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Kim

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(54) **LIGHTING DEVICE WITH STAGGERED LIGHT SOURCES RESPONSIVE TO A SINGLE USER CONTROL**

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H05B 37/02 (2006.01)

(52) **U.S. Cl.** **315/291**; 315/307; 315/312

(58) **Field of Classification Search** 315/291, 315/294, 297, 307, 312
See application file for complete search history.

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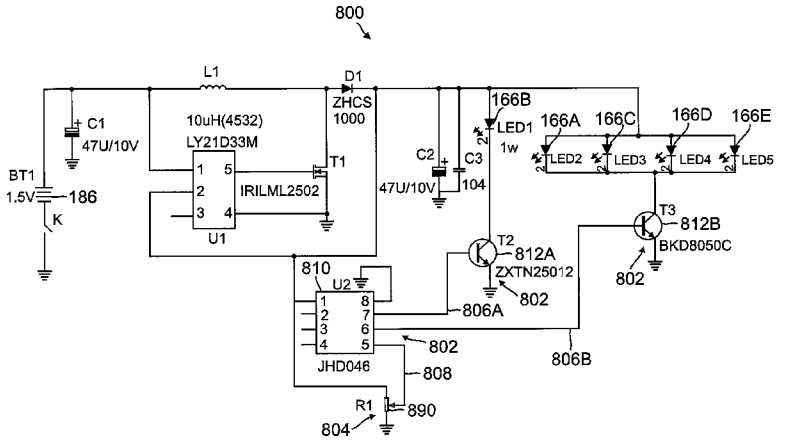
(57) **ABSTRACT**

Various lighting devices and related methods of operation are provided which may be used to adjust brightness levels of a plurality of light sources in a staggered fashion in response to a single user control. In one example, a lighting device includes a plurality of light sources. Each light source is adapted to exhibit an associated current brightness level within a range of brightness levels associated with each light source extending from an associated minimum brightness level to an associated maximum brightness level. The lighting device also includes a user control adapted to selectively adjust the current brightness levels exhibited by the light sources in a staggered fashion such that the light sources exhibit different current brightness levels from each other over at least a range of positions of the user control.

22 Claims, 8 Drawing Sheets



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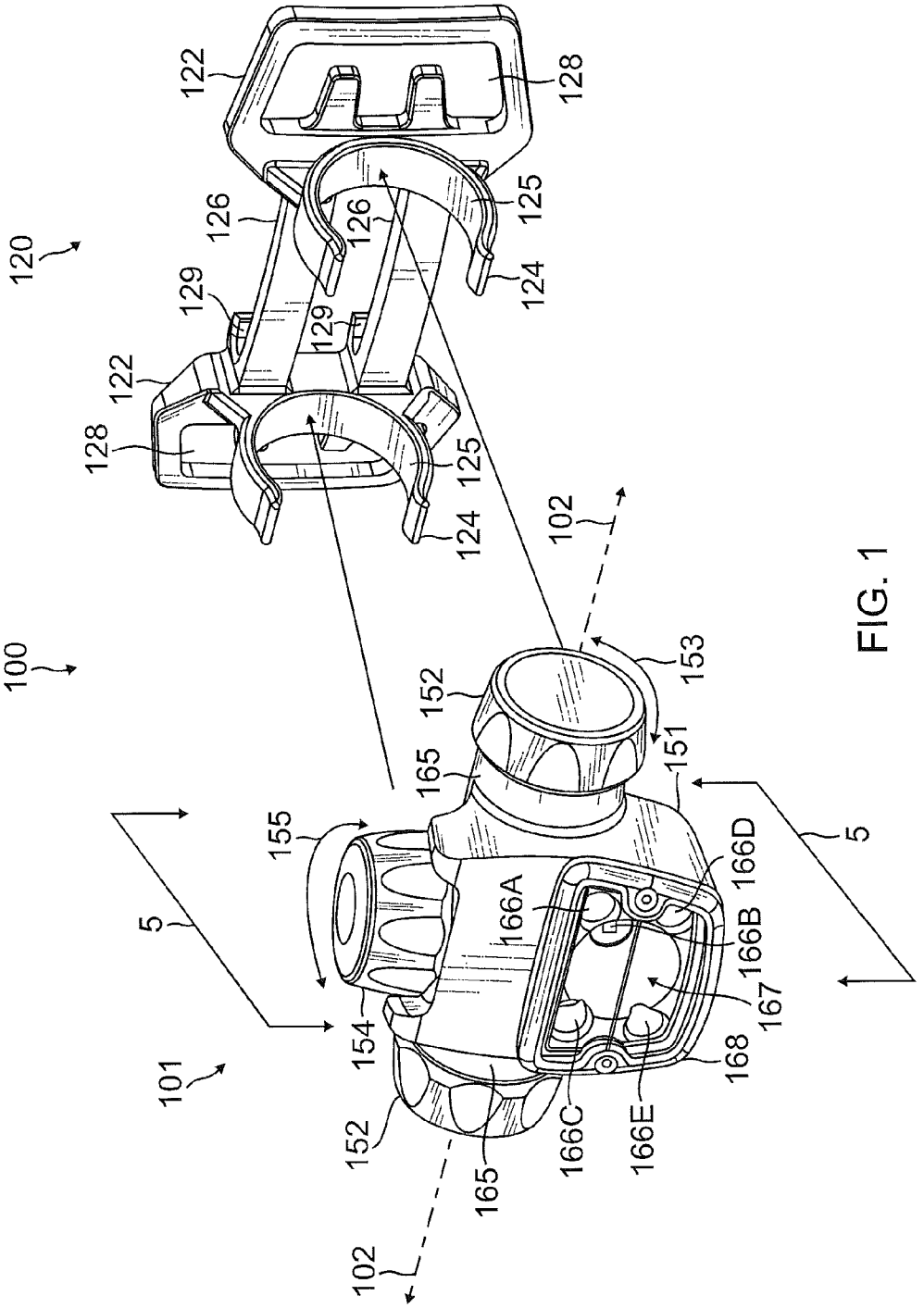

