ABSTRACT

An elastic structure includes a main board, two fixing portions, and a latching arm. The two fixing portions disposed at opposite sides of the main board and at the same plane with the main board. The latching arm extends outwardly from a middle portion of the main board and forms an acute angle with the main board. The latching arm includes a resisting arm inclined toward the main board. An electronic device using the elastic structure is also described.
ELASTIC STRUCTURE AND SHELL ASSEMBLY USING THE SAME

BACKGROUND

[0001] 1. Technical Field

[0002] The exemplary disclosure generally relates to an elastic structure and a shell assembly using the elastic structure.

[0003] 2. Description of Related Art

[0004] With the development of wireless communication and information processing technology, portable electronic devices such as mobile phones and personal digital assistants (PDAs) are now widely used. Consumers may enjoy the full convenience of the portable electronic devices almost any time and anywhere.

[0005] These portable electronic devices are often equipped with elastic structures to provide elastic force between two components thereof, to provide ground connection for electronic component assembled there in, to serve as a protection shield of the electronic components from electromagnetic interference, to elastically latch or assemble with other components, etc. Generally, when the elastic structure is used to provide elastic force between two components, the elastic structure usually defines a long elastic arm to ensure the elasticity thereof. Thus, such structure of the elastic structure requires a large space to assemble in the portable electronic device which defeats the trend of miniaturization.

[0006] Therefore, there is room for improvement within the art.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] Many aspects of the exemplary elastic structure and shell assembly using the same can be better understood with reference to the following drawings. These drawings are not necessarily drawn to scale, the emphasis instead being placed upon clearly illustrating the principles of the present elastic structure and shell assembly using the same. Moreover, in the drawings like reference numerals designate corresponding parts throughout the several views. Wherever possible, the same reference numbers are used throughout the drawings to refer to the same or like elements of an embodiment.

[0008] FIG. 1 shows a perspective view of a shell assembly with an elastic structure mounted thereon according to an exemplary embodiment.

[0009] FIG. 2 shows an exploded perspective view of the shell assembly shown in FIG. 1.

[0010] FIG. 3 is similar to FIG. 2, but viewed from another aspect.

[0011] FIG. 4 shows an enlarged, perspective view of the elastic structure, according to an exemplary embodiment.

[0012] FIG. 5 shows a partial cross-sectional view taken along line V-V of FIG. 1.

DETAILED DESCRIPTION

[0013] Please referring to FIG. 1, a perspective view of a shell assembly 100 with an elastic structure 50 mounted thereon according to an exemplary embodiment is shown. The shell assembly 100 includes a touch pen 10, a shell 30 and the elastic structure 50.

[0014] Also referring to FIG. 2 and FIG. 3, the touch pen 10 is detachably mounted on the shell 30 and latched by the elastic structure 50. The touch pen 10 includes a touch head portion 11, a body portion 13 and a tail portion 15 opposite to the touch head portion 11. The body portion 13 includes substantially stepped latching portions 132 disposed at opposite sides of the touch head portion 11 respectively. The tail portion 15 defines a substantially V-shaped latching slot 152 therein, and thereby forms an inclined resisting wall 155 within the latching slot 152, toward the touch head portion 11.

[0015] The shell 30 may be a battery cover of a portable electronic device (e.g. mobile phone, personal digital assistant, etc.). The shell 30 includes an upper wall 31, two sidewalls 33 and a touch pen assembly portion 35. The upper wall 31 includes an outer surface 311 and an opposite inner surface 313. The two sidewalls 33 extend from two longitudinal lateral margins of the upper wall 31 toward the inner surface 313 side respectively. The two sidewalls 33 each defines several latching blocks 331 spaced protruding thereon for assembling the shell 30 to a body (not shown) of the portable electronic device. The touch pen assembly portion 35 is a groove recessed in the outer surface 311 of the upper wall 31, for assembling the touch pen 10 therein. The touch pen assembling portion 35 has an accommodating cavity 351 and two substantially stepped latching grooves 352. The accommodating cavity 351 is defined at one end of the touch pen assembling portion 35, corresponding to the touch head portion 11 of the touch pen 10. The latching grooves 352 are respectively defined at two opposite sides of the accommodating cavity 351 corresponding to the two latching portions 132 of the touch pen 10, for assembling the touch head portion 11 of the touch pen 10 therein. An opposite end of the touch pen assembling portion 35 defines a through hole 353 corresponding to the latching slot 152 of the touch portion 15 of the touch pen 10.

