A heat dissipation device includes a heat sink, a fan mounted on a top side of the heat sink and an engaging member mounted on the heat sink. The engaging member includes an engaging portion and an elastic member. The engaging portion includes an extending portion and a pressing portion extending from an end of extending portion. The extending portion is slidably mounted on a fin of the heat sink. The elastic member is positioned around the extending portion and sandwiched between the fin and the pressing portion. The elastic member is compressed and offers a resilient force pushing the pressing portion to move towards the fan and press a side of the fan.
HEAT DISSIPATION DEVICE WITH FAN

BACKGROUND

[0001] 1. Technical Field

The disclosure relates to heat dissipation devices and, more particularly, to a heat dissipation device with a fan capable of being conveniently assembled to and disassembled from a heat sink thereof.

[0002] 2. Description of Related Art

A heat sink is usually placed in thermal contact with a heat generating electronic device such as a central processing unit (CPU), and transfers heat through convection away from the heat generating electronic device so as to prevent overheating of the heat generating electronic device.

[0003] Generally, a fan is mounted on a side of the heat sink to improve heat dissipation efficiency of the heat sink. The fan and the heat sink are assembled together by a number of screws. The screws are assembled to and disassembled from the heat sink one by one by a technical tool. This is very time-consuming and troublesome.

[0004] What is needed, therefore, is a heat dissipation device with a fan of being conveniently assembled to and disassembled from a heat sink thereof, thereby overcoming the above-described problems.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] FIG. 1 is an assembled view of a heat dissipation device in accordance with an embodiment of the present disclosure.

[0008] FIG. 2 is an exploded view of the heat dissipation device of FIG. 1.

[0009] FIG. 3 is a partly assembled view of the heat dissipation device of FIG. 1, wherein a side of a fan is mounted on a heat sink of the heat dissipation device.

[0010] FIG. 4 is a partly assembled view of the heat dissipation device of FIG. 1, wherein an engaging member is away from the fan.

[0011] FIG. 5 is an assembled view of the heat dissipation device of FIG. 1, wherein the engaging member presses the fan.

DETAILED DESCRIPTION

[0012] Referring to FIG. 1, an embodiment of a heat dissipation device comprises a heat sink 10, a fan 20 mounted on a top side of the heat sink 10 and an engaging member 30 fixed on the heat sink 10 and pressing the fan 20.

[0013] Referring to FIG. 2, the heat sink 10 comprises a rectangular base 12, a number of first fins 13 and a number of second fins 14. The first and second fins 13, 14 extend upwardly from a top surface of the base 12 and are spaced from each other. The first fins 13 are located at a central portion of the base 12. The second fins 14 are divided into two rows along a width direction of the base 12. The two rows of the second fins 14 are located at lateral edges of the base 12 and sandwich the first fins 13 therebetween.

[0014] The first fins 13 are divided into a number of rows along a length direction and a width direction of the base 12. Each of the first fins 13 is elongated and perpendicularly connects with the base 12. Tops of the first fins 13 are coplanar and lower than tops of the second fins 14. A baffling portion 131 extends upwardly from the outmost end of each of the first fins 13 which is located at the outmost front or rear row along the length direction of the base 12. The baffling portions 131 abut against opposite sides of the fan 20. Tops of the baffling portions 131 are lower than the tops of the second fins 14.

[0015] Each of the second fins 14 is elongated and perpendicularly connects with the base 12. The second fin 14 is higher than the first fin 13. Two conical ridges 142 extend inwardly from inner surfaces of the second fins 14 which are located at the outmost front and rear sides of a right row of the second fins 14, respectively. The ridges 142 are located at a top of the end of the first fin 13 and press the fan 20. Two through holes 140 are defined at the second fins 14 which are located at the outmost front and rear sides of a left row of the second fins 14, respectively. The through holes 140 align with the ridges 142. A recess 15 is defined in a top of the heat sink 10 and enclosed by the tops of the first fins 13, inner surfaces of the baffling portions 131 and the inner surfaces of the second fins 14. The fan 20 is received in the recess 15 and supported by the tops of the first fins 13. A periphery of the fan 20 abuts against the inner surfaces of the baffling portions 131 and the inner surfaces of the second fins 14.