120
122
128
126
125
129
124
100
102
153
152
151
165
155
5
166A
166D
166B
167
154
168
101
166C
166E

FIG. 1

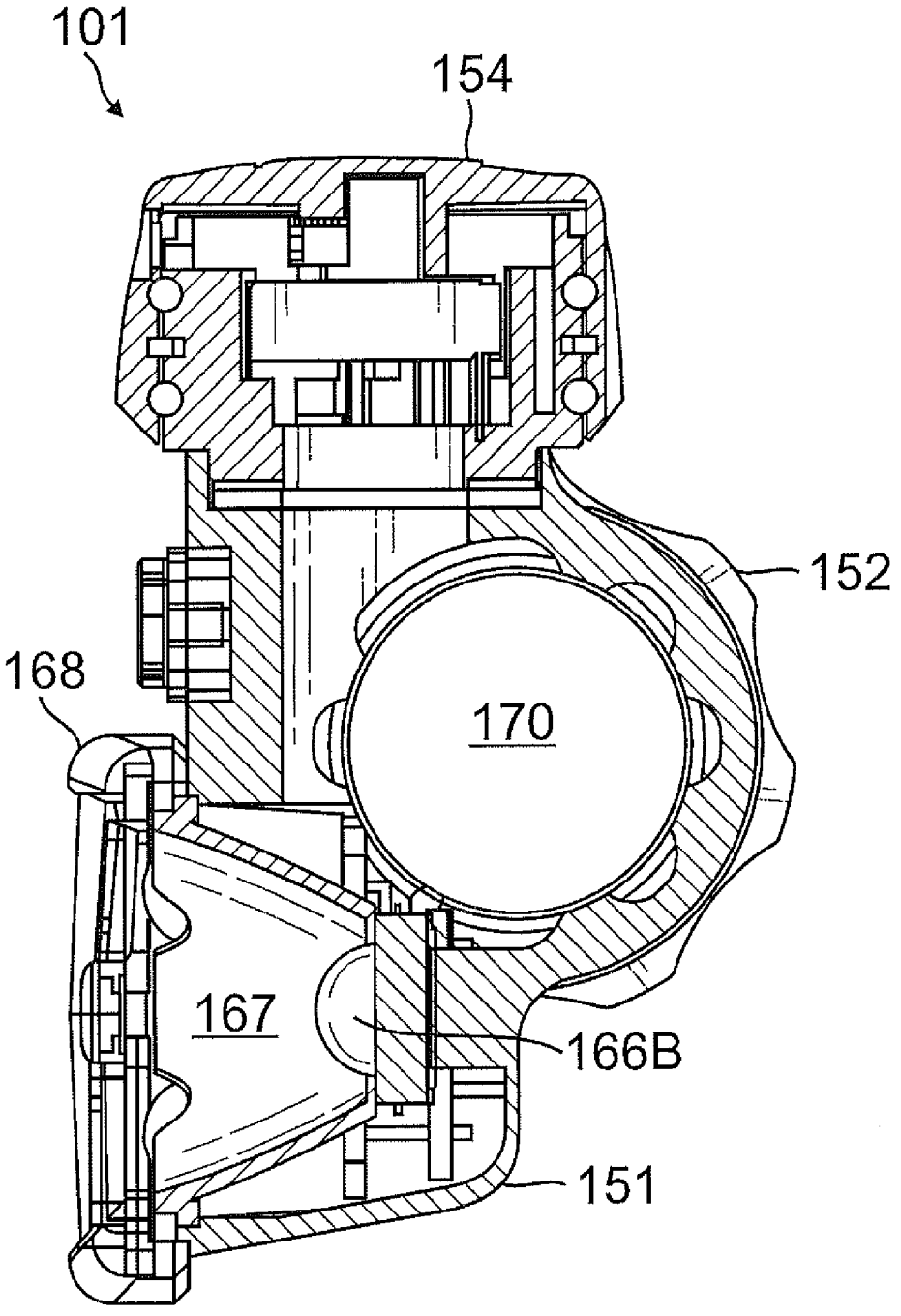


FIG. 2

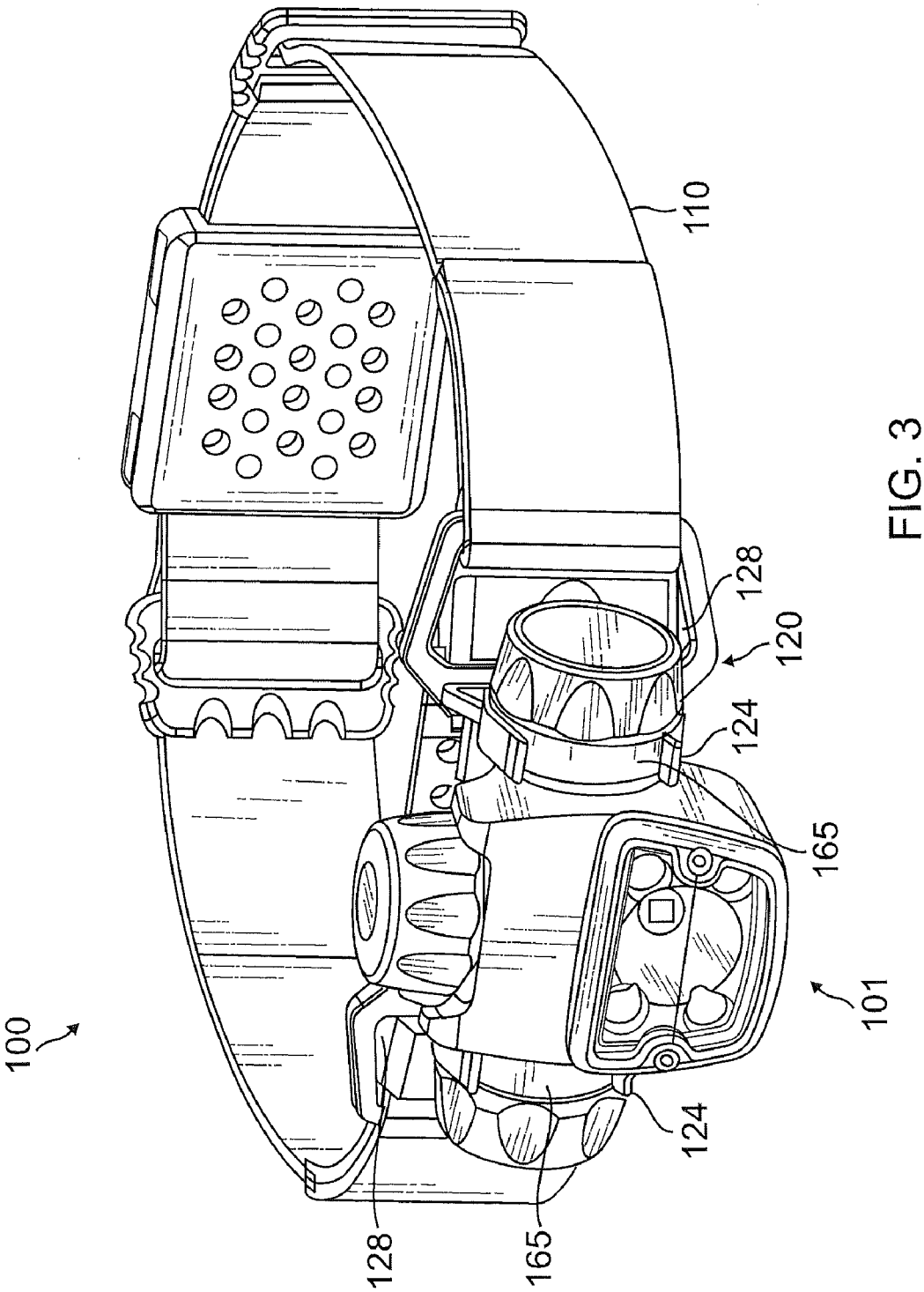


FIG. 3

