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(54) **ILLUMINATED GLOVE DEVICE**

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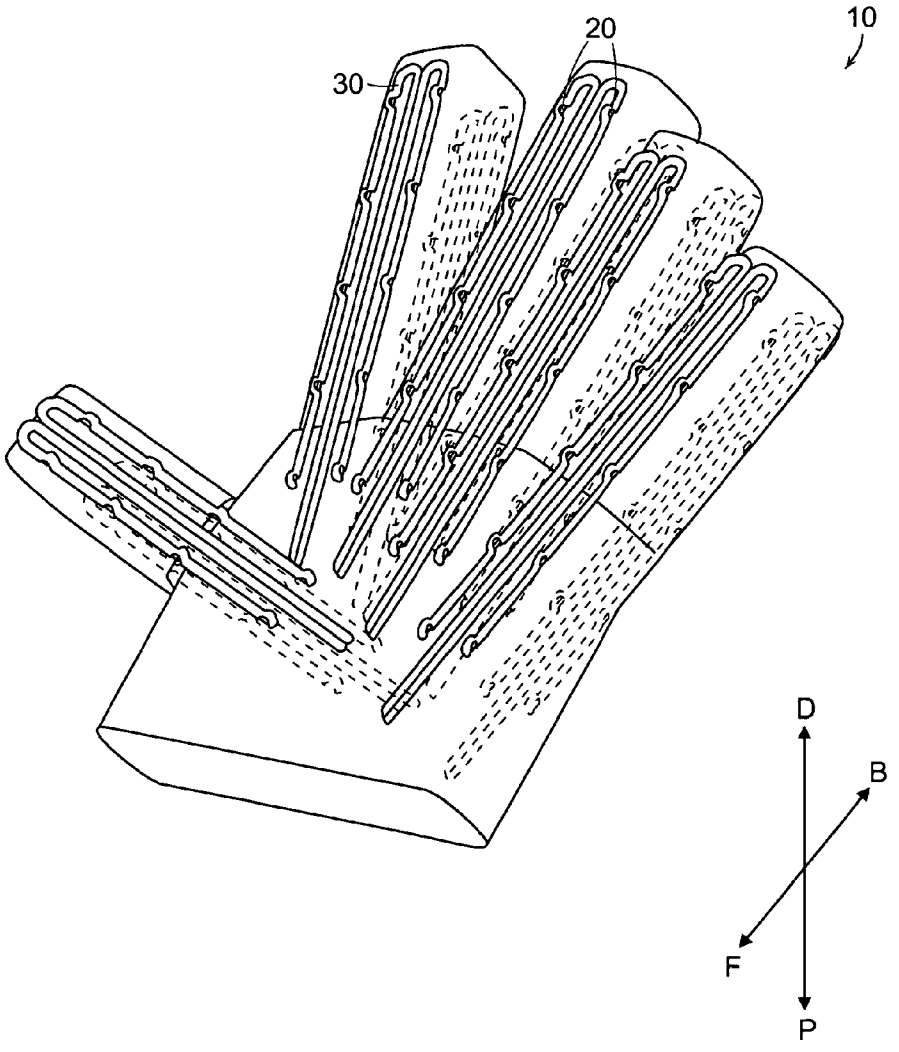
*A41D 19/00* (2006.01)

(52) **U.S. Cl.** ..... **2/161.6**; 2/167

(57) **ABSTRACT**

An illuminated glove device for safety and recreational use is provided. The device preferably includes a first layer of glove material, a second layer of laminate material on which a circuit is provided, and a third layer bonded to the second layer for providing a protective coating of the circuit. The circuit may include one or more light sources positioned along a perimeter of the glove so as to form an outline of a human hand. A switch on the glove allows a user to turn the glove on and off or switch colors, for example, from amber, to red to green. The circuit may be battery powered and the switch may be adapted to allow the glove to alternate between a variety of modes. The device is suitable for various applications recreational, safety, emergency and other low-light applications.



