LIGHT-EMITTING BUTTON MODULE

Abstract

A light-emitting button module includes a power supply unit, a conductive transmission unit, which is electrically connected to the power supply unit; and at least one light-emitting button, which is connected to the conductive transmission unit and includes a button body, a substrate, and a light-emitting element. The button body includes a receiving chamber that extends through the button body and an engagement retention groove that is circumferentially formed in the button body and surrounds the receiving chamber. The substrate is arranged inside the button body and electrically connected to the conductive transmission unit. The light-emitting element is coupled to the substrate and received in the receiving chamber.
LIGHT-EMITTING BUTTON MODULE

FIELD OF THE INVENTION

[0001] The present invention relates to a light-emitting button, and in particular to a light-emitting button module for use in clothing.

BACKGROUND OF THE INVENTION

[0002] Clothing is a must for human living. Since the clothing are put on a human body and is moved with the human body. An apparent indication on the clothing may allow for instantaneous observation and identification of the existence and the movement of a person. For example, a person working in a dark environment often puts on a jacket or an accessory that reflects lights to clearly indicate his or her position or movement in the dark environment so as to ensure the safety of the person working in the dark environment. Light emission technology has been commonly used in road workers or cleaning personnel that often work in the nighttime or they can wear clothing having light reflective property so as to be seen or identified by a car driver at a sufficient distance or even earlier, allowing the driver to take proper actions in order to avoid accidents.

[0003] The light-reflecting clothing is effective in providing a function of alarming and safety. However, the effect of being safe may vary with different environments and the persons to be protected and there might still be insufficiency for such a measure in securing safety. For example, the light-reflecting clothing works to reflect light only when there is light irradiation. In case that a car is moving in a high speed toward a person wearing the light-reflecting clothing, the reflection of light may be identified only in a short period of time when the light-reflecting clothing is irradiated by the light of the car and the distance that the car is from the object of light reflection may be extremely short for response, or alternatively it may be in a dark environment or in a situation where reflection of light may not occur timely. Collision may still occur. Thus, such a passive light reflection technology applied to clothing may not be sufficient or effective to meet the need for securing safety in various environments.

[0004] In view of the fact that the conventional light-reflecting clothing may not be effective or may be imperfect in securing safety in the nighttime, the present invention aims to provide a light-emitting button module that is suitable for use with clothing and in dark environments and can provide, in an active manner, light emission.

SUMMARY OF THE INVENTION

[0005] An object of the present invention is to provide a light-emitting module for use with clothing, particularly a light-emitting button module.

[0006] To achieve the above object, the present invention provides a light-emitting button module, which comprises: a power supply unit; a conductive transmission unit, which is electrically connected to the power supply unit; and at least one light-emitting button, which is connected to the conductive transmission unit and comprises a button body, a substrate, and a light-emitting element. The button body comprises a receiving chamber that extends through the button body and an engagement retention groove that is circumferentially formed in the button body and surrounds the receiving chamber. The substrate is arranged inside the button body and electrically connected to the conductive transmission unit. The light-emitting element is coupled to the substrate and received in the receiving chamber.

[0007] The light-emitting button module as described above further comprises a packaging member, which encloses connection between the light-emitting button and the conductive transmission unit.

[0008] In the light-emitting button module as described above, the receiving chamber receives therein an optic lens and is closed thereby.

[0009] In the light-emitting button module as described above, the optic lens is a convex lens.

[0010] In the light-emitting button module as described above, the optic lens is a concave lens.

[0011] The light-emitting button module as described above further comprises an externally-attached piece, which comprises a first coupling section, the button body comprising a second coupling section arranged to correspond to the first coupling section. The first coupling section and the second coupling section are releasable engaging with each other.

[0012] In the light-emitting button module as described above, the light-emitting element comprises a light-emitting diode.

[0013] In the light-emitting button module as described above, the conductive transmission unit comprises an electrically conductive fabric.

[0014] The light-emitting button module as described above further comprises a control unit, which is electrically connected between the power supply unit and the conductive transmission unit.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] The present invention will be apparent to those skilled in the art by reading the following description of preferred embodiments thereof with reference to the drawings, in which:

[0016] FIG. 1 is an exploded view showing a light-emitting button module constructed in accordance with a first embodiment the present invention;

[0017] FIG. 2 is a perspective view showing the light-emitting button module constructed in accordance with the first embodiment the present invention in an assembled form;

[0018] FIG. 3 is a schematic view illustrating a use of the light-emitting button module constructed in accordance with the first embodiment the present invention;

[0019] FIG. 4 is a cross-sectional view showing a light-emitting button module constructed in accordance with a second embodiment the present invention;

[0020] FIG. 5 is a cross-sectional view showing a modification of the light-emitting button module of the second embodiment the present invention;

[0021] FIG. 6 is a cross-sectional view showing another modification of the light-emitting button module of the second embodiment the present invention;

[0022] FIG. 7 is a cross-sectional view showing a light-emitting button module constructed in accordance with a third embodiment the present invention;

[0023] FIG. 8 is a perspective view showing the light-emitting button module constructed in accordance with the third embodiment the present invention;

