walls of the casing, thereby achieving a damping effect.

[0030] Further, two springs are disposed on the two opposite sides of the fan respectively, and the two springs are urged against the two opposite sides of the casing respectively, so that the fan is suspended in the casing, thereby achieving a damping effect.

[0031] Further, most vibration waves are damped by the elastic members, so that the vibration waves transmitted to the hard disk in the electronic device are reduced, thereby reducing the impact of the vibration on the hard disk and enabling the hard disk to perform properly.

What is claimed is:

1. A fan structure, comprising:
 - a casing, having an accommodation space;
 - a fan, located in the accommodation space, and having a first side and a second side opposite to each other; and
 - two elastic members, one of the two elastic members being sandwiched between the casing and the first side of the fan, the other one of the two elastic members being sandwiched between the casing and the second side of the fan, wherein the two elastic members bias the fan away from direct contact with the casing, so as to suspend the fan within the casing through the two elastic members.
2. The fan structure according to claim 1, wherein one of the two elastic members has one end mounted on the first side of the fan, and the other end urged against the casing;
 - and the other one of the two elastic members has one end mounted on the second side of the fan, and the other end urged against the casing.
3. The fan structure according to claim 2, wherein each of the elastic members is a compression spring.
4. The fan structure according to claim 1, wherein each of the elastic members comprises an elastic piece and two

assembling pieces, the two assembling pieces are connected to two opposite ends of the elastic piece respectively, the first side and the second side of the fan each comprise two mounting portions spaced apart from each other by a distance, the two assembling pieces of one of the two elastic members are mounted on the two mounting portions on the first side of the fan, the two assembling pieces of the other one of the two elastic members are mounted on the two mounting portions on the second side of the fan, the two elastic pieces protrude outwards from the first side and the second side of the fan respectively, and a middle segment of each of the two elastic pieces is urged against the casing.

5. The fan structure according to claim 4, wherein each of the elastic pieces comprises a bent segment and connecting segments extending from two opposite ends of the bent segment, the bent segment contacts the casing, and the two connecting segments are engaged with the two assembling pieces respectively.

6. A fan structure, comprising:

- a casing, having a first side wall and a second side wall opposite to each other;
- a fan, located between the first side wall and the second side wall, and having a mounting portion; and
- an elastic member, having a middle segment surrounding the fan, and two ends assembled to the mounting portion respectively, so as to make the fan be located in the elastic member, the elastic member being urged against the first side wall and the second side wall respectively, so as to suspend the fan within the casing through the elastic member.

7. The fan structure according to claim 6, wherein the elastic member comprises an elastic piece and two assembling pieces, the two assembling pieces are connected to two opposite ends of the elastic piece respectively, the elastic piece is disposed along the periphery of the fan, and the two assembling pieces are mounted on the mounting portion of the fan respectively, so as to make the elastic piece surround the fan, and make the fan be urged against the first side wall and the second side wall respectively through the elastic piece.

8. A fan structure comprising:

- a fan mounted for rotational movement within a fan shroud;

a fan case having opposite first and second mounting regions; and

at least one elastic member suspending the fan and fan shroud between the first and second mounting regions of the fan case and damping the transmission of vibrations from the fan to the fan case.

9. The fan structure according to claim 8, wherein the at least one elastic member comprises an elongated elastic member that encircles the fan shroud.

10. The fan structure according to claim 9, wherein the fan shroud comprises a mounting post, and the ends of the elongated elastic member are mounted to the mounting post.

11. The fan structure according to claim 10, wherein the elongated elastic member comes into compression contact with the first and second mounting regions.

12. The fan structure according to claim 9, wherein the fan case is four-sided, the first and second mounting regions forming two of the four sides, wherein the elongated elastic member comes into compression contact with each of the four sides.

13. The fan structure according to claim 8, wherein the at least one elastic member comprises a pair of springs.

14. The fan structure according to claim 13, wherein the pair of springs are compression springs.

15. The fan structure according to claim 13, wherein the pair of springs are coil springs.

16. The fan structure according to claim 13, wherein the pair of springs are leaf springs.

17. The fan structure according to claim 8, wherein each elastic member comprises two assembly ends and an intermediate segment, wherein the two assembly ends are mounted for a compression fit within corresponding mounting portions of the fan shroud.

18. The fan structure according to claim 17, wherein the intermediate segment is bent.

19. The fan structure according to claim 18, wherein the intermediate segment includes a flat portion that is biased into compression contact with the opposite first and second mounting regions of the fan case.

20. The fan structure according to claim 17, wherein the intermediate segment is curved.

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