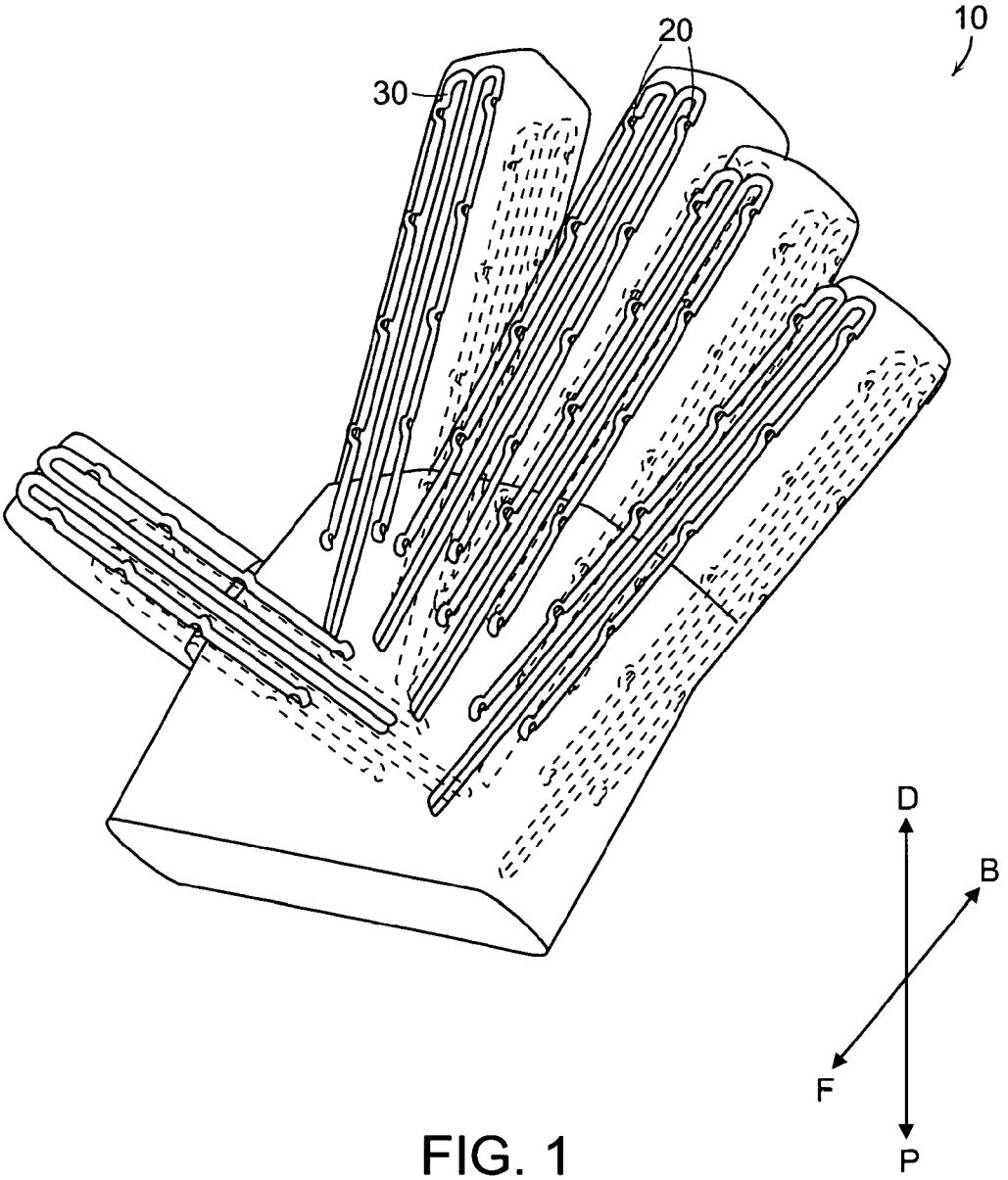



FIG. 1

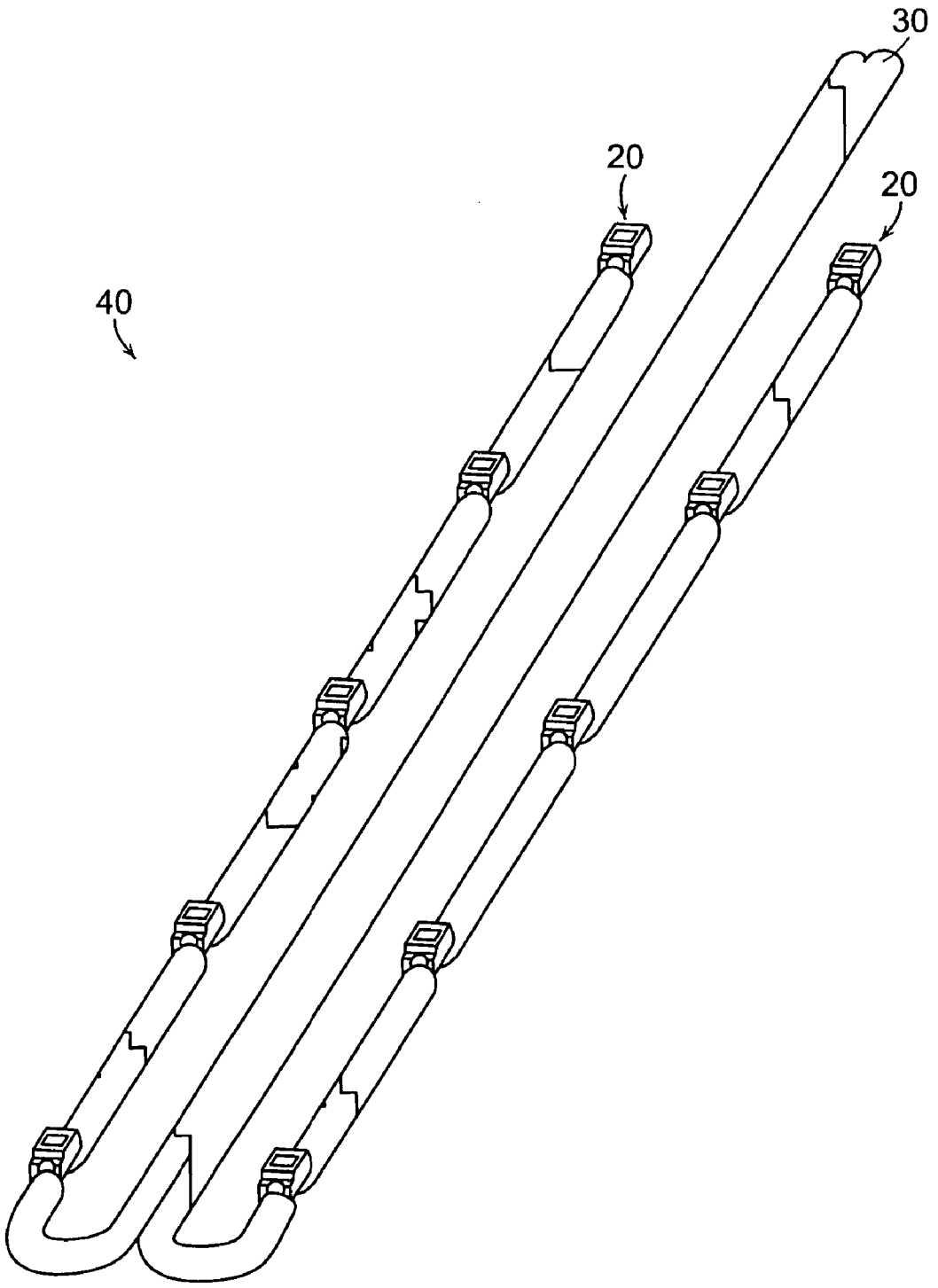



FIG. 2

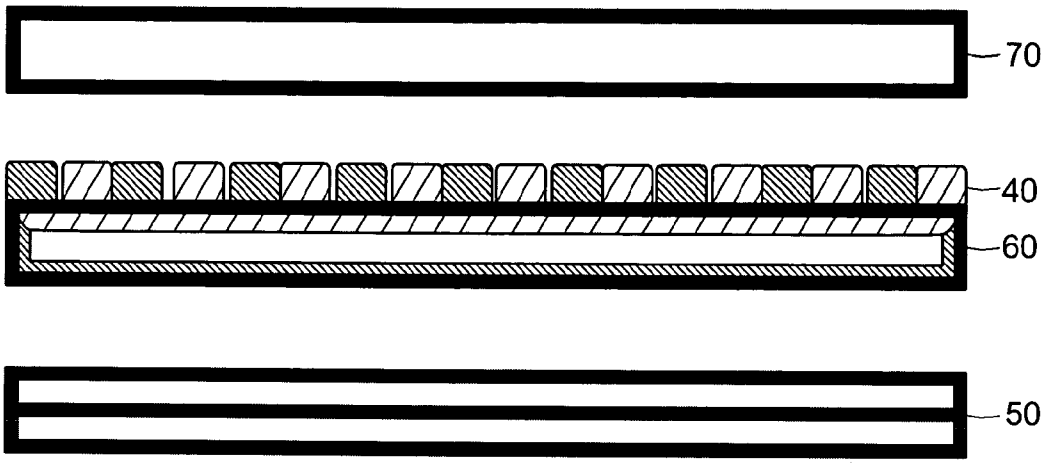



FIG. 3