[0016] The engaging member 30 comprises two engaging portions 32, two elastic elements 34 and a stopping portion 36. Each of the engaging portions 32 comprises a rectangular head 322, a cylindrical extending portion 324, and a conical pressing portion 326. The extending portion 324 and the pressing portion 326 are located at opposite sides of the head 322 and oriented towards opposite directions. The extending portion 324 extends outwardly from a central portion of a lateral surface of the head 322. The extending portion 324 extends through the through hole 140 of the second fin 14 of the heat sink 10 and engages with the stopping portion 36. An end of the extending portion 324 is recessed to define an engaging groove 3240 to engage with the stopping portion 36. The pressing portion 326 extends outwardly from another lateral surface of the head 322 to engage with the fan 20. The elastic element 34 is positioned around a periphery of the extending portion 324 and is sandwiched between a corresponding second fin 14 and the head 322. In this embodiment, the elastic element 34 is a helical spring, and can be compressed along an axial direction thereof. The stopping portion 36 is integrally formed by an elastic plastic or metallic sheet. The stopping portion 36 comprises a U-shaped opening portion 364 and two connecting portions 362 extending outwardly from two opposite ends of the operating portion 364. The connecting portions 362 are oriented towards opposite directions. The connecting portion 362 defines a mounting hole 3621 to receive the extending portion 324. A slit 3263 is defined at the outmost end of the connecting portion 362 and communicates with the mounting hole 3621 to divide the outmost end of the connecting portion into two spaced portions.

[0017] The fan 20 comprises a cubical bracket 22 and a blade assembly 24 received in the bracket 22. Middle portions of four corners of the bracket are recessed; thus, four triangular mounting portions 224 are formed at a bottom end of the bracket 22. Two of the mounting portions 224 are pressed by the ridges 142 of the second fins 14 of the heat sink 10. Two of the mounting portions 224 are pressed by the pressing portions 326 of the engaging member 30.

[0018] Referring to FIGS. 3-5, in assembly, the stopping portion 36 is located at a left side of the heat sink 10 and the mounting holes 3621 align with the through holes 140 of the second fins 14 of the heat sink 10. The elastic elements 34 enclose the extending portions 324 of the engaging member 30, respectively. The two extending portions 324 of the
engaging member 30 extend through the through holes 140 of the second fins 14 and the mounting holes 3621 of the connecting portions 362 of the stopping portion 36, respectively. In this state, the pressing portions 326 of the engaging portion 32 face the ridges 142 of the second fins 14. The elastic element 34 is sandwiched between the head 322 of the engaging portion 32 and the inner surface of the corresponding second fin 14. The connecting portion 362 firmly engages in the engaging groove 3240. When the extending portion 324 extends in the mounting hole 3261, the outmost end of the connecting portion 362 expands and a width of the slit 3623 is broadened. When the engaging groove 3240 of the extending portion 324 is received in the mounting hole 3621, the outmost end of the connecting portion 362 restores to its original configuration and the connecting portion 362 firmly engages with the periphery of the extending portion 324 defining the engaging groove 3240. Thus, the engaging member 30 is mounted on the heat sink 10.

[0019] Referring to FIG. 3 again, a right end of a bottom portion of the fan 20 is received in the recess 15 of the heat sink 10. Two of the mounting portions 224 of the fan 20 are pressed downwardly to make the mounting portions 224 sandwich between the ridges 142 of the second fins 14 and the tops of the first fins 13 of the heat sink 10. Another two of the mounting portions 224 abut against top portions of the pressing portions 326 of the engaging member 30. Therefore, the right end of a bottom portion of the fan 20 abuts against the tops of the first fins 13 and a left end is spaced from the tops of the first fins 13.

[0020] Referring to FIG. 4 again, the operating portion 364 of the stopping portion 36 is subject to an external force, which pulls the stopping portion 36 outwardly relative to the second fins 14 to make the pressing portions 326 move outwardly and away from the fan 20. Thus, the bottom portion of the fan 20 is totally received in the recess 15 and the left end of the fan 20 abuts against the tops of the first fins 13. The elastic element 34 is compressed.

[0021] Referring to FIG. 5 again, the external force is released, whereby, due to the resilience of the elastic elements 34, the pressing portions 326 are pushed toward the mounting portions 224 of the fan 20 and press the mounting portions 224. The operating portion 364 abuts against outer surfaces of the second fins 14 of the heat sink 10. Thus, the heat dissipation device is assembled completely.

