US009288934B2

(12) **United States Patent**
Shao

(10) **Patent No.: US 9,288,934 B2**
(45) **Date of Patent: Mar. 15, 2016**

(54) **ELECTRONIC DEVICE HAVING CLIP CLASPING ELECTRONIC MODULE**

(71) Applicant: **HON HAI PRECISION INDUSTRY CO., LTD.**, New Taipei (TW)

(72) Inventor: **Chun-Hao Shao**, New Taipei (TW)

(73) Assignee: **HON HAI PRECISION INDUSTRY CO., LTD.**, New Taipei (TW)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 322 days.

(21) Appl. No.: **14/054,769**

(22) Filed: **Oct. 15, 2013**

(65) **Prior Publication Data**

US 2015/0085450 A1 Mar. 26, 2015

(30) **Foreign Application Priority Data**

Sep. 23, 2013 (TW) ..... 102134180 A

(51) **Int. Cl.**
H05K 7/12 (2006.01)
H05K 7/20 (2006.01)

(52) **U.S. Cl.**
CPC ***H05K 7/20727*** (2013.01); ***H05K 7/20172*** (2013.01)

(58) **Field of Classification Search**
CPC H05K 7/20727; H01L 23/4006
USPC 361/747, 756, 726, 802, 740
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

6,549,424 B1 * 4/2003 Beseth H05K 7/1409 361/726
6,618,259 B1 * 9/2003 Hood, III G06K 13/0825 361/726

FOREIGN PATENT DOCUMENTS

CN 202759698 U 2/2013
TW 568298 U 12/2003
TW M338537 U 8/2008

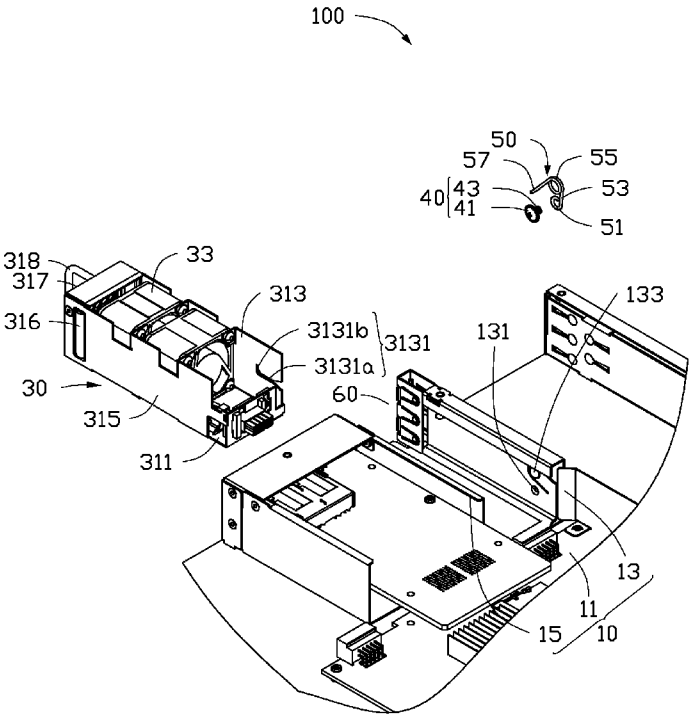
* cited by examiner

Primary Examiner — Dion R Ferguson
Assistant Examiner — Mandeep S Buttar
(74) *Attorney, Agent, or Firm* — Novak Druce Connolly Bove + Quigg LLP

(57) **ABSTRACT**

An electronic device includes a frame, a electronic module, and a clip. The frame includes a supporting plate and a first bracket mounted on the supporting plate. The electronic module is located at the supporting plate. A guiding groove is defined in the electronic module. The clip is mounted on the frame and connects the electronic module. The clip includes a mounting portion mounted on the first bracket and a clasp extending from the mounting portion. The clasp can slide along the guiding groove to elastically clasp the first bracket.