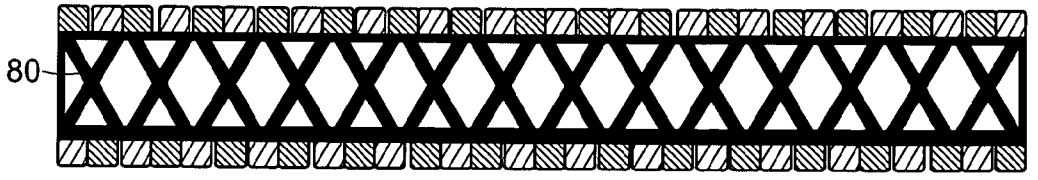



FIG. 4

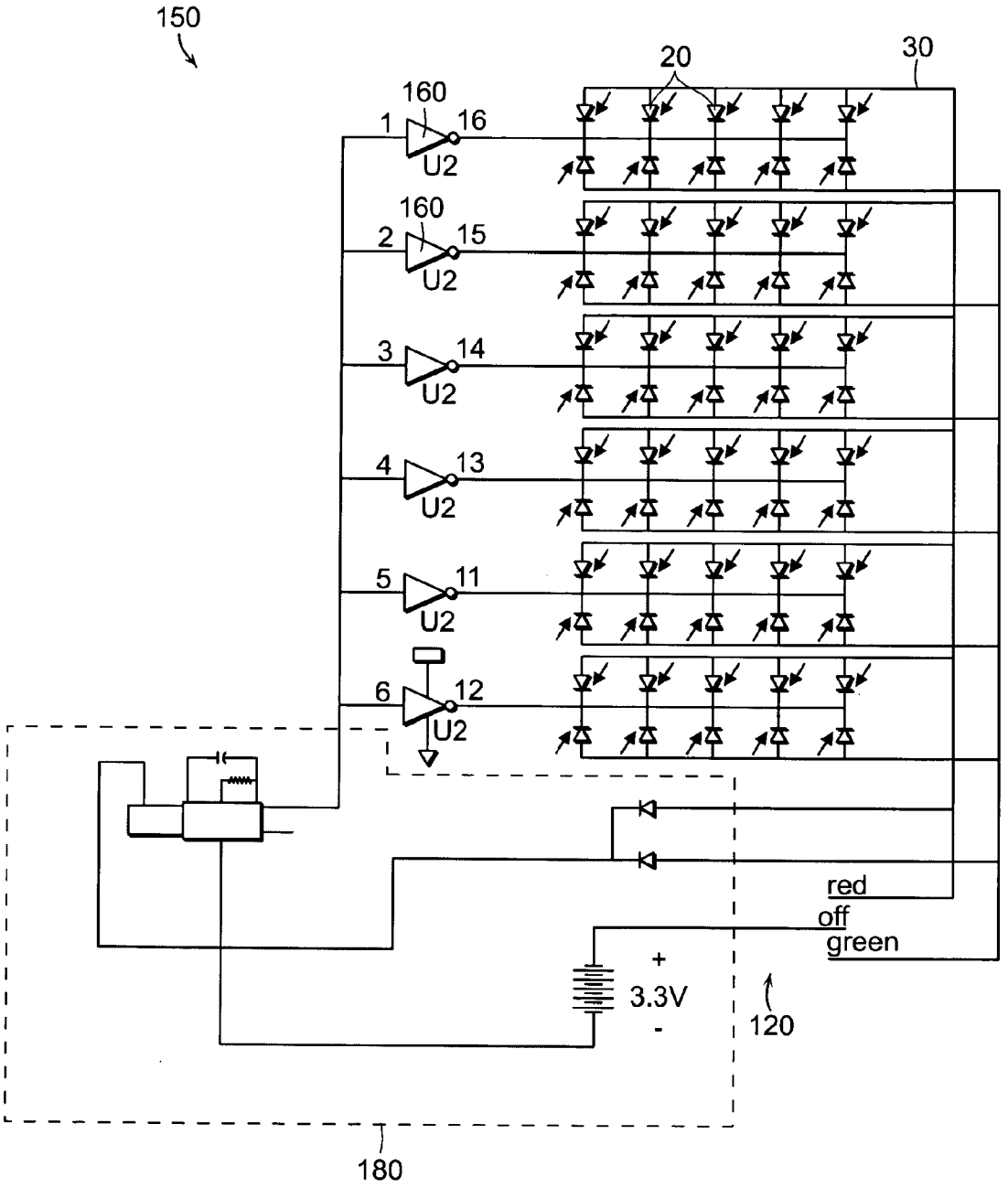

150
20
30
160
1
16
U2
160
2
15
U2
3
14
U2
4
13
U2
5
11
U2
6
12
U2
red
off
green
+
3.3V
-
120
180

