FOLDABLE ELECTRONIC DEVICE

CROSS-REFERENCE TO RELATED APPLICATIONS

This non-provisional application claims priority under 35 U.S.C. §119(a) on Patent Application No(s). 099214925 filed in Taiwan, R.O.C. on Aug. 4, 2010, the entire contents of which are hereby incorporated by reference.

BACKGROUND OF THE INVENTION

1. Field of Invention

The present invention relates to a foldable electronic device, and more particularly to a foldable electronic device with a flexible display as a display screen.

2. Related Art

In recent years, with the rapid development of technology and information, manufacturing technologies of electronic products are also improved gradually. In consideration of the pursuit of portability and practicability, the electronic products develop towards being light, thin, short, and small. For example, screens have developed from early large-volume and large-weight cathode ray tube (CRT) displays to light-weight and thin-volume liquid crystal display (LCD) displays. Moreover, due to the pursuit of small size of electronic products for convenient carrying, the size of displays gets smaller relatively. However, common displays generally cannot have convenience in carrying and comfort in use at the same time, that is, when the screen gets smaller and can be easily carried, the area of the screen is reduced correspondingly, such that the content of the screen frame is reduced, and is inconvenient for the user for watching. In order to solve this problem, foldable electronic screens are developed, that is, a plurality of small-size displays are combined into a large-size screen, but joints are generated between the displays, and thus the frame quality is deteriorated.

Therefore, flexible displays, for example, electronic paper or organic light-emitting diodes (OLED) displays, have been developed, and are available in the market. However, presently, the flexible displays applied on electronic devices for the purpose of reducing the volume are in the manner of rolling. The flexible displays in the manner of rolling can overcome the disadvantage of deteriorated frame quality caused by combining a plurality of small-size displays into a large-size screen. However, the flexible display has a requirement of minimal bending curvature when being rolled up, and due to excessive small curvature, the flexible display has a fold, and cannot display normally when being unfolded again, so the flexible display cannot be rolled up to be excessively small. When the flexible display is applied in a foldable electronic product, as the flexible display needs to have a radius of the minimal bending curvature, the flexible display will be bent along a shaft having a radius greater than the minimal bending curvature. When the flexible display is bent along the shaft, it will be stretched by a casing at two ends of the flexible display due to extension, such that the problem of tearing and damage of the flexible display due to the influence of stretching tension occurs. Therefore, the conventional design cannot solve the problem, and the flexible display cannot be implemented on the current foldable electronic products.

SUMMARY OF THE INVENTION

Accordingly, the present invention is a foldable electronic device, so as to solve the problem of generation of creases and

tearing when a flexible display is applied in a foldable electronic device existing in the prior art.

The present invention provides a foldable electronic device, which comprises a foldable casing, a flexible display, and at least one elastic member. The foldable casing is capable of being unfolded or folded, and the flexible display is disposed in the foldable casing, and is capable of being unfolded or folded together with the foldable casing. Furthermore, the elastic member connects the foldable casing and the flexible display, so as to provide the flexible display the extending flexibility when being unfolded or folded.

The foldable electronic device comprises two elastic members, and the two elastic members connects two opposite ends of the foldable casing and the flexible display, so as to provide the flexible display the extending flexibility when being unfolded or folded.

In the foldable electronic device of the present invention, the foldable casing has at least two casing bodies, and the two casing bodies are pivoted to each other, and are capable of being unfolded and folded with respect to each other. When the two casing bodies are unfolded with respect to each other, a bearing range is formed thereby, and the flexible display is disposed on the bearing range.

In the foldable electronic device according to the present invention, the foldable casing has three casing bodies, and the three casing bodies are pivoted to each other, and are capable of being unfolded and folded with respect to each other. When the three casing bodies are unfolded with respect to each other, a bearing range is formed thereby, and the flexible display is disposed on the bearing range.

In the foldable electronic device according to the present invention, the flexible display is capable of being unfolded or folded together with the foldable casing. However, when being in a folded state, the foldable casing applies a stretching stress on the flexible display, thus forcing the flexible display to extend. Therefore, in the foldable electronic device, an elastic member is disposed to connect the flexible display and the foldable casing, so as to provide the flexible display the extending flexibility when being unfolded or folded. That is to say, the flexible display is enabled to have extensibility through the coordination of the elastic member, thus avoiding the risk of being stretched by the stress of the foldable casing and being torn and damaged. Therefore, the present invention solves the problems and applies the flexible display in the foldable electronic device to achieve the efficacy of having a minimal volume when being folded and having a maximal display screen when being unfolded.

These and other aspects of the present invention will become apparent from the following description of the preferred embodiment taken in conjunction with the following drawings, although variations and modifications therein may be affected without departing from the spirit and scope of the novel concepts of the disclosure.

BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings illustrate one or more embodiments of the invention and, together with the written description, serve to explain the principles of the invention. Wherever possible, the same reference numbers are used throughout the drawings to refer to the same or like elements of an embodiment, and wherein:

FIG. **1**A is a schematic view of a foldable electronic device according to an embodiment of the present invention;

FIG. **1**B is a schematic structural view of a foldable electronic device according to an embodiment of the present invention;