17 Claims, 3 Drawing Sheets



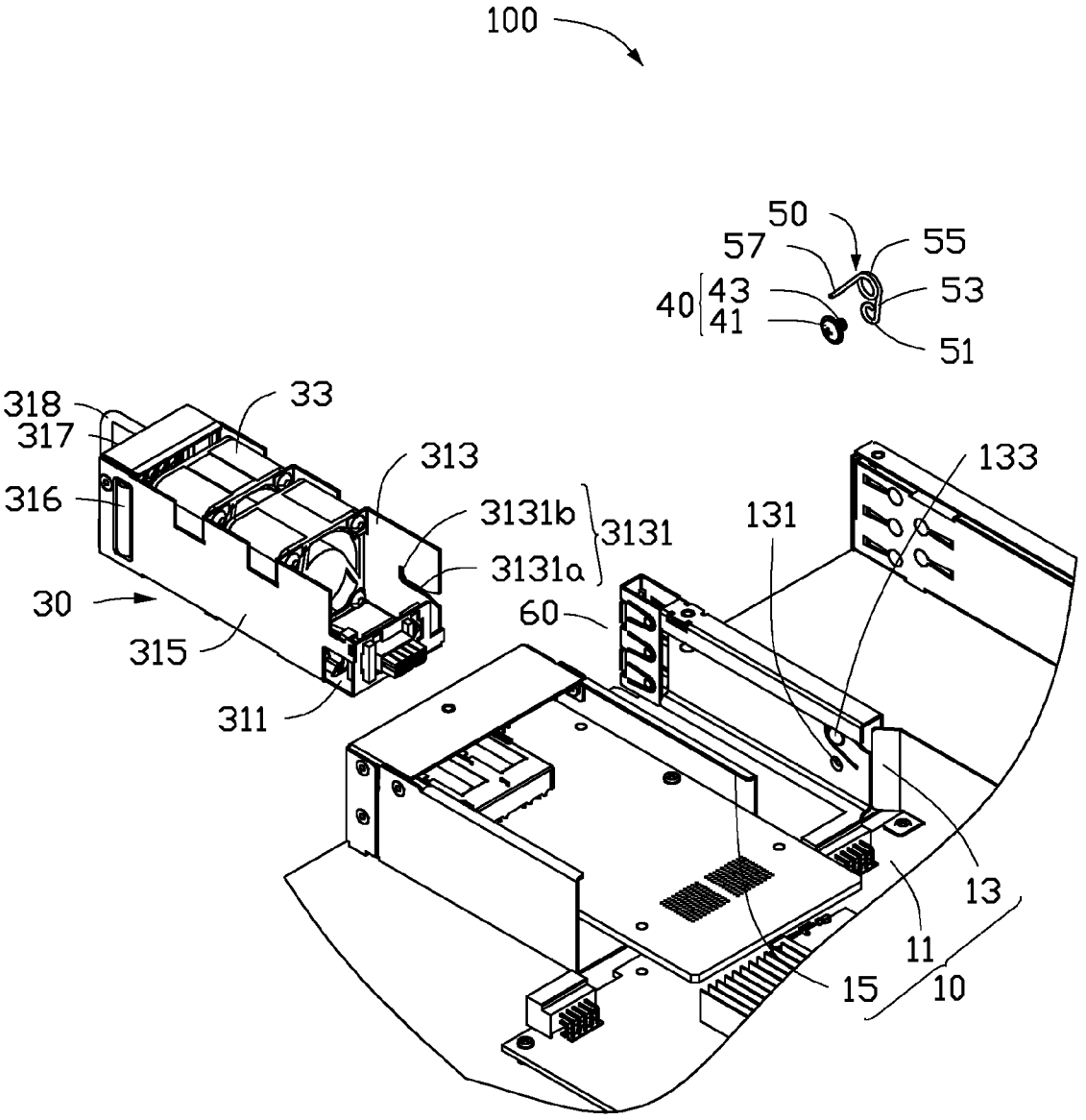

100
50
57
55
40
43
41
53
51
318
317
33
313
316
3131b
3131
3131a
131
133
30
60
315
311
13
11
15
10