FIG. 5

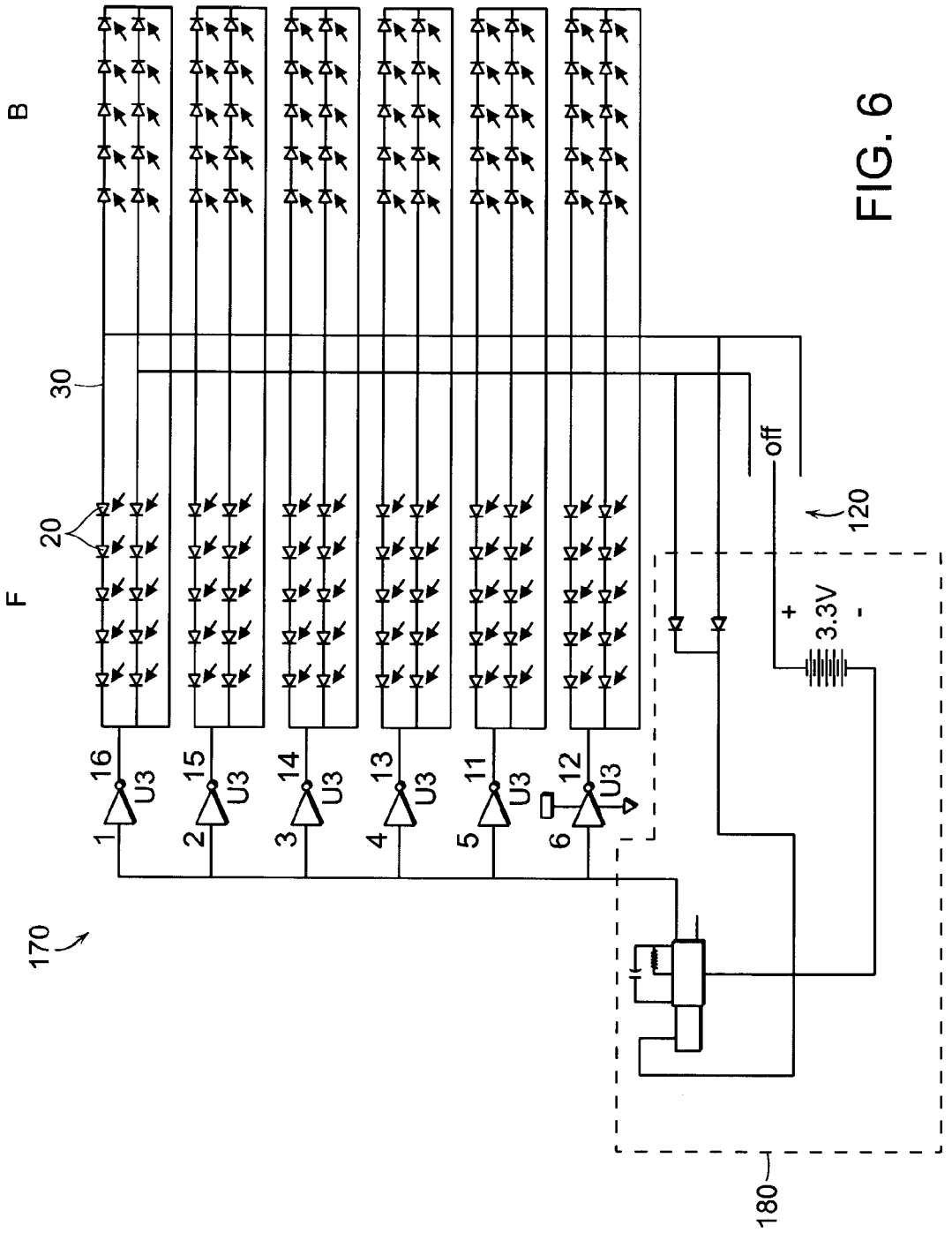



FIG. 6

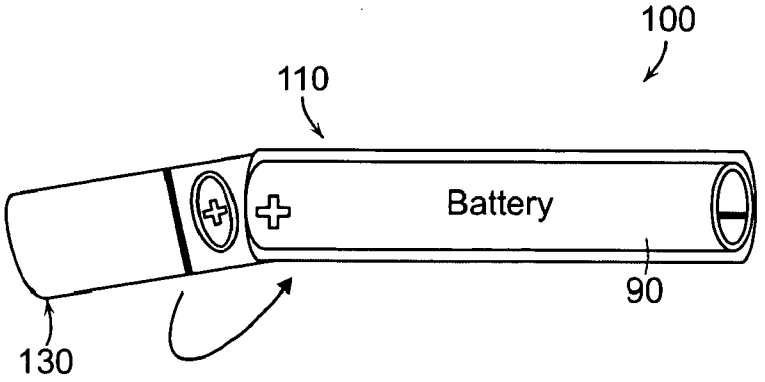



FIG. 7

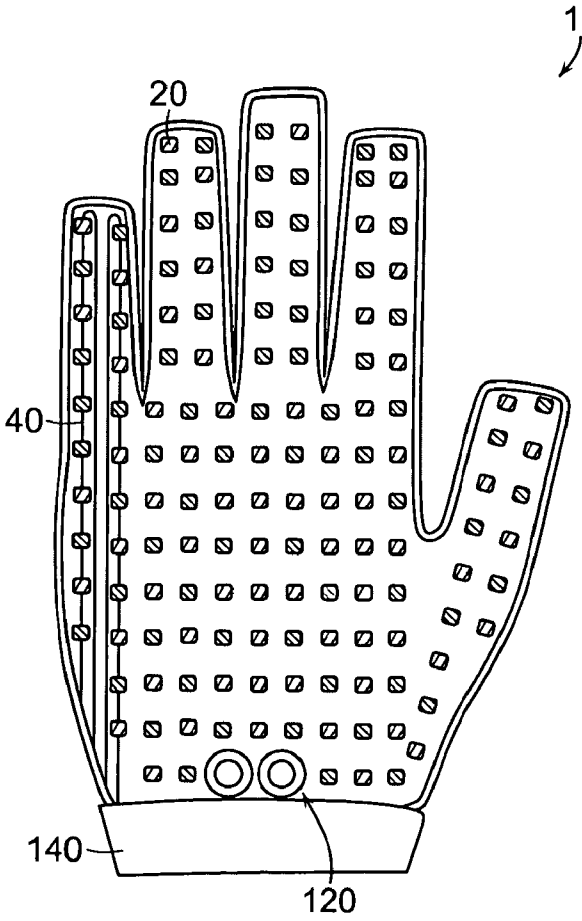



FIG. 8

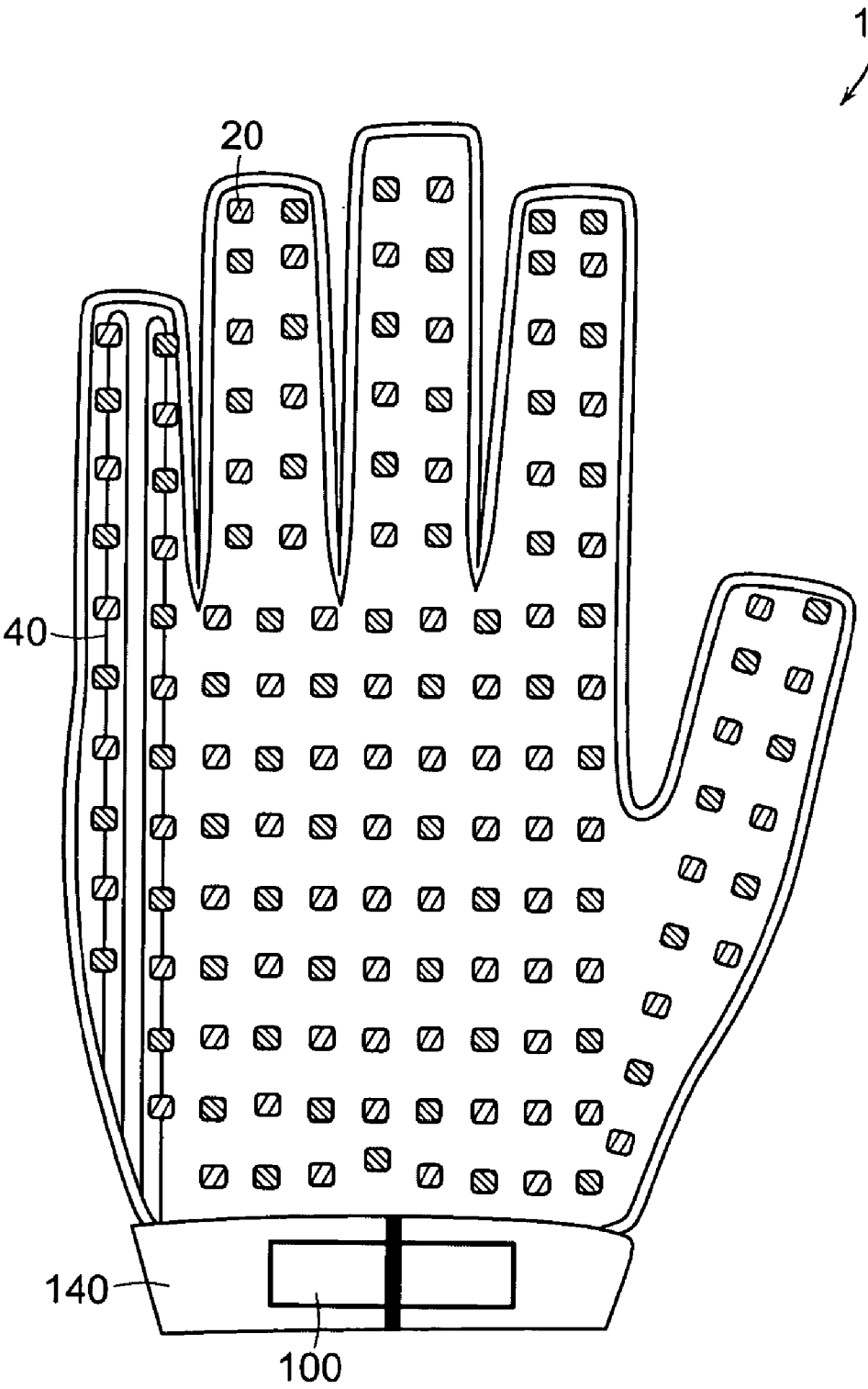



FIG. 9

# ILLUMINATED GLOVE DEVICE

## CROSS-REFERENCE TO RELATED APPLICATION

**[0001]** This application claims the benefit of copending application U.S. Provisional Application Ser. No. 60/995,299 filed on Sep. 26, 2007, the disclosure of which is expressly incorporated herein by reference in its entirety.