[0022] It is to be understood, however, that even though numerous characteristics and advantages of the disclosure have been set forth in the foregoing description, together with details of the structure and function of the disclosure, 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 disclosure 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 heat dissipation device comprising:
   a heat sink;
   a fan mounted on a top side of the heat sink; and
   an engaging member comprising an engaging portion and an elastic member, the engaging portion comprising an extending portion and a pressing portion extending from an end of the extending portion, the extending portion slidably mounted on the heat sink, the elastic member positioned around the extending portion and sandwiched between a first fin of the heat sink and the pressing portion;
   wherein the elastic member is compressed between the first fin of the heat sink and the pressing portion to provide a resilient force which pushes the pressing portion to move towards the fan and press a side of the fan.

2. The heat dissipation device as claimed in claim 1, wherein the heat sink comprises a base and the first fin extends upwardly from a top surface of the base, and the extending portion of the engaging member is slidably mounted on the first fin.

3. The heat dissipation device as claimed in claim 2, wherein a connecting portion abuts against an outer surface of the first fin, and the engaging portion of the engaging member extends through the first fin and engages with the connecting portion.

4. The heat dissipation device as claimed in claim 3, wherein the connecting portion defines a through hole and a slit at an outmost end thereof to divide the outmost end of the connecting portion into two portions, the slit communicates with the through hole, an end of the extending portion of the engaging member engages in the through hole.

5. The heat dissipation device as claimed in claim 4, wherein the end of the extending portion is recessed to define an engaging groove, the engaging groove is received in the through hole of the connecting portion and the connecting portion firmly engages in the engaging groove.

6. The heat dissipation device as claimed in claim 1, wherein the elastic member is a helical spring.

7. The heat dissipation device as claimed in claim 2, wherein the heat sink further comprises a second fin which is located at an opposite side of the first fin and abuts against another side of the fan.

8. The heat dissipation device as claimed in claim 7, wherein a ridge extends inwardly from an inner surface of the second fin and presses the another side of the fan.

9. The heat dissipation device as claimed in claim 8, wherein the heat sink comprises a plurality of third fins extend upwardly from the top surface of the base, and tops of the third fins support the fan.

10. The heat dissipation device as claimed in claim 9, wherein a baffling portion extends upwardly from a lateral end of an outer one of the third fins and abuts the fan.

11. A heat dissipation device comprising:
   a heat sink comprises a base and a first fin and a second fin extending upwardly from a top surface of the base;
   a fan mounted on a top side of the heat sink and sandwiched between the first and second fins of the heat sink, a side of the fan abutting against an inner surface of the second fin; and
   an engaging member comprising an engaging portion and an elastic member, the engaging portion comprising an extending portion and a pressing portion extending from an end of extending portion, the extending portion slidably mounted on the first fin, the elastic member positioned around the extending portion and sandwiched between the first fin and the pressing portion;
   wherein the elastic member is compressed between the first fin and the pressing portion to provide a resilient force pushing the pressing portion to move towards the fan and press another side of the fan.

12. The heat dissipation device as claimed in claim 11, wherein the extending portion extends through the first fin.
and engaging with a connecting portion which abuts against an outer surface of the first fin.

13. The heat dissipation device as claimed in claim 12, wherein the heat sink comprises two first fins aligned with each other, the engaging member comprises two engaging portions and two elastic members, the another engaging member extends through another first fin and engages with another connecting portion, and the pressing portion of the another engaging portion presses the fan.

14. The heat dissipation device as claimed in claim 13, wherein an operating portion connects the two connecting portions and is located at outside of the heat sink, and the operating portion and the two connecting portions are parts of an elastic sheet.

15. The heat dissipation device as claimed in claim 11, wherein an inner surface of the second fin forms a ridge pressing the fan.

16. The heat dissipation device as claimed in claim 11, wherein the heat sink comprises a plurality of third fins extend upwardly from the top surface of the base and positioned between the first and second fins, tops of the third fins support the fan.

17. The heat dissipation device as claimed in claim 16, wherein a baffling portion extends upwardly from a lateral end of an outer one of the third fins and abuts the fan.

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