SHOCKPROOF FAN APPARATUS

ABSTRACT

A fan apparatus includes a fan, a shockproof unit, and a case. The fan includes two plates, and a through hole is defined on each plate. The shockproof unit includes a pole penetrating the two through holes, and at least a flange is defined on the pole; at least an elastic element is restricted between one of the plates and the flange. Two ends of the pole protrude from the through holes and abut on the case when the fan is received in the case. A concave groove is defined on each end of the pole; the concave groove protrudes one of the through holes and received in a sleeve abutting on the case; a containing hole is defined in the sleeve to receive the end of the pole.
SHOCKPROOF FAN APPARATUS

BACKGROUND

[0001] 1. Technical Field
[0002] The present disclosure relates to a fan apparatus, and particularly, to a shockproof fan apparatus.
[0003] 2. Description of Related Art
[0004] An electronic device often uses a fan for heat dissipation, the fan is installed in a case mounted in the electronic device. However, while rotating, the fan blades may collide with the case due to vibration of the fan. This could damage the fan blades or the case.
[0005] Therefore, what is needed is a fan apparatus that overcomes these limitations.

BRIEF DESCRIPTION OF THE DRAWINGS

[0006] The components in the drawings are not necessarily drawn to scale, the emphasis instead being placed upon clearly illustrating the principles of a shockproof fan apparatus. Moreover, in the drawings, like reference numerals designate corresponding parts throughout the several views.
[0007] FIG. 1 is an exploded, isometric view of a fan apparatus in accordance with an exemplary embodiment.
[0008] FIG. 2 is an enlarged view of section II of FIG. 1.
[0009] FIG. 3 is an isometric view of a partial assembly of the fan apparatus of FIG. 1.
[0010] FIG. 4 is an assembled, isometric view of the fan apparatus of FIG. 1.

DETAILED DESCRIPTION

[0011] FIG. 1 showing an exploded, isometric view of a fan apparatus 1. The fan apparatus 1 includes a fan 10 having two square-shaped plates 12 thereon, and four through holes 14 are defined on four corners of each plate 12; each through hole 14 corresponds to one of the through holes 14 of the other plate 12. The fan apparatus 1 further includes a case 20 to receive the fan 10, and two shockproof units 28 and a number of spacers 70 to apply shockproof capability to the fan apparatus 1.

[0012] Each shockproof unit 28 includes a pole 30, two elastic element 40, two gaskets 50 and two sleeves 60, and two flanges 32 are defined on the pole 30. Referring to FIG. 2, two concave grooves 34 are defined on the two ends of the pole 30, forming two fastening sections 36 at the two ends of the pole 30. Each gasket 50 has a hole in the center, and the sleeve 60 has a containing hole 62 therein. A protrusion 64 is defined on the sleeve 60 to fasten to the concave groove 34 of the pole 30. In the present embodiment, the elastic element 40 is a coil spring, and the sleeve 60 is made of plastic material.

[0013] Referring to FIG. 3-4, each pole 30 penetrates through the elastic element 40, the hole of the gasket 50, and the through hole 14 of the plate 12 from both ends to fix the pole 30, the elastic elements 40, and the gaskets 50 between the two plates 12 of the fan 10. The elastic element 40 is restricted between the flange 32 and the gasket 50 positioned against an inner side of the plate 12, and the fastening section 36 protrudes to an outer side of the plate 12 and is received in the containing hole 62 of the sleeve 60 to assemble the shockproof unit 28. The other shockproof unit 28 is assembled to two diagonal through holes 14 of the plates 12 in the same way. In other embodiments, a number of the shockproof units 28 can be installed on any corner of the plates 12.

[0014] The spacers 70 are attached to outer sides of the fan 10 before placing the fan 10 into a cavity 22 of the case 20. The sleeves 60 and the spacers 70 are positioned between the outer sides of the fan 10 and the inner sides of the case 20.

[0015] In another embodiment, only one of the flanges 32 is defined on the pole 30, and the two elastic elements 40 are positioned against two ends of the flange 32.

[0016] In another embodiment, the elastic element 40 can be positioned between the outer side of plate 12 and the sleeve 60, and the flange 32 is unnecessary.

[0017] Therefore, when the fan 10 is in operation, the sleeves 60 and the spacers 70 can absorb shock made from the fan 10, and elastic deformation of the elastic elements 40 can retain the fan 10 in position to avoid colliding with the case 20 while vibrating.

[0018] Although the present disclosure has been specifically described on the basis of the exemplary embodiment thereof, the disclosure is not to be construed as being limited thereto. Various changes or modifications may be made to the embodiment without departing from the scope and spirit of the disclosure.

What is claimed is:

1. A fan apparatus, comprising:
   a fan comprising two plates; each plate comprising one through hole, and the through holes on the two plates are in opposite positions; and
   a shockproof unit comprising a pole penetrating the two through holes; at least one flange defined on the pole, and at least one elastic element, wherein each of the at least one elastic element is restricted between one of the plates and the flange.

2. The fan apparatus as claimed in claim 1, wherein the fan apparatus further comprises a case to receive the fan; two ends of the pole protrude from the through holes and abut on the case when the fan is received in the case.

3. The fan apparatus as claimed in claim 2, wherein a concave groove is defined on each end of the pole; the concave groove protrudes one of the through holes and is received in a sleeve abutting on the case.

4. The fan apparatus as claimed in claim 3, wherein a containing hole is defined in the sleeve to receive the end of the pole.

5. The fan apparatus as claimed in claim 3, wherein the sleeve is made of plastic material.

6. The fan apparatus as claimed in claim 2, wherein at least one spacer is positioned between the fan and the case when the fan is received in the case.

7. The fan apparatus as claimed in claim 1, wherein the shockproof unit comprises at least one gasket, each gasket is positioned between one of the at least one elastic element and the plate restricting the elastic element.

8. A fan apparatus, comprising:
   a fan comprising two plates; each plate comprising one through hole, and the through holes on the two plates are in opposite positions;
   a case to receive the fan; and
   a shockproof unit comprising a pole penetrating the two through holes, and two ends of the pole abutting on the case; at least one elastic element penetrating by the pole being restricted between the plate and the case.

9. The fan apparatus as claimed in claim 8, wherein a concave groove is defined on each end of the pole; the concave groove protrudes one of the through holes and is received in a sleeve abutting on the case.
10. The fan apparatus as claimed in claim 9, wherein a containing hole is defined in the sleeve to receive the end of the pole.

11. The fan apparatus as claimed in claim 10, wherein the sleeve is made of plastic material.

12. The fan apparatus as claimed in claim 8, wherein the shockproof unit comprises at least one gasket, each gasket is positioned between one of the at least one elastic element and the plate restricting the elastic element.

13. The fan apparatus as claimed in claim 8, wherein at least one spacer is positioned between the fan and the case.

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