## FIELD OF THE INVENTION

**[0002]** The subject invention is related to an illuminated glove device. More particularly, the subject invention is related to an illuminated glove device for use in traffic control, military, roadside assistance, emergency personnel, recreational, and other illumination purposes for low-light, night vision, signaling and/or safety applications. The illumination device preferably includes a contact switch capable of controlling operation of the device in various modes, where the contact switch can be activated by pressing the switch at the base of the glove.

## BACKGROUND OF THE INVENTION

**[0003]** It has long been known that individuals participating in recreational outdoor activities, traffic control, military, roadside assistance, emergency assistance, and other activities particularly in low light or dark conditions may require the assistance of illumination. In addition, construction, road crews, police officers, firefighters, emergency personnel, first responders, joggers, or even pedestrians can be exposed to injury when not seen. This, of course, is particularly true in low light conditions or at night, but can be true even in inclement weather conditions, such as snow storms and the like. Further, individuals participating in recreational activities and sports, such as biking, skiing, snowboarding, sledding or the like may also be exposed to injury in inclement weather when vision is impaired.

**[0004]** While attempts have been made to provide means for making an individual more visible in such low light or dark conditions, they are less than satisfactory. For example, individuals participating in outdoor activities have placed reflective tapes on their clothing, worn bright-colored clothing, utilized reflective holograms, surface-mounted beams of light and/or reflective or transmitting devices but, as will be appreciated, unless a motorist's lights strike the reflective material precisely or the motorist can recognize or see a beam of light, the individuals remain at risk. Warning materials have even been incorporated into articles of clothing, such as reflective tape on gloves, vests, shoes etc. Gloves have also been provided with illuminating substances having phosphorescent or florescent properties.

**[0005]** The subject invention provides a device for optimally illuminating the hand of an individual participating in various activities under low light, no light or inclement weather conditions and overcomes the shortcomings in prior art systems.

## SUMMARY OF THE INVENTION

**[0006]** The subject invention is directed to an illuminated glove device for use in recreational and safety applications. The illuminated glove device preferably includes at least a first layer in contact with a user's hand, a second layer made of a laminate material on which a circuit is provided, and a third layer operably connected to the second layer for providing a protective coating of the circuit contained in the second layer. The circuit preferably includes one or more light sources, such as light emitting diodes (LEDs) for illuminating the hand of a user while in use. The first layer is typically a fleece material, but can also be leather, rubber, polyvinyl, microfiber, knit, polyester, nylon, spandex, or any other natural or synthetic material or composite material suitable for a given application. The second and third layers can be laminate textiles, and are preferably flexible thermoplastic or thermo-fusible materials including but not limited to: ethylene vinyl acetate, polyethylene, polyester and polyamide.

**[0007]** The circuit can be adapted and configured to include a number of different colored light emitting sources such as red, green and amber. In addition, the circuit can be configured to enable selective and alternate illumination of these light sources so that light sources of a single color or a combination of colors can be illuminated if desired.

**[0008]** The illuminated glove device of the subject invention can also be adapted and configured to operate in a plurality of modes such as all on, all off, strobe, and blinking. These modes are accessed by a user by engaging a switch positioned on the illuminated glove which serves to control which mode of operation the illuminated glove device is maintained. The circuitry also includes a replaceable battery for powering the circuit. Because the battery is replaceable, this allows for lower manufacturing costs.

**[0009]** The subject invention can be used in a variety of applications such as recreational activities, traffic control, military, roadside assistance, and by persons such as emergency construction road crews, police officers, firefighters, emergency personnel, first responders, joggers, bikers or even pedestrians. These and other aspects and advantages of the subject invention will become more readily apparent from the following description of the preferred embodiments taken in conjunction with the drawings.

## BRIEF DESCRIPTION OF THE DRAWINGS

**[0010]** For a fuller understanding of the nature and desired objects of the present invention, reference is made to the following detailed description taken in conjunction with the accompanying drawing figures wherein like reference characters denote corresponding parts throughout the several views and wherein:

**[0011]** FIG. **1** is a three-dimensional perspective view of an illuminated glove device according to the subject invention;

**[0012]** FIG. **2** is an enlarged perspective view of a portion of a circuit showing a plurality of LEDs according to the subject invention;

**[0013]** FIG. **3** is a cross-sectional exploded parts view of the illuminated glove device showing the various layers of circuitry protection;

**[0014]** FIG. **4** is a cross-sectional view of the flexible cord that holds together front and back portions of glove material of the illuminated glove device;

**[0015]** FIG. **5** is an exemplary circuit diagram of a circuit operable for one side of an illuminated glove device of the subject invention;

**[0016]** FIG. **6** is an exemplary circuit diagram of a circuit operable for two sides of an illuminated glove device of the subject invention;

**[0017]** FIG. **7** shows a battery pack for powering the circuitry of the illuminated glove device;

**[0018]** FIG. **8** is a two-dimensional perspective front view of an illuminated glove device showing a user-operated switch according to the subject invention; and

**[0019]** FIG. **9** is a two-dimensional perspective back view of an illuminated glove device showing the battery pack according to the subject invention.