FIG. 1

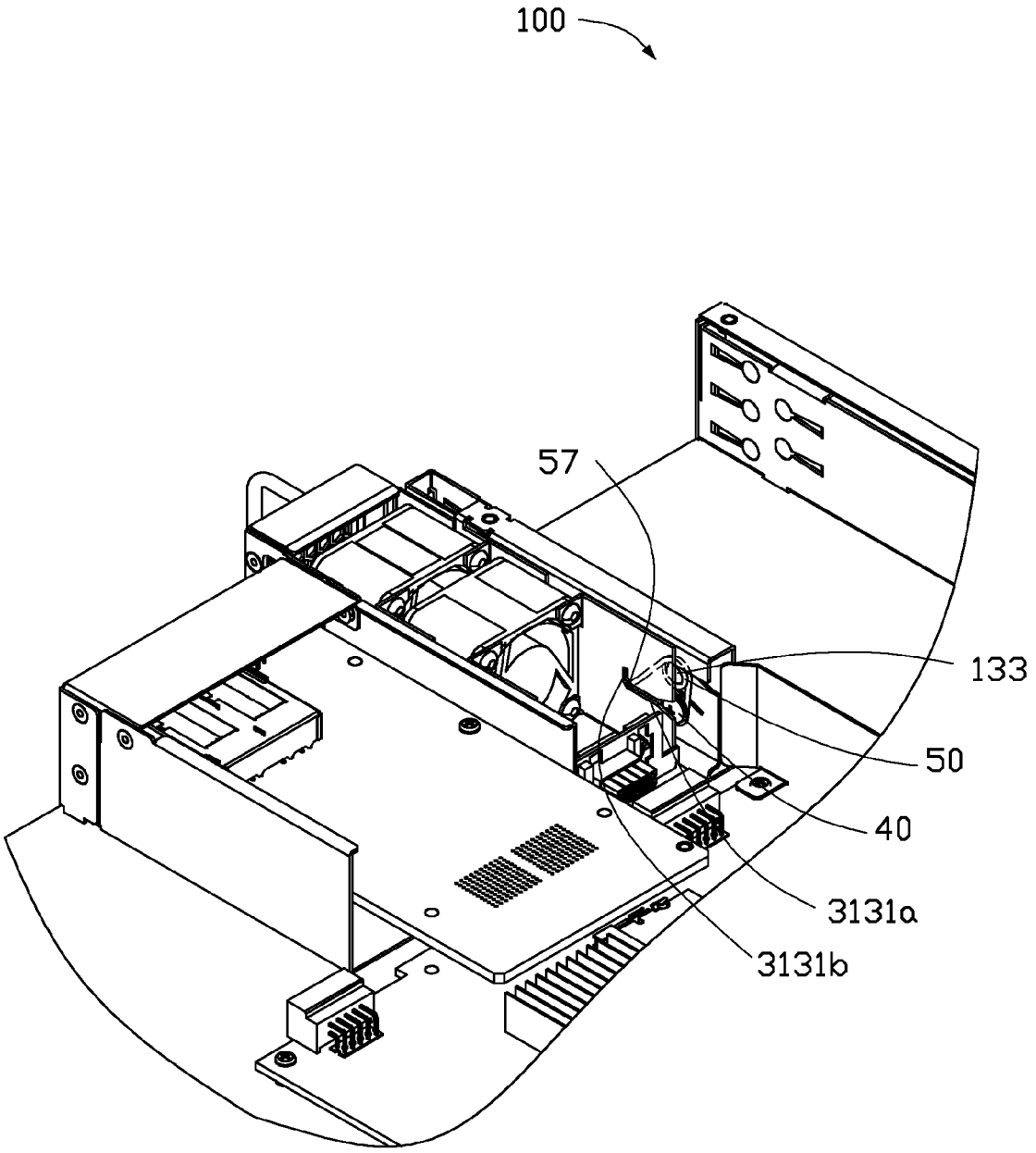


FIG. 2

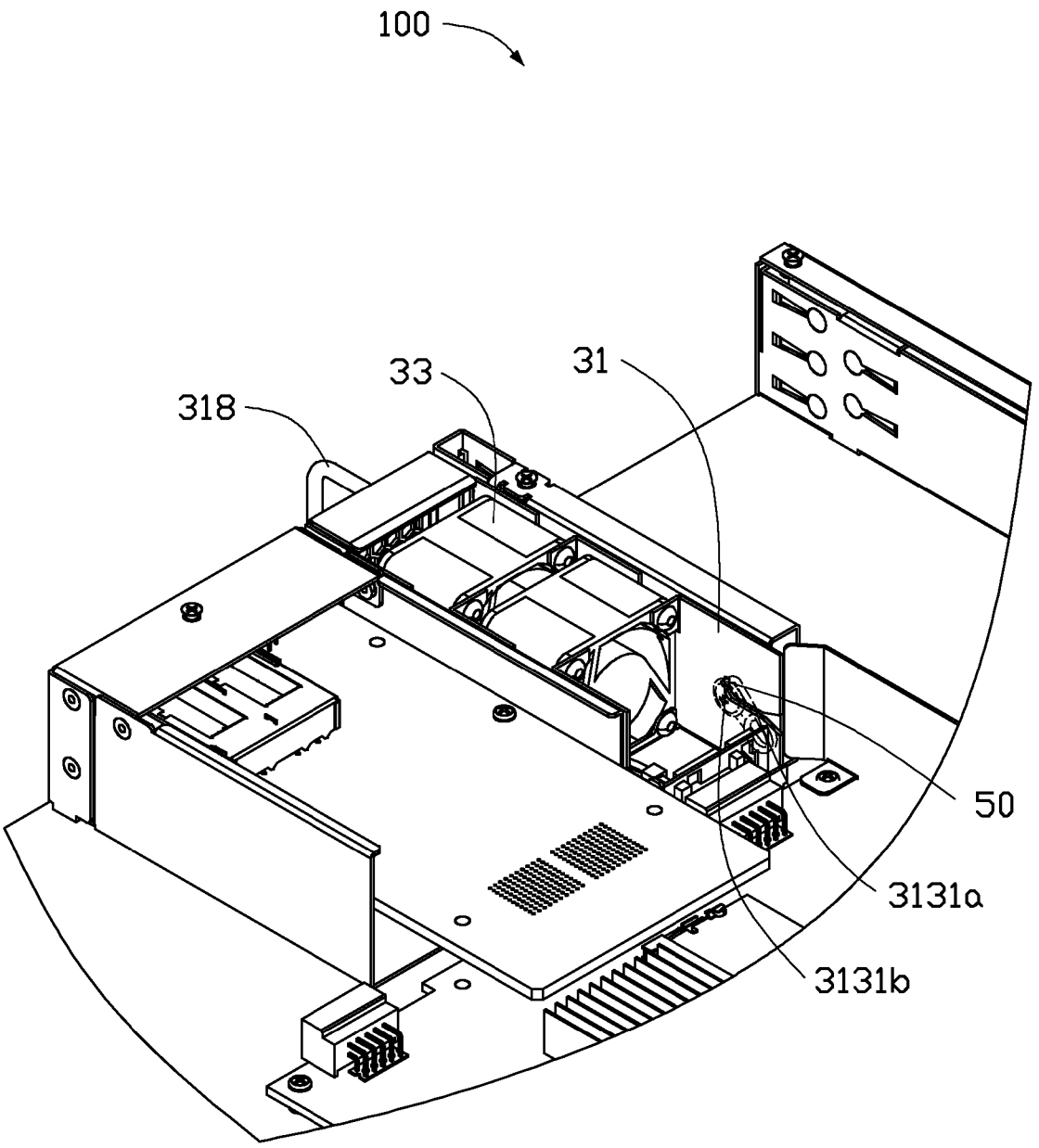


FIG. 3

ELECTRONIC DEVICE HAVING CLIP CLASPING ELECTRONIC MODULE

BACKGROUND

1. Technical Field

The present disclosure relates to an electronic device having an electronic module and a clip clasping the electronic module.