[0024] FIG. 9 is a perspective view showing a light-emitting button module constructed in accordance with a fourth embodiment the present invention; and
FIG. 10 is a cross-sectional view showing a light-emitting button module constructed in accordance with a fifth embodiment of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

With reference to the drawings and in particular to FIGS. 1 and 2, of which FIG. 1 is an exploded view showing a light-emitting button module constructed in accordance with a first embodiment the present invention and FIG. 2 is a perspective view showing the light-emitting button module constructed in accordance with the first embodiment the present invention in an assembled form, as shown in FIG. 1, the light-emitting button module according to the present invention comprises a power supply unit 10; a conductive transmission unit 20, which is electrically connected to the power supply unit 10, the conductive transmission unit 20 being an soft or flexible electrically conductive and signal-transmitting means, such as an electrically conductive fabric or a flat cable; and at least one light-emitting button 30, which is connected to the conductive transmission unit 20, wherein the light-emitting button 30 comprises a button body 300, a substrate 301, and a light-emitting element 302. The button body 300 comprises a receiving chamber 303 that extends through the button body 300 and an engagement retention groove 304 that is circumferentially formed in the button body 300 and surrounds the receiving chamber 303. The substrate 301 is arranged inside the button body 300 and is electrically connected to the conductive transmission unit 20. The light-emitting element 302 is coupled to the substrate 301 and is received in the receiving chamber 303. An optic lens 305 is set in and closes the receiving chamber 303. 

Referring to FIG. 7, which is a cross-sectional view showing a light-emitting button module constructed in accordance with a third embodiment the present invention, as shown in the drawing, the light-emitting button module of the third embodiment of the present invention further comprises an externally-attached piece 60, which comprises a first coupling section 600. The button body 300 comprises a second coupling section 305 arranged to correspond to the first coupling section 600. The first coupling section 600 and the second coupling section 305 are releasable engaging with each other. Referring to FIG. 8, which is a perspective view of the light-emitting button module according to the third embodiment of the present invention, as shown in the drawing, the externally-attached piece 60 may have an outside configuration that is formed as desired, such as a crown like shaped illustrated in the instant embodiment, in order to improve visual aesthetics. Further, the attached piece 60 can be made in such a form as comprising a light condensing surface having a curved cross-section in order to realize condensation of light or regulation of light emission direction.

Further, the attached piece 60 is releasable attached to the button body 300, so that in use, it is possible to efficiently replace it if desired.

Referring to FIG. 9, which is a perspective view showing a light-emitting button module constructed in accordance with a fourth embodiment the present invention, as shown in the drawing, the light-emitting button module of the fourth embodiment of the present invention further comprises a control unit 70, which is electrically connected between the power supply unit 10 and the conductive transmission unit 20. The control unit 70 controls the activation/de-activation of the light-emitting button 30. For example, the control unit 70 may comprise a control circuit board in which data related to flashing frequency, speed, and sequence of the light-emitting buttons 30 are loaded so that control of the light-emitting buttons 30 can be made according to such data.

Referring to FIG. 10, which is a cross-sectional view showing a light-emitting button module constructed in accordance with a fifth embodiment of the present invention, as shown in the drawing, the light-emitting button module of the fifth embodiment of the present invention further comprises a packaging member 80, which encloses connection between the light-emitting button 30 and the conductive transmission unit 20 in order to provide a more tight and close coupling between the light-emitting button 30 and the conductive transmission unit 20.

Although the present invention has been described with reference to the preferred embodiments thereof, it is apparent to those skilled in the art that a variety of modifications and changes may be made without departing from the scope of the present invention which is intended to be defined by the appended claims.

What is claimed is:

1. A light-emitting button module, comprising:
   a power supply unit;
   a conductive transmission unit, which is electrically connected to the power supply unit; and
at least one light-emitting button, which is connected to the conductive transmission unit and comprises a button body, a substrate, and a light-emitting element, the button body comprising a receiving chamber that extends through the button body and an engagement retention groove that is circumferentially formed in the button body and surrounds the receiving chamber, the substrate being arranged inside the button body and electrically connected to the conductive transmission unit, the light-emitting element being coupled to the substrate and received in the receiving chamber.

2. The light-emitting button module as claimed in claim 1 further comprising a packaging member, which encloses connection between the light-emitting button and the conductive transmission unit.

3. The light-emitting button module as claimed in claim 1, wherein the receiving chamber receives therein an optic lens and is closed thereby.

4. The light-emitting button module as claimed in claim 3, wherein the optic lens is a convex lens.

5. The light-emitting button module as claimed in claim 3, wherein the optic lens is concave lens.

6. The light-emitting button module as claimed in claim 1 further comprising an externally-attached piece, which comprises a first coupling section, the button body comprising a second coupling section arranged to correspond to the first coupling section, the first coupling section and the second coupling section being releasable engaging with each other.

7. The light-emitting button module as claimed in claim 1, wherein the light-emitting element comprises a light-emitting diode.

8. The light-emitting button module as claimed in claim 1, wherein the conductive transmission unit comprises an electrically conductive fabric.

9. The light-emitting button module as claimed in claim 1 further comprising a control unit, which is electrically connected between the power supply unit and the conductive transmission unit.