## DETAILED DESCRIPTION OF THE INVENTION

**[0020]** The subject invention relates to an illuminated glove device for safety and recreational use. The illuminated glove device (also referred to herein as "glove") may be fabricated from a full length glove covering each of the fingers, or a partial glove, where a portion of one or more of the fingers is exposed. The illuminated glove device includes an electrical circuit in which one or more light emitting components, such as light emitting diodes (LEDs), are connected by a wire in a closed circuit. The circuit may be present on one or both sides of the glove; in other words, only a single circuit may be used to illuminate light emitting components on one or both sides of the glove, or alternatively, multiple circuits may be used to illuminate one or both sides of the glove. A tactile switching mechanism preferably is provided on the glove which allows a user to turn the glove on and off or switch colors, for example, between amber, red, and green. The circuit and switch may also be adapted to allow the glove to alternate between a variety of modes. These modes include on, off, blinking and strobe, and encompass the ability to selectively and alternately illuminate different colors or groups of light sources. The circuitry is preferably battery powered, with a battery housed within a battery pack positioned on the glove, typically on the back portion of the glove. This device is suitable for various applications including use in traffic control, military, roadside assistance, emergency, recreational, warning, night vision, signaling and safety illumination applications.

**[0021]** FIG. **1** is a three-dimensional perspective view of an illuminated glove device **10** according to the subject invention. A plurality of light sources such as LEDs **20** are connected in series by a wire **30**, such as a Kevlar® wire. However, the LEDs **20** in the circuitry may be substituted with any suitable optical illuminator such as fluorescent bulbs, incandescent bulbs, liquid crystal display (LCD) devices, etc. FIG. **1** also depicts the orientation of the terms used to describe the illuminated glove device **10** throughout this application. The proximal direction P is toward a wrist or opening of the glove, the distal direction D is toward the tips of the fingers, the front side F of the glove referring to a palm side of the glove and the back side B of the glove referring to the side opposite the palm.

**[0022]** FIG. **2** is an enlarged, isolated perspective view of a portion of a circuit **40** showing a plurality of LEDs **20** according to the subject invention. For example, as shown in FIG. **2**, the LEDs **20** are spaced along a perimeter of each finger and continue lengthwise down the illuminated glove device **10**, thus forming the shape of a human hand. This particular configuration of LEDs **20** enables a person viewing the illuminated glove device **10** at a distance to recognize a user's hand form. In other words, the arrangement of LEDs **20** that approximate the outline of the user's hand can enhance visibility of the glove, and thus alert viewers to the presence of the user and distinguish the user from other potential sources of illumination in the vicinity of the user. However, the LEDs or other light sources may be arranged in any particular manner suitable for a given application.

**[0023]** Because the illuminated glove device **10** is configured to be used in wet conditions or may otherwise come into contact with moisture, oil or dirt from the hand of the user, the subject invention provides for waterproof protection of the circuit **40**. FIG. **3** is a cross-sectional view of the illuminated glove device **10** showing various layers of circuitry protection for the circuit **40** that are arranged in conjunction with the glove material. These layers include at least a first layer of glove material **50**, a flexible layer **60** that is preferably operably connected to the circuit **40**, and an outer or surface layer **70**. The glove material **50** preferably is made of a fiber material such as fleece, leather, rubber, polyvinyl, microfiber, knit, polyester, nylon, spandex, or any other natural or synthetic material or composite material suitable for a given application. In one embodiment, the glove material **50** is a microfleece material. The glove material **50** is configured to come into contact with the skin and helps shield and protect the skin of the user's hand.

**[0024]** The flexible layer **60** is typically a laminated textile material that is configured to be connected to the glove material **50**. For example, the laminated textile material can be a thermoplastic or thermo-fusible material such as ethylene vinyl acetate, polyethylene, polyester, or polyamide. The flexible layer **60** must be suitably elastic to allow the user to perform hand signals, gripping or other manual functions while the illuminated glove device **10** is in use. As shown, the circuit **40** is adhered to the flexible layer **60** using thermofusion, epoxy, glue, or another adhesive or connecting element for securing the circuit **40** to the flexible layer **60**.

**[0025]** A surface layer **70** preferably is connected to the flexible layer **60** to shield the circuit **40** from the atmosphere, thereby providing a partial or complete seal against moisture. The surface layer **70** can be a clear laminate and may be the same material as the flexible layer **60**, namely thermoplastic or thermo-fusible materials such as ethylene vinyl acetate, polyethylene, polyester, and polyamide, or optionally may be a different material. The connection between the flexible layer **60** and the surface layer **70** is preferably achieved by using a lamination process. During the process, an adhesive such as a reactive laminate powder can be used to bond the surface layer **70** to the flexible layer **60**. The powder or other adhesive, for example, can be activated by heat in a heated press which bonds the layers **60**, **70** together. The lamination process is used to seal the circuit **40**, providing waterproof protection from outside moisture and contamination.

**[0026]** A front portion of the glove material **50** preferably is connected to a back portion of the glove material **50** by a woven or stitched flexible cord **80**. A cross-sectional view of the flexible cord **80** connecting the front and back portions of the glove material **50** is shown in FIG. **4**. The flexible cord **80** can be woven with a cross stitch or web pattern, for example, and connects the two halves of the glove material to each other in order to form the shape of the illuminated glove device **10**. By using the flexible cord **80**, the illuminated glove device **10** is adjustable in size, and thus can expand so as to be suitable for various glove sizes. The use of cross-stitched or woven flexible cord **80** also increases the durability of the illuminated glove device **10**. The flexible cord **80** can be made of elastic or any other suitable stretch material.