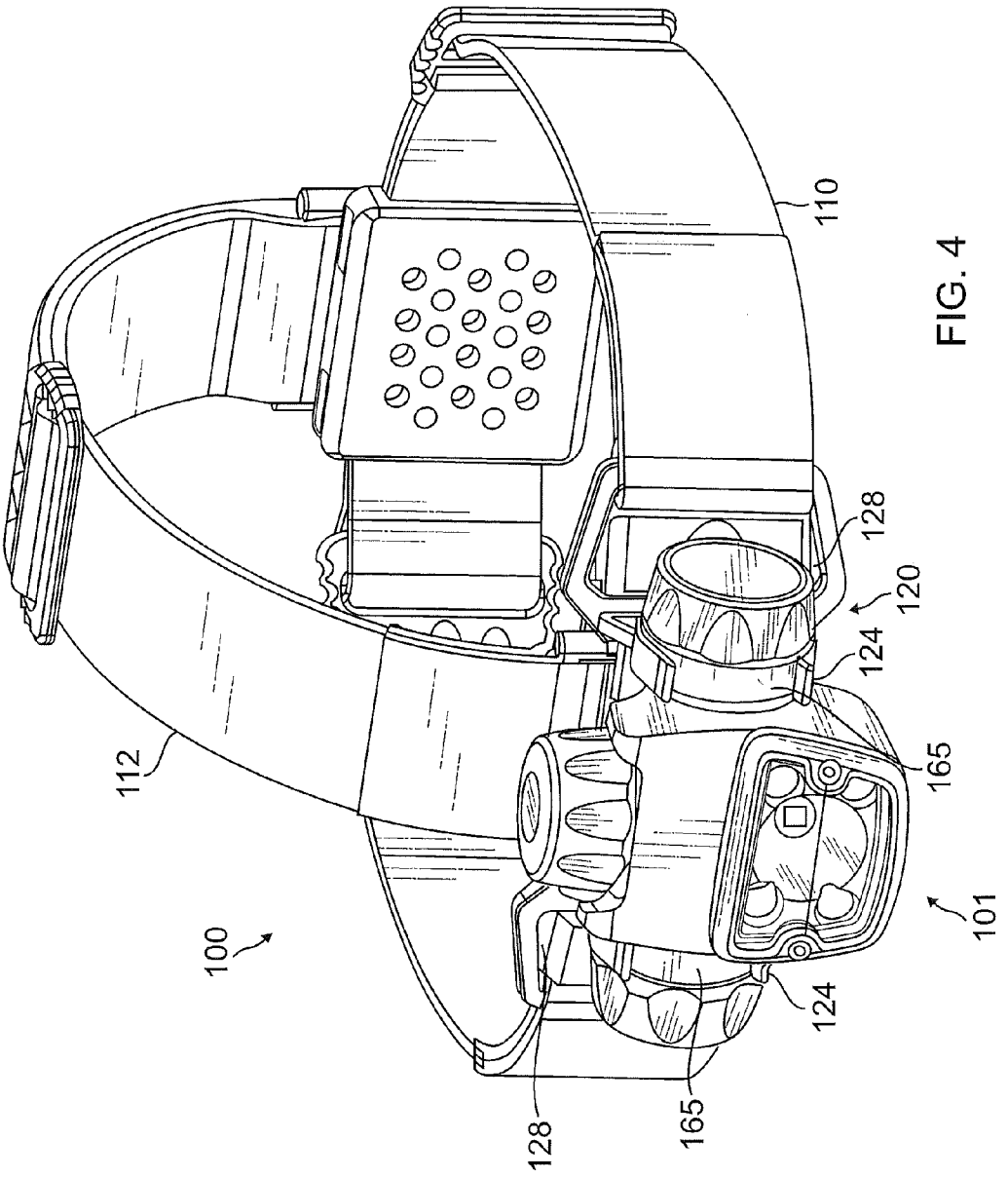


FIG. 4

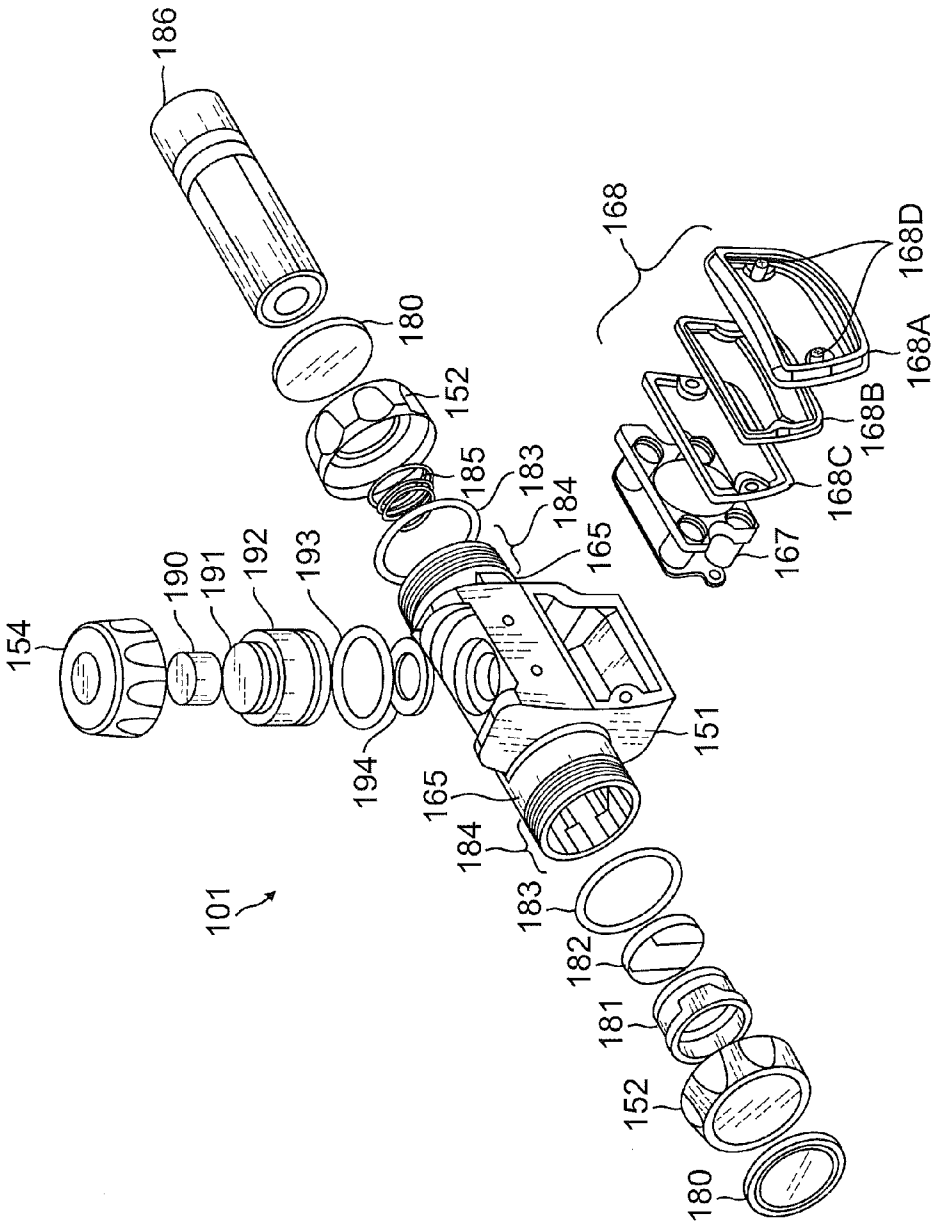

186
180
152
185
183
184
165
168
168D
168A
168B
168C
167
190
191
192
193
154
151
194
165
184
183
182
181
152
180
101

FIG. 5

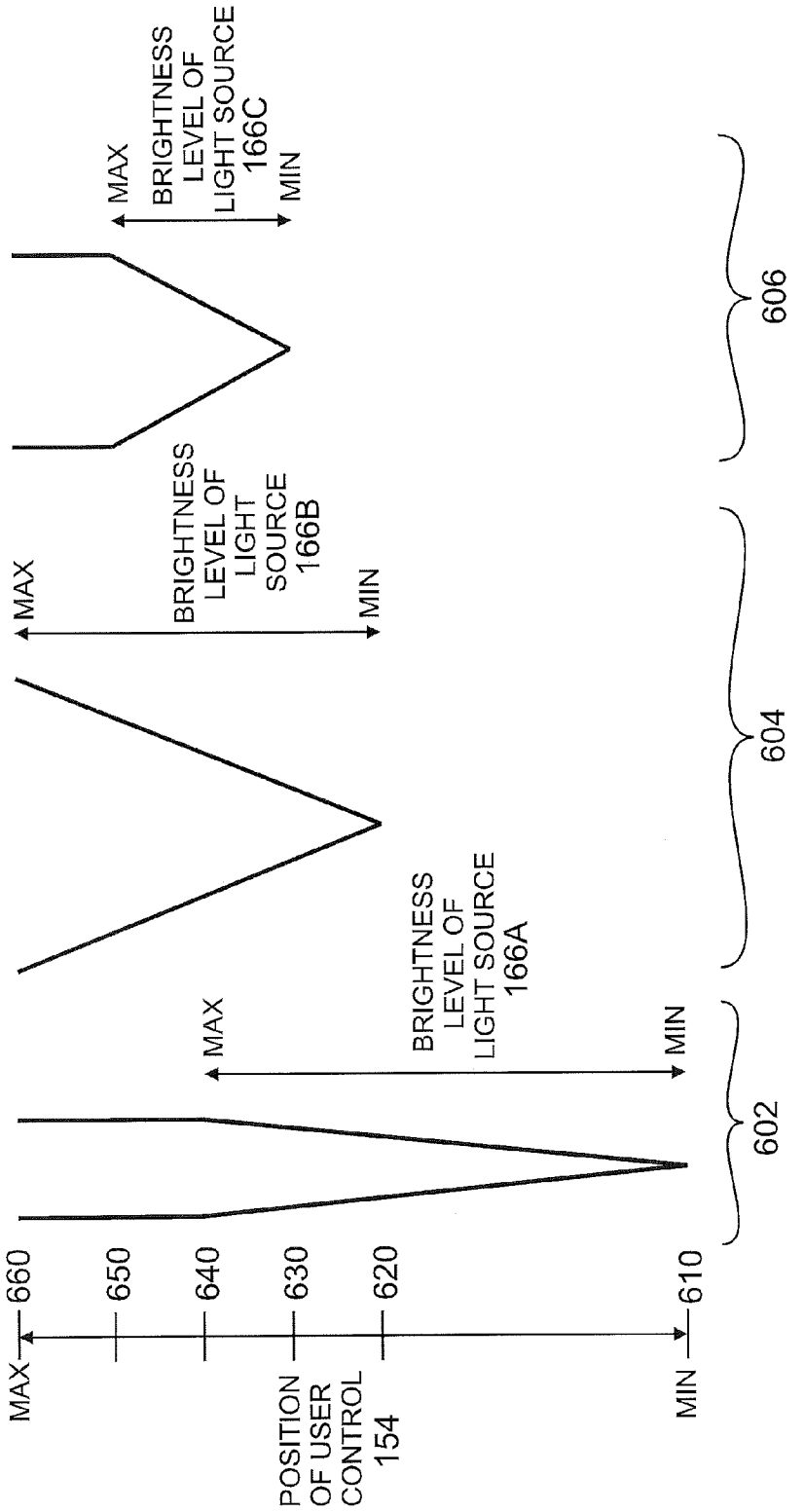

MAX
660
650
640
630
620
610
MIN
POSITION OF USER CONTROL 154
MAX
BRIGHTNESS LEVEL OF LIGHT SOURCE 166A
MIN
602
MAX
BRIGHTNESS LEVEL OF LIGHT SOURCE 166B
MIN
604
MAX
BRIGHTNESS LEVEL OF LIGHT SOURCE 166C
MIN
606