[0016] Also referring to FIG. 4, the elastic structure 50 is formed by punching and bending a piece of metallic material, and is configured to elastically latch the touch pen 10 to the shell 30. The elastic structure 50 is substantially L-shaped and includes a main board 51, two fixing portions 53 and a latching arm 55. The main board 51 is a substantially T-shaped board and includes a first extending arm 511, a second extending arm 512 opposite to the first extending arm 511, and a third extending arm 513 perpendicular to the first extending arm 511 and the second extending arm 512. The two fixing portions 53 are substantially L-shaped, and are disposed at opposite sides of the main board 51 by extending out from the corresponding first extending arm 511 and the second extending arm 512 respectively. The two fixing portions 53 are at substantially same plane with the main board 51 and each fixing portion 53 includes a free end 535 parallel to the first extending arm 511 and the second extending arm 512. In the exemplary embodiment, each fixing portion 53 includes a bent portion 533 at a substantially middle portion thereof for enhancing the structural strength of the elastic structure 50. The latching arm 55 is substantially V-shaped, and is disposed at a distal end of the third extending arm 513 for latching with the tail portion 15 of the touch pen 10. The latching arm 55 includes an elastic arm 551 and a resisting arm 553. The elastic arm 551 extends outwardly from the distal end of the third extending arm 513 and forms an acute angle with the third extending arm 513. The resisting arm 553 extends from the distal end of the elastic arm 551 and is bent toward the third extending arm 513 to form an acute angle with the elastic arm 551, and thus forms an inclined portion toward the main board 51.
Also referring to FIG. 5, when assembling the shell assembly 100, the elastic structure 50 is assembled to the shell 30 with the two fixing portions fixedly mounted on the inner surface 313 of the upper wall 31 of the shell 30. The latching arm 55 of the elastic structure 50 is inserted into the through hole 353 and is accommodated within the touch pen assembling portion 35 of the shell 30 correspondingly. The resisting arm 553 of the elastic structure 50 is disposed toward the accommodating cavity 351 of the touch pen assembling portion 35. When the touch pen 10 is detachably assembled to the shell 30, the touch head portion 11 is inserted into the accommodating cavity 351 of the touch pen assembling portion 35 of the shell 30 with the two latching portions 132 latching into the two latching grooves 352 of the touch pen assembling portion 35 simultaneously. The tail portion 15 of the touch pen 10 is pressed downwardly and accommodated within the touch pen assembling portion 35 of the shell 30; the latching arm 55 of the elastic structure 50 latches into the assembling slot 152 of the tail portion 15 of the touch pen 10 correspondingly, the resisting arm 553 of the elastic structure 50 elastically resists the resisting wall 155 of the touch pen 10.

When detaching the touch pen 10, the touch pen 10 is pushed toward the tail portion 15 end to compress the resisting arm 553 until the touch head portion 11 of the touch pen 10 exits the accommodating cavity 351 of the touch pen assembling portion 35. Then, the touch pen 10 can be easily removed.

It is to be understood, however, that even through numerous characteristics and advantages of the present invention have been set forth in the foregoing description, together with details of the structure and function of the invention, 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 invention 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 elastic structure comprising:
   a main board;
   two fixing portions disposed at opposite sides of the main board and lying on a same plane with the main board; and
   a latching arm extending outwardly from a middle portion of the main board and bending to form an acute angle with the main board, the latching arm having a resisting arm at the distal end thereof inclined toward the main body.

2. The elastic structure as claimed in claim 1, wherein the main board is substantially T-shaped board and includes a first extending arm, an opposite second extending arm, and a third extending arm perpendicular to the first extending arm and the second extending arm; the two fixing portions and the latching arm extend from the first extending arm, the second extending arm and the third extending arm respectively.

3. The elastic structure as claimed in claim 2, wherein the fixing portion is substantially L-shaped and includes a free end parallel to the first extending arm and the second extending arm.

4. The elastic structure as claimed in claim 1, wherein the fixing portion defines a bent portion at the substantially middle portion thereof.

5. The elastic structure as claimed in claim 2, wherein the latching arm is substantially V-shaped and disposed at the distal end of the third extending arm, the latching arm includes an elastic arm extending from the distal end of the third extending arm and forms an acute angle with the third extending arm; the resisting arm extends from the elastic arm and is bent towards the third extending arm to form an acute angle with the elastic arm.

6. The elastic structure as claimed in claim 1, wherein the elastic structure is formed by punching and bending a piece of metallic material.

7. The elastic structure as claimed in claim 6, wherein the cross section of elastic structure is substantially E-shaped.

8. A shell assembly comprising:
   a shell comprising an upper wall and a touch pen assembling portion defined in the upper wall; an elastic structure fixedly mounted on the upper wall, comprising:
   a main board;
   two fixing portions disposed at two opposite sides of the main board and lying on the same plane with the main board; and
   a latching arm extending from the main board and being bent to form an acute angle with the main board; and
   a touch pen detachably assembled to the touch pen assembling portion of the shell and being latched by latching arm of the elastic structure.

9. The elastic structure as claimed in claim 8, wherein the touch pen includes a touch head portion and an opposite tail portion; the tail portion defines an assembling slot recessed in one surface thereof; one end of the touch pen assembling portion defines an accommodating cavity therein for corresponding the touch head portion therein, the other end of the touch pen assembling portion defines a through hole, the latching portion penetrates through the through hole of the shell and latches into the assembling slot of the touch pen.

10. The elastic structure as claimed in claim 9, wherein the touch pen further includes a body portion defining stepped latching portions at the two sides thereof respectively adjacent to the touch head portion; the two sides of the accommodating cavity defines two stepped latching grooves recessed therein corresponding to the two latching portions of the touch pen respectively, for assembling the touch head portion of the touch pen therein.

11. The elastic structure as claimed in claim 8, wherein the main board is substantially T-shaped board and includes a first extending arm, an opposite second extending arm, and a third extending arm perpendicular to the first extending arm and the second extending arm; the two fixing portions and the latching arm extend from the first extending arm, the second extending arm and the third extending arm respectively.

12. The elastic structure as claimed in claim 10, wherein the latching arm is substantially V-shaped and disposed at the distal end of the third extending arm, the latching arm includes an elastic arm extending from the distal end of the third extending arm to form an acute angle with the third extending arm, and a resisting arm extending from the elastic arm and being bent towards the third extending arm.

13. The elastic structure as claimed in claim 12, wherein the shell further includes two sidewalls extending from the two longitudinal lateral margins of the upper wall respectively and are parallel to each other; the two sidewalls each defines several latching blocks spaced protruding thereon.