2. Description of Related Art

A conventional electronic device, such as a server, includes a frame and a plurality of electronic modules mounted on the frame. Each electronic module includes a bracket and electronic components received in the bracket. A plurality of screws extends through the bracket of the electrode module and engages with the frame to assemble the electronic module on the frame. However, this is time-consuming to use a technical tool to assemble to or disassemble the screws from the frame one by one by.

What is needed, therefore, is an improved electronic device which overcomes the above described shortcomings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is an exploded view of an electronic device of an exemplary embodiment of the present disclosure.

FIG. **2** is an assembled view of the electronic device of FIG. **1**, wherein an electronic module of the electronic device is unlocked.

FIG. **3** is an assembled view of the electronic device of FIG. **1**, wherein the electronic module of the electronic device is locked.

DETAILED DESCRIPTION

An embodiment of an electronic device in accordance with the present disclosure will now be described in detail below and with reference to the drawings.

In the description that follows, the stated orientations of all of the elements of the electronic device are with reference to the orientations of all of the elements as shown in FIG. **1**.

Referring to FIGS. **1** to **2**, an electronic device **100** in accordance with an exemplary embodiment includes a frame **10**, an electronic module **30** mounted on the frame **10**, and a clip **50** assembled on the frame **10** and connecting the electronic module **30**.

The frame **10** includes a supporting plate **11**, a first bracket **13** and a second bracket **15** mounted on the supporting plate **11**. The supporting plate **11** is an elongated plate. The first bracket **13** is an elongated plate. A bottom side of the first bracket **13** is mounted on a top surface of the supporting plate **11**. The first bracket **13** is perpendicular to the supporting plate **11**. A mounting hole **131** is defined in a rear end of the first bracket **13** to receive a fastener **40** therein. The fastener **40** is used to fasten the clip **50** on the first bracket **13**. A positioning member **133** is formed on the rear end of the first bracket **13** to position the clip **50**. The positioning member **133** is aligned with the mounting hole **131** and located at a top of the mounting hole **131**. In this embodiment, the positioning member **133** is a protrusion protruding from the first bracket **13**.

In this embodiment, the fastener **40** is a screw and includes a head **41** and a pole **43** extending from a central portion of the head **41**. The head **41** and the pole **43** are cylindrical. A diameter of the head **41** is larger than that of the pole **43** and is larger than a bore diameter of the mounting hole **131**. The pole **43** is used to extend through the clip **50**, the mounting hole **131** and screw with the first bracket **13** to fasten the clip **50** on the first bracket **13**.

The second bracket **15** faces and aligned with the first bracket **13**. The second bracket **15** is spaced from the first bracket **13**. The first bracket **13**, the second bracket **15** and the supporting plate **11** cooperatively define a receiving chamber **60** therebetween to receive the electronic module **30** therein. In this embodiment, the second bracket **15** is an elongated plate and a bottom side of the second bracket **15** is mounted on the top surface of the supporting plate **11**. The second bracket **15** is perpendicular to the supporting plate **11** and parallel to the first bracket **13**. A length of the first bracket **13** is equal to that of the second bracket **15**. Opposite ends of the first bracket **13** are respectively aligned with opposite ends of the second bracket **15**. A depth of the receiving chamber **60** is larger than a height of the electronic module **30**.