FIG. 6

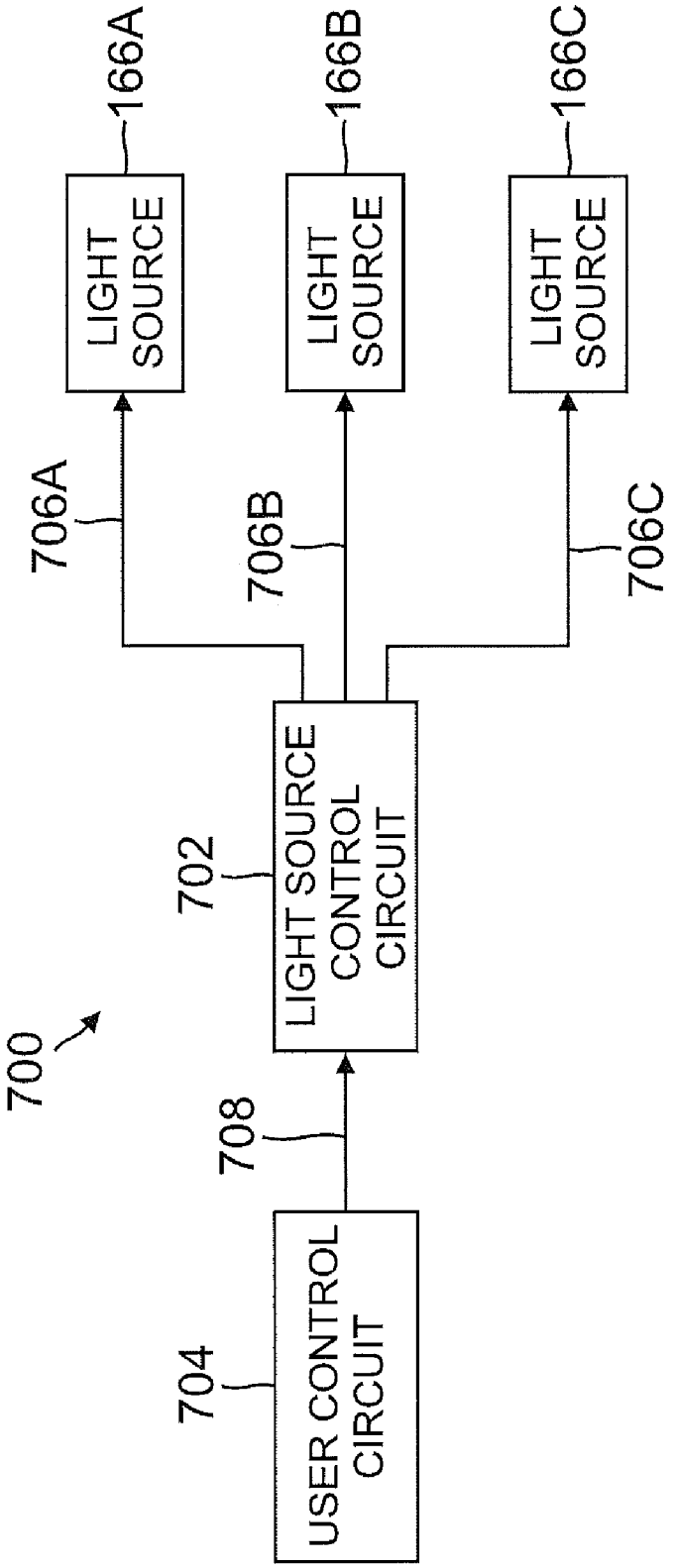
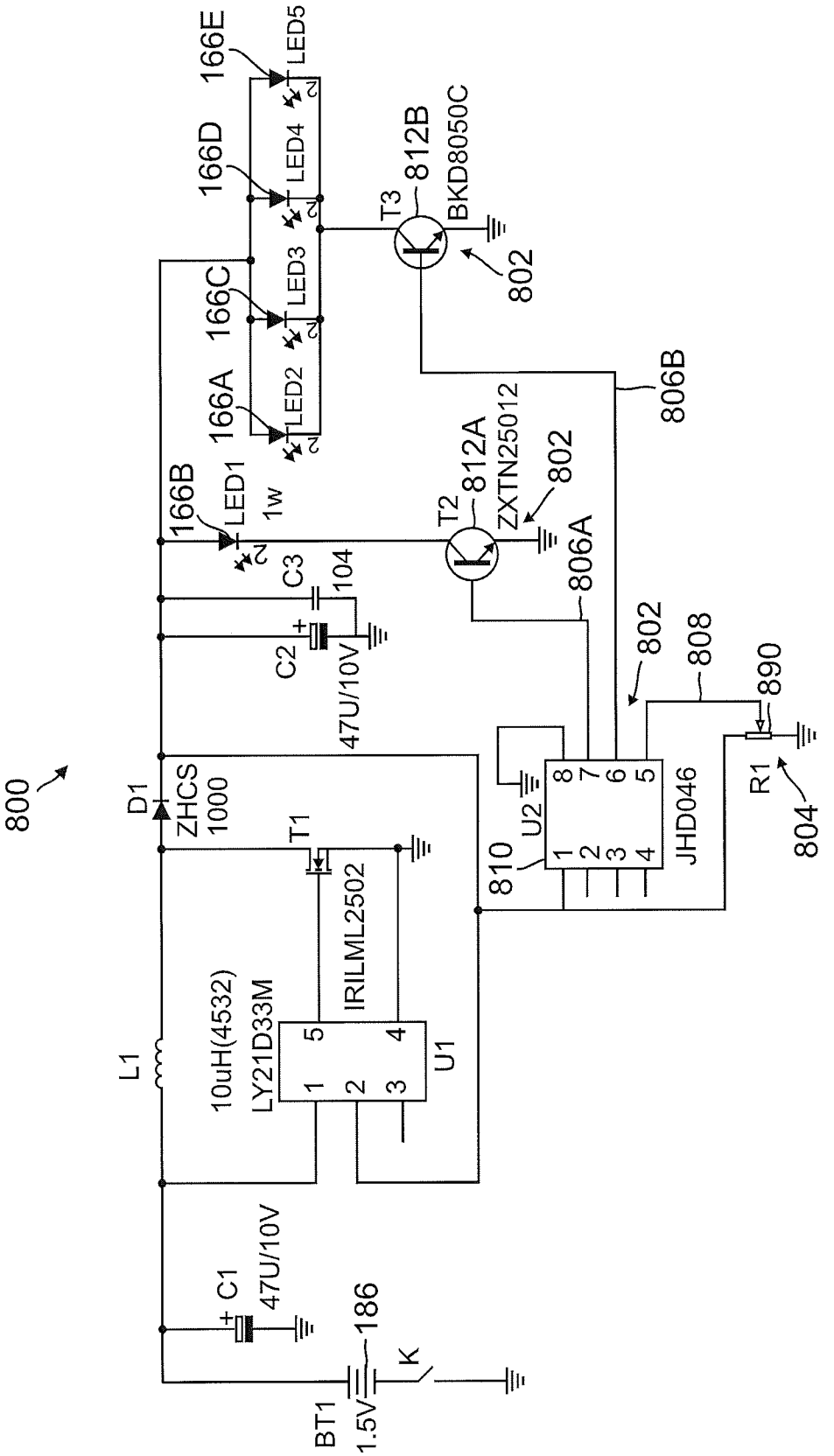

700
USER CONTROL CIRCUIT
704
708
LIGHT SOURCE CONTROL CIRCUIT
702
706A
706B
706C
LIGHT SOURCE
166A
LIGHT SOURCE
166B
LIGHT SOURCE
166C

FIG. 7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BT1
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186
K
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ZHCS
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L1
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IRILML2502
U1
C2
47U/10V
C3
104
166B
LED1
1w
166A
LED2
166C
LED3
166D
LED4
166E
LED5
T2
812A
ZXTN25012
802
806A
T3
812B
BKD8050C
802
806B
802
808
890
R1
804
U2
JHD046
810

FIG. 8

LIGHTING DEVICE WITH STAGGERED LIGHT SOURCES RESPONSIVE TO A SINGLE USER CONTROL

BACKGROUND

1. Field of the Invention

The present invention generally relates to lighting devices and more particularly to lighting devices having a plurality of light sources.

2. Related Art

Portable lighting devices such as flashlights, headlamps, and other types of lighting devices may be implemented with one or more light sources which may be used to illuminate areas of interest. In particular, lighting devices having a plurality of light sources can be useful in that different types of light sources, such as light sources providing different beam patterns or different wavelengths, may be provided in a single device. Unfortunately, many existing lighting devices that include multiple light sources are often difficult and cumbersome to control.

For example, certain lighting devices may include separate controls for different light sources. In this regard, a user may be forced to select from among a variety of different controls when operating the lighting device. Unfortunately, such implementations can require the user to remember and differentiate between the different controls. This can this can complicate the operation of the lighting device for the user, especially if adjustments to multiple light sources are desired. As an example, in dark environments, there may be insufficient light for the user to reliably distinguish between multiple controls. As another example, in stressful environments, there may be insufficient time for the user to distinguish between multiple controls. Accordingly, there is a need for an improved lighting device that overcomes one or more of the deficiencies discussed above.

SUMMARY

Various lighting devices and methods of operation are provided which may be used to adjust brightness levels of a plurality of light sources in a staggered fashion in response to a single user control. In one embodiment, a lighting device includes a plurality of light sources. Each light source is adapted to exhibit an associated current brightness level within a range of brightness levels associated with each light source extending from an associated minimum brightness level to an associated maximum brightness level. The lighting device also includes a user control adapted to selectively adjust the current brightness levels exhibited by the light sources in a staggered fashion such that the light sources exhibit different current brightness levels from each other over at least a range of positions of the user control.