**[0027]** FIG. **5** is an exemplary diagram of a circuit **150** for one side of the illuminated glove device **10** of the subject invention. The circuit has a plurality of LEDs **20**, operational amplifiers **160**, additional voltage regulating circuitry **180** and a switch **120** for activating the circuit **150**. FIG. **6** shows

an exemplary circuit diagram of an electrical circuit **170** for both the front F and the back B sides of the illuminated glove device **10** of the subject invention, having a plurality of LEDs **20**, operational amplifiers **160**, additional voltage regulating circuit **180** and a switch **120** for activating the circuit **170**. Circuits **150**, **170** may also be adapted to allow the illuminated glove device **10** to alternate between a variety of modes. These modes include, on, off, blinking or strobe, as well as the ability to alternate the color of LEDs **20** illuminated. LEDs **20** may be placed in an alternating pattern of any one of red, green or amber, etc. depending on a desired application.

**[0028]** FIG. **7** shows a battery pack **100** that preferably includes a battery **90**, battery casing **110**, and battery cover **130**. When the battery cover **130** is returned to a closed position, in the direction of the arrow as shown, a closed circuit is formed connecting the battery **90**, or power source, to the circuit **40**. The battery **90** may also be replaceable in order to reduce costs. The battery pack **100** may be held in place by the wristband **140** of the illuminated glove device **10**. The wristband **140** may also incorporate a strap with a hook and loop mechanism such as a Velcro® latch or other clasping mechanism to secure the battery pack **100**.

**[0029]** FIGS. **8** and **9** are two-dimensional perspective views of the front and back of the illuminated glove device **10**, respectively. A placement of the switch **120** and battery pack **100** are also shown. With regard to the switch **120**, in this embodiment, a user, with the same hand, is capable of controlling an operation of the illuminated glove device **10** by pressing the switch **120** and also alternating between a variety of illumination modes. In one embodiment, the switch **120** is a rocker on/off switch. In another embodiment, the switch **120** is a momentary switch so that one needs to hold it down for a predetermined time before it is operative, thus preventing the illuminated glove device **10** from being inadvertently turned on or off by accidentally touching the switch **120**. The illuminated glove device **10** may also be adapted with a hook or loop mechanism (not shown), such as a band of material or strap to hold an additional mini flashlight, alternative illumination device or other accessory on the lateral portion of the hand.

**[0030]** The present invention has been described in detail, including preferred embodiments. However, it should be recognized that those skilled in the art, upon considering this disclosure, may make modifications and improvements within the spirit and scope of this invention.

What is claimed is:

**1**. An illuminated glove device, comprising:
a first layer for contacting a user's hand;
a circuit provided on a second layer, wherein the second layer comprises a thermoplastic laminate material and the circuit includes a plurality of light sources; and
a third layer connected to the second layer for providing a protective coating of the circuit.

**2**. The illuminated glove device of claim **1**, wherein at least a portion of a material of the first layer is selected from the group consisting of: fleece, leather, rubber, polyvinyl, microfiber, knit, polyester, nylon and spandex.

**3**. The illuminated glove device of claim **1**, wherein a material of the second layer is selected from the group consisting of: ethylene vinyl acetate, polyethylene, polyester and polyamide.

**4**. The illuminated glove device of claim **1**, wherein a material of the third layer is selected from the group consisting of: ethylene vinyl acetate, polyethylene, polyester and polyamide.

**5**. The illuminated glove device of claim **1**, wherein the light sources are light emitting diodes.

**6**. The illuminated glove device of claim **5**, wherein the circuit is configured to selectively illuminate the light sources of different colors.

**7**. The illuminated glove device of claim **6**, wherein the circuit is configured to operate in a plurality of modes.

**8**. The illuminated glove device of claim **7**, wherein the modes are selected from the group consisting of an on mode, an off mode, a blinking mode, and an alternating color mode.

**9**. The illuminated glove device of claim **7**, further comprising a control switch configured to alternate between the modes.

**10**. The illuminated glove device of claim **7**, further comprising a replaceable battery for powering the circuit.

**11**. The illuminated glove device of claim **1**, wherein the light sources are positioned along a perimeter of the illuminated glove device so as to form an outline of a human hand.

**12**. The illuminated glove device of claim **1**, wherein the second layer is connected to the third layer by a laminate.

**13**. An illuminated glove device configured to be worn by a user, comprising:
at least one layer including a plurality of light sources arranged in a circuit, the circuit being encased in a laminated textile material.

**14**. The illuminated glove device of claim **13**, wherein the laminated textile material is selected from the group consisting of: ethylene vinyl acetate, polyethylene, polyester and polyamide.

**15**. The illuminated glove device of claim **13**, further comprising at least one additional layer for contacting a user's hand.

**16**. The illuminated glove device of claim **13**, further comprising at least an outer layer for protecting the laminated textile layer from the atmosphere.

**17**. The illuminated glove device of claim **13**, wherein the circuit is operable in a plurality of modes, including at least one of an on/off mode, a blinking mode, and an alternating color mode.

**18**. The illuminated glove device of claim **13**, wherein the light sources arranged in the circuit include light emitting diodes of a plurality of different colors, the light sources being arranged in a predetermined pattern.

**19**. The illuminated glove device of claim **13**, wherein the light sources are positioned along a perimeter of the illuminated glove device so as to form an outline of a human hand.

**20**. An illuminated glove device configured to be worn by a user, comprising:
a first layer for contacting the user's hand;
a circuit provided on a second layer, wherein the second layer comprises a thermoplastic laminate material and the circuit includes a plurality of light emitting diodes arranged in a predetermined pattern of a plurality of colors, and operable in a plurality of modes; and
a third layer connected to the second layer for providing a protective coating of the circuit.

* * * * *