The electronic module **30** includes a housing **31** and a fan module **33** received in the housing **31**. Alternatively, other electronic components may be received in the housing **31**. The housing **31** includes an elongated bottom plate **311**, a first sidewall **313** and a second sidewall **315** perpendicularly extending from opposite sides of the bottom plate **311**, and a connecting plate **317** perpendicularly extending from a front end of the bottom plate **311**. Each first sidewall **313**, second sidewall **315**, and the connecting plate **317** is rectangular. Opposite sides of the connecting plate **317** interconnect front ends of the first sidewall **313** and the second sidewall **315**. A handle **318** is formed on an outer side of the connecting plate **317** for operating the electronic module **30** expediently. In this embodiment, the handle **318** is a U-shaped strip.

The first sidewall **313** and the second sidewall **315** are elongated and parallel to each other. A rear end of the first sidewall **313** is away from the connecting plate **317** and a guiding groove **3131** is defined therein to receive the clip **50**. The guiding groove **3131** is L-shaped and includes a first guiding section **3131***a* and a second guiding section **3131***b* extending from the first guiding section **3131***a*. The first guiding section **3131***a* is horizontal and extends from a rear edge along a longitudinal direction of the first sidewall **313**. The second guiding section **3131***b* is vertical and extends upwardly from a front end of the first section **3131***a*. The first guiding section **3131***a* and the second guiding section **3131***b* communicate with each other. A width of a rear end of the first section **3131***a* is larger than that of the other portion of the first section **3131***a* to guide the clip **50** to enter the guiding groove **3131**. A length of the second guiding section **3131***b* is less than that of the first guiding section **3131***a*.

A width of the electronic module **30** is slightly less than or equal to that of the receiving chamber **60**. Two elastic pressing portions **316** protrude outwardly from front ends of the first sidewall **313** and the second sidewall **315** to abut the first bracket **13** and the second bracket **15**. The two pressing portions **316** face each other. The fan module **33** is sandwiched between the first sidewall **313** and the second sidewall **315** and a top end of the fan module **33** is below top sides of the first sidewall **313** and the second sidewall **315**.

The clip **50** is a wire clip and includes a connecting arm **53**, a mounting portion **51** and a positioning portion **55** formed on opposite ends of the connecting arm **53**, and a clasp **57** extending from the positioning portion **55**. The fastener **40** extends through the mounting portion **51**, the mounting hole **131** and screws with the first bracket **13** to fasten the clip **50** on the first bracket **13**. The connecting arm **53** is annular and is rotatable relative to the pole **43** of the fastener **40**. The positioning portion **55** hooks the positioning member **133** of the first bracket **13** to position the clip **50**. The positioning

portion **55** is annular. The clasp **57** is L-shaped and used to slide along the guiding groove **3131** to clasp the first sidewall **313**. The clasp **57** and the connecting arm **53** are located at opposite sides of the positioning portion **55** and cooperatively form a V-shaped configuration.

Referring to FIGS. **2** to **3**, when the electronic module **30** is assembled from the frame **10**, the clip **50** is positioned on the first bracket **13**, and a rear end of the electronic module **30** is pushed into the receiving chamber **60** by operating the handle **318** from a front end of the receiving chamber **60** away from the positioning member **133**. The electronic module **30** is pushed continuously to make the clasp **57** of the clip **50** enter into the guiding groove **3131** and slide along the first section **3131***a*. The first sidewall **313** pushes the positioning portion **55** of the clip **50** to make the positioning portion **55** be disassembled from the positioning member **133** when the first sidewall **313** sliding. The electronic module **30** is pushed again to make the clasp **57** be pressed and slide from the first section **3131***a* to the second section **3131***b*. In this process, the clip **50** rotates relative to the pole **43** and is compressed. When the clasp **57** enters the second section **3131***b*, the clasp **57** is released, arrived to a top end of the second section **3131***b* and elastically abuts the first sidewall **313**. In this state, the electronic module **30** is locked.