In another embodiment, a method of operating a lighting device is provided. The lighting device includes a user control and a plurality of light sources. Each light source is adapted to exhibit an associated current brightness level within a range of brightness levels associated with each light source extending from an associated minimum brightness level to an associated maximum brightness level. The method includes detecting an adjustment of the user control. The method also includes selectively adjusting the current brightness levels exhibited by the light sources in a staggered fashion in response to the detecting such that the light sources exhibit different current brightness levels from each other over at least a range of positions of the user control.

The scope of the invention is defined by the claims, which are incorporated into this section by reference. A more complete understanding of embodiments of the present invention will be afforded to those skilled in the art, as well as a realization of additional advantages thereof, by a consideration of the following detailed description of one or more embodiments. Reference will be made to the appended sheets of drawings that will first be described briefly.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** illustrates a lighting device including a main body and a removable cradle in accordance with an embodiment of the invention.

FIG. **2** illustrates a cross-section view taken at line **5-5** of the main body of the lighting device of FIG. **1** in accordance with an embodiment of the invention.

FIG. **3** illustrates the lighting device of FIG. **1** including a strap in accordance with an embodiment of the invention.

FIG. **4** illustrates the lighting device of FIG. **1** including another strap in accordance with an embodiment of the invention.

FIG. **5** illustrates an exploded view of the main body of the lighting device of FIG. **1** in accordance with an embodiment of the invention.

FIG. **6** illustrates changes in the relative brightness of a plurality of different light sources of the lighting device of FIG. **1** in response to a single user control in accordance with an embodiment of the invention.

FIG. **7** illustrates a block diagram of control circuitry of the lighting device of FIG. **1** in accordance with an embodiment of the invention.

FIG. **8** illustrates a circuit diagram of the lighting device of FIG. **1** in accordance with an embodiment of the invention.

Embodiments of the present invention and their advantages are best understood by referring to the detailed description that follows. It should be appreciated that like reference numerals are used to identify like elements illustrated in one or more of the figures.

DETAILED DESCRIPTION

FIG. **1** illustrates a lighting device **100** including a main body **101** and a cradle **120** configured to receive lighting device **100** in accordance with an embodiment of the invention, and FIG. **2** illustrates a cross-section view taken at line **5-5** of main body **101** in accordance with an embodiment of the invention.

Main body **101** of lighting device **100** is configured to be inserted into cradle **120** and also may be selectively removed from cradle **120**. In this regard, main body **101** may be advantageously attached to cradle **120** and positioned in any convenient location where cradle **120** is positioned. For example, in one embodiment, cradle **120** may be positioned on a user's head to facilitate using lighting device **100** as a headlamp. However, lighting device **100** need not be limited to headlamp applications. For example, in other embodiments, cradle **120** may be positioned in other locations, such as on a belt, clothing, wrist strap, or other locations which may be convenient to a user. In other embodiments, main body **101** may be removed from cradle **120** to facilitate handheld use of main body **101** (e.g., as a flashlight) by a user or placement of main body **101** in other locations.

Main body **101** includes a housing **151** having a substantially elongate shape extending in a substantially vertical direction. Main body **101** includes mounting members **165** exhibiting substantially cylindrical exterior surfaces on either

side of housing **151**. Main body **101** may be selectively connected to cradle **120** through engagement of mounting members **165** with cradle **120**. In this regard, cradle **120** includes two support members **124** which have substantially arcuate interior surfaces **125** that may be engaged with the substantially cylindrical exterior surfaces of mounting members **165** when mounting members **165** are inserted into support members **124**.

While main body **101** is engaged with cradle **120** (e.g., through engagement of mounting members **165** and support members **124**), housing **151** may be rotated relative to cradle **120** along an axis **102** in the directions denoted by arrows **153** to adjust the angle of light emitted by one or more light sources **166**A-E further described herein.

Advantageously, the weight of housing **151** is supported by both of support members **124**. Because housing **151** is engaged with cradle **120** through support members **124** and mounting members **165**, the center of gravity of main body **101** is situated in close proximity to support members **124** and the remaining portions of cradle **120**.

Main body **101** includes end caps **152** connected to mounting members **165** on either side of housing **151**. A user may grasp housing **151** or end caps **152** to rotate main body **101** relative to cradle **120**. Advantageously, the shape of housing **151** permits the center of gravity of main body **101** to be horizontally positioned between support members **124** and vertically positioned substantially level with or lower than (e.g., below) axis **102**, support members **124**, and/or mounting members **165**. Such positioning of the center of gravity allows gravitational forces to substantially pull housing **151** into a stable position (e.g., without causing main body **101** to be top heavy or cantilevered which could result in unintentional rotation of main body **101**). As a result, cradle **120** is configured to hold housing **151** in a stable, reliable manner while still permitting housing **151** to rotate.

Cradle **120** includes connecting members **122** and **126** that include apertures **128** and **129** which may receive various straps or other mounting devices for positioning cradle **120** in desired locations. For example, FIG. **3** illustrates main body **101** and cradle **120** connected to a strap **110** in a headlamp configuration in accordance with an embodiment of the invention. In this regard, strap **110** passes through apertures **128** of connecting members **122** to secure cradle **120** to strap **110**. In this configuration, cradle **120** may be positioned in front of a user's forehead and strap **110** may be configured to wrap around the user's head to secure lighting device **100** to the user.

As another example, FIG. **4** illustrates main body **101** and cradle **120** connected to strap **110** and also connected to a strap **112** in another headlamp configuration in accordance with an embodiment of the invention. In this regard, strap **112** passes through apertures **129** of connecting members **126** to secure cradle **120** to strap **112**. In this configuration, strap **112** may be configured to wrap over a top of the user's head to further secure lighting device **100** to the user.

Main body **101** also includes a user control **154** mounted substantially on a top side of housing **151**. User control **154** may be rotated relative to housing **151** to adjust a potentiometer or other appropriate control of lighting device **100** to adjust, for example, the intensity of light emitted by one or more of light sources **166**A-E. For example, the user may grasp user control **154** to rotate user control **154** in the directions denoted by arrows **155** relative to body **150**. Advantageously, the location of user control **154** on the top side of housing **151** permits a user to adjust user control **154** without causing housing **151** to rotate along axis **102**. As a result, main body **101** can remain in a desired position (e.g., rotated to a desired angle relative to cradle **120**) while the user operates user control **154**.

In addition, the position of user control **154** on the top side of housing **151** permits the user to adjust user control **154** without unintentionally interfering with the light provided by light sources **166**A-E. In this regard, the user's hand may be placed on the top side of housing **151** rather than in front of light sources **166**A-E (e.g., within beam patterns emitted by light sources **166**A-E) which could otherwise interrupt beam patterns emitted by light sources **166**A-E. As a result, the user can avoid inadvertently interrupting beam patterns emitted by light sources **166**A-E (e.g., avoid casting a shadow) over an illuminated area of interest while adjusting user control **154**.

Although user control **154** is illustrated as a user-rotatable dial (e.g., a knob), other embodiments are also contemplated. For example, in other embodiments, user control **154** may be implemented as a slider (e.g., connected to a potentiometer that slides along an axis), a spring loaded lever, a toggle switch, a switch having separate increment and decrement positions, two or more switches (e.g., an increment switch and a decrement switch), or other appropriate controls.

Lighting device **100** includes five light sources labeled **166**A-E. Although five light sources are shown, any desired number of light sources, and any desired types of light sources may be used. For example, in various embodiments, light sources **166**A-E may be implemented as light emitting diodes (LEDs), incandescent light sources, visible light sources, non-visible light sources (e.g., emitting infrared, ultraviolet, and/or other light wavelengths), spotlights, floodlights, and/or other appropriate types of light sources as may be desired in particular implementations.

Light sources **166**A-E are mounted within a lens assembly **167** (e.g., which may be implemented to include a plurality of lenses, each of which may provide total internal reflection of light from a corresponding one or more of light sources **166**A-E) in housing **151**. Light sources **166**A-E and lens assembly **167** are mounted within housing **151** behind a window assembly **168**.

As shown in FIG. **4**, housing **151** includes a substantially cylindrical chamber **170**. Chamber **170** may receive a battery (e.g., a conventional AA or AAA battery) for powering lighting device **100**.

FIG. **5** illustrates an exploded view of main body **101** in accordance with an embodiment of the invention. In addition to various components of main body **101** previously described herein, FIG. **5** also shows several additional components.

For example, FIG. **5** further illustrates plates **180**, a printed circuit board (PCB) **181**, a contact plate **182**, o-rings **183**, threads **184**, a spring **185**, and a battery **186**. Plates **180** may be inserted into end caps **152** and affixed or otherwise secured to end caps **152** using any appropriate product such as, for example, adhesive, glue, or other products. Plates **180** may include letters, symbols, and/or other appropriate insignia which remain visible when plates **180** are secured to end caps **152**. Battery **186** may be inserted into chamber **170** (see FIG. **4**) within housing **151** for powering light sources **166**A-E, PCB **181**, and a PCB **191**. While inserted into chamber **170**, battery **186** engages with contact plate **182** and spring **185**. PCB **181** and/or PCB **191** may be used to provide appropriate circuitry for operating light sources **166**A-E in response to control signals generated in response to operation of user control **154**. End caps **152** may be engaged with threads **184** to secure end caps **152** to mounting members **165**. In this regard, o-rings **183** may be used to seal end caps **152** against housing **151**.

FIG. **5** also illustrates various components of window assembly **168**. In this regard, window assembly **168** includes a reflector cap **168**A, a reflector mirror **168**B, and a reflector ring **168**C, all of which may be secured to lens assembly **167** by screws **168**D.

In addition, FIG. **5** illustrates a switch **190**, PCB **191**, a switch cap **192**, an o-ring **193**, and a switch ring **194**. Switch **190** engages with user control **154** and PCB **191**. In this regard, switch **190** may rotate with user control **154**. PCB **181** and/or PCB **191** may detect the position of user control **154**, and adjustments thereof, using switch **190** and generate one or more control signals for operating light sources **166**A-E in various ways further described herein. User control **154**, switch **190**, and PCB **191** may be received by switch cap **192** which is inserted into body with switch ring **194** and sealed against housing **151** by o-ring **193**.

The implementation of switch **190** and other relevant components of lighting device **100** may be changed in embodiments having different implementations of user control **154**. For example, switch **190** may be implemented in an appropriate manner (e.g., as a potentiometer that slides along an axis, a switch responsive to a spring loaded lever, a switch responsive to a toggle switch, a switch having separate increment and decrement positions, two or more switches, or other appropriate switch implementations) to engage with user control **154** in such embodiments.

FIG. **6** illustrates changes in the relative brightness (e.g., intensity) of light sources **166**A-C of lighting device **100** in response to operation of user control **154** in accordance with an embodiment of the invention, and FIG. **7** illustrates a block diagram **700** of control circuitry of lighting device **100** in accordance with an embodiment of the invention. For example, in one embodiment, various components of block diagram **700** may be used to control light sources **166**A-C to operate in the manner identified in FIG. **6**.

Although the following descriptions of FIGS. **6-7** refer to light sources **166**A-C, the features described with regard to one or more of light sources **166**A-C may be similarly applied to light sources **166**D-E and/or other light sources of lighting device **100**. Moreover, although the various features of FIG. **6-7** are described with regard to lighting device **100** implemented as a headlamp, such features may be used in any type of lighting device **100** where desired (e.g., a flashlight or other appropriate type of lighting device).

FIG. **6** show beam patterns **602**, **604**, and **606** which correspond to the relative brightness of light sources **166**A, **166**B, and **166**C, respectively, in response to adjustment of user control **154** from a minimum position to a maximum position. As shown in FIG. **6**, light sources **166**A-C may transition from a minimum brightness level to a maximum brightness level in a staggered fashion such that light sources **166**A-C may exhibit minimum, intermediate, and maximum brightness levels corresponding to different positions of user control **154**.

As previously described, light sources **166**A-C may be implemented as different types of light sources. As such, light sources **166**A-C may exhibit different beam patterns (e.g., different dispersion patterns) as denoted by the different widths of beam patterns **602**, **604**, and **606**. For example, in one embodiment, light source **166**A may be implemented as a spotlight having a relatively narrow beam pattern as indicated by the narrow width of beam pattern **602**. In another embodiment, light source **166**B may be implemented as a floodlight having a relatively wide beam pattern as indicated by the wide width of beam pattern **604** in comparison to beam pattern **602**. In another embodiment, light source **166**C may be implemented as a light source having an intermediate beam pattern as indicated by the intermediate width of beam pattern **606** in comparison to beam patterns **602** and **604**.

For purposes of illustration, beam patterns **602**, **604**, and **606** are shown separately from each other. However, in various embodiments, beam patterns **602**, **604**, and **606** may overlap with some or all of each other.

In various embodiments, light sources **166**A-C may be implemented with similar or different minimum and maximum brightness levels. For example, in one embodiment, the minimum and maximum brightness levels of light sources **166**A-C may be substantially similar to each other. In another embodiment, the maximum brightness levels of light sources **166**A-C may differ from each other such that, for example, when light sources **166**A and **166**B are both set to their maximum brightness levels, light source **166**B may still be brighter than light source **166**A. In another embodiment, the minimum brightness levels of light sources **166**A-C may differ from each other such that, for example, when light sources **166**A and **166**B are both set to their minimum brightness levels, light source **166**B may still be brighter than light source **166**A.

The operation of user control **154** will now be further described with regard to beam patterns **602**, **604**, and **606**. When user control **154** is at a minimum position **610** (e.g., an off position), all of light sources **166**A-C remain turned off (e.g., exhibiting minimum brightness).

As user control **154** is adjusted from position **610** to position **620**, light source **166**A turns on and gradually increases in brightness until reaching approximately 50 percent brightness when user control **154** reaches position **620**. Light sources **166**B-C remain turned off as user control **154** transitions from position **610** to position **620**.