When the electronic module **30** is disassembled from the frame **10**, the clasp **57** is pressed downwardly, and the electronic module **30** is pulled outwardly along the receiving chamber **60** until the electronic module **30** is completely pulled out from the receiving chamber **60**. In this process, the clasp **57** slides from the second section **3131***b* to the first section **3131***a*, the connecting portion **51** rotates about the pole **43**, the clip **50** is released and elastically hooks the positioning member **133**.

In this disclosure, the electronic module **30** is pushed or pulled along the receiving chamber **60** to make the electronic module **30** locked by the clip **50** or disassembled from the frame **10**. Thus, the assembly or disassembly processes of the electronic device **100** are time-saving and the technical tool is omitted.

It is to be further understood that even though numerous characteristics and advantages of the present embodiments have been set forth in the foregoing description, together with details of the structures and functions of the embodiments, 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. An electronic device comprising: a frame comprising a supporting plate and a first bracket mounted on the supporting plate; an electronic module located at the supporting plate, and a guiding groove defined in the electronic module; and a clip mounted on the frame and connecting the electronic module, the clip comprising a mounting portion mounted on the first bracket and a clasp extending from the mounting portion wherein the clasp can slide along the guiding groove to elastically clasp the first bracket and wherein the clip further comprises a positioning portion, and a connecting arm, the first bracket comprises a positioning member, and the positioning portion elastically hooks the positioning member, the positioning portion and the mounting portion are respectively located at opposite ends of the connecting arm.

2. The electronic device of claim **1**, wherein the positioning member is a protrusion protruding from the first bracket.

3. The electronic device of claim **2**, wherein the positioning portion is annular.

4. The electronic device of claim **1**, wherein the clasp extends from the positioning portion, the clasp and the connecting arm are located at opposite sides of the positioning portion and cooperatively form a V-shaped configuration.

5. The electronic device of claim **1**, wherein a mounting hole is defined in the first bracket, a fastener extends through the mounting portion of the clip, the mounting hole of the first bracket, and engages with the first bracket to assemble the clip on the first bracket.

6. The electronic device of claim **5**, wherein the fastener comprises a head and a pole extending from the head, the mounting portion surrounds the pole and is rotatable relative to the pole.

7. The electronic device of claim **5**, wherein the mounting portion is annular.

8. The electronic device of claim **1**, wherein the guiding groove comprises a first section and a second section extending from the first section, and the first section angles with the second section.

9. The electronic device of claim **8**, wherein the first section is horizontal and the second section is vertical and perpendicularly extends from an end of the first section.

10. The electronic device of claim **9**, wherein the first section communicates with the second section.

11. The electronic device of claim **1**, wherein a handle is formed on the electronic module.

12. The electronic device of claim **1**, wherein a second bracket is mounted on the supporting plate, the second bracket faces and is spaced from the first bracket, and the first bracket, the second bracket, and the supporting plate cooperatively define a receiving chamber therebetween to receive the electronic module therein.

13. The electronic device of claim **12**, wherein two elastic pressing portions protrude outwardly from opposite sides of the electronic module to abut the first bracket and the second bracket.

14. The electronic device of claim **13**, wherein the two elastic pressing portions face each other.

15. An electronic device comprising: a frame comprising a supporting plate and a first bracket mounted on the supporting plate, and a mounting hole defined in the first bracket; an electronic module located at the supporting plate, and a guiding groove defined in the electronic module; a fastener; and a clip comprising a mounting portion and a clasp extending from the mounting portion, the fastener extending through the mounting portion, the mounting hole of the first bracket and engaging with the first bracket, wherein the clasp can slide along the guiding groove to elastically clasp the first bracket and wherein the clip further comprises a positioning portion, and a connecting arm, the first bracket comprises a positioning member, and the positioning portion elastically hooks the positioning member, the positioning portion and the mounting portion are respectively located at opposite ends of the connecting arm.

16. The electronic device of claim **15**, wherein the guiding groove comprises a first section and a second section extending from the first section, and the first section angles with the second section.

17. The electronic device of claim **16**, wherein a length of the second section is less than that of the first section.

* * * * *