As user control **154** is adjusted from position **620** to position **630**, light source **166**A further increases in brightness until reaching approximately 80 percent brightness when user control **154** reaches position **630**. Light source **166**B turns on as user control passes position **620** and further increases in brightness until reaching approximately 30 percent brightness when user control **154** reaches position **630**. Light source **166**C remains turned off as user control **154** transitions from position **620** to position **630**.

As user control **154** is adjusted from position **630** to position **640**, light source **166**A further increases in brightness until reaching its maximum brightness when user control **154** reaches position **640**. Light source **166**B further increases in brightness until reaching approximately 50 percent brightness when user control **154** reaches position **640**. Light source **166**C turns on as user control passes position **630** and further increases in brightness until reaching approximately 50 percent brightness when user control **154** reaches position **640**.

As user control **154** is adjusted from position **640** to position **650**, light source **166**A remains at its maximum brightness level. Light source **166**B further increases in brightness until reaching approximately 80 percent brightness when user control **154** reaches position **650**. Light source **166**C further increases in brightness until reaching its maximum brightness when user control **154** reaches position **650**.

As user control **154** is adjusted from position **650** to position **660**, light source **166**A remains at its maximum brightness level. Light source **166**B further increases in brightness until reaching its maximum brightness level when user control **154** reaches position **660**. Light source **166**C remains at its maximum brightness level as user control is adjusted from position **650** to position **660**.

As user control **154** is adjusted in the reverse direction from position **660** through positions **650**, **640**, **630**, and **620** to position **610**, the brightness levels of light sources **166**A-C

decrease in a similar staggered fashion. As a result, light sources **166**A-C may turn on, turn off, and vary in brightness in a staggered fashion as user control **154** is adjusted.

The particular staggered implementation shown in FIG. **6** is provided for purposes of illustration and not limitation. Lighting device **100** may be implemented to control light sources **166**A-C in accordance with any desired minimum and maximum brightness levels, staggered or not staggered, relative to user control **154**. For example, although all of light sources **166**A-C are illustrated as being turned on at the same time for at least a range of positions of user control **154** (e.g., all of light sources **166**A-C remain turned on as user control **154** is adjusted from position **630** to position **660**), light source **166**A may alternatively turn off when user control **154** reaches position **640** and remain off as user control **154** is adjusted to position **660**. Continuing this example, light source **166**C may alternatively turn on when user control **154** reaches position **650** (e.g., light source **166**C may turn on after light source **166**A turns off) and remain on as user control **154** is adjusted from position **650** to position **660**.

Advantageously, user control **154** permits a user to adjust the on/off states and brightness of all of light sources **166**A-C using only a single control. This feature is desirable for users whose hands must remain free as much as possible to perform other tasks. In particular, such users may adjust a plurality of light sources **166**A-C using only a single hand, without requiring manipulation of a plurality of different controls.

Referring now to FIG. **7**, a light source control circuit **702** provides control signals **706**A-C to light sources **166**A-C in response to one or more control signals **708** received from a user control circuit **704**. In one embodiment, light source control circuit **702** may be implemented by PCB **181** and/or PCB **191**, and user control circuit **704** may be implemented by switch **190**, PCB **181**, and/or PCB **191**. For example, as previously described, switch **190** may engage with user control **154** and may be adjusted as user control **154** is adjusted. This adjustment of switch **190** may cause PCB **181** and/or PCB **191** to generate one or more control signals (e.g., control signals **708**) which may be provided to control circuit **702** (e.g., PCB **181** and/or PCB **191**) for operating light sources **166**A-E (e.g., including light sources **166**A-C).

Thus, the adjustment of user control **154** can cause control signals **708** to be provided from user control circuit **704** to light source control circuit **702** to identify the position of user control **154** (e.g., positioned at any of the positions **610** to **660** identified in FIG. **6**, or intermediate positions thereof).

In response to control signals **708**, light source control circuit **702** may generate control signals **706**A-C to adjust the brightness of light sources **166**A-C in a staggered fashion, such as the implementation identified in FIG. **6**, or other implementations. For example, in one embodiment, light source control circuit **702** may be implemented by a controller, microprocessor, or other appropriate device which may be programmed to provide any desired control signals **706**A-C in response to control signals **708**. As a result, light sources **166**A-C may be controlled to achieve any desired staggered or non-staggered changes in brightness levels.

FIG. **8** illustrates a circuit diagram **800** of the lighting device of FIG. **1** in accordance with an embodiment of the invention. Circuit diagram **800** includes light sources **166**A-E (shown implemented by LEDs in this embodiment), battery **186**, a light source control circuit **802** (e.g., which may be used to implement light source control circuit **702** in one embodiment), a user control circuit **804** (e.g., which may be used to implement user control circuit **702** in one embodiment), and additional circuitry as shown. Light source control circuit **802** includes a programmable controller **810** and transistors **812**A/**812**B, all of which may be implemented by PCB **181** and/or PCB **191**. User control circuit **804** includes a potentiometer **890** which may be implemented by switch **190**, PCB **181**, and/or PCB **191**.

User control circuit **804** provides a control signal **808** to programmable controller **810**, for example, in response to adjustment of potentiometer **890** by a user operating user control **154**. In response to control signal **808**, programmable controller **810** of light source control circuit **802** may generate a control signal **806**A to adjust the brightness of light source **166**B, and may further generate a control signal **806**B to adjust the brightness of light sources **166**A and **166**C-E. In this regard, control signals **806**A-B control the operation of transistors **812**A-B which cause changes in the brightness of light sources **166**A-E. For example, in this embodiment, the brightness of light source **166**B may be controlled independently from the brightness of light sources **166**A and **166**C-E to achieve any desired staggered or non-staggered changes in brightness levels.

Although two control signals **806**A and **806**B are shown in circuit diagram **800**, any desired number of control signals may be generated and used in other embodiments to independently control any desired number of light sources in any desired staggered or non-staggered pattern, such as in accordance with the various patterns previously described herein.

Where applicable, the various components set forth herein can be combined into composite components and/or separated into sub-components without departing from the spirit of the present invention. Similarly, where applicable, the ordering of various steps described herein can be changed, combined into composite steps, and/or separated into substeps to provide features described herein.

The foregoing disclosure is not intended to limit the present invention to the precise forms or particular fields of use disclosed. It is contemplated that various alternate embodiments and/or modifications to the present invention, whether explicitly described or implied herein, are possible in light of the disclosure.

Embodiments described above illustrate but do not limit the invention. It should also be understood that numerous modifications and variations are possible in accordance with the principles of the present invention. Accordingly, the scope of the invention is defined only by the following claims.

What is claimed is:

1. A lighting device comprising:

a plurality of light sources, wherein each light source is adapted to exhibit an associated current brightness level within a range of brightness levels associated with each light source extending from an associated minimum brightness level to an associated maximum brightness level; and

a user control adapted to selectively adjust the current brightness levels exhibited by the light sources in a staggered fashion such that the light sources exhibit different current brightness levels from each other over at least a range of positions of the user control.

2. The lighting device of claim **1**, wherein the user control is adapted to adjust a current brightness level of a first one of the light sources from a first minimum brightness level to a first maximum brightness level as the user control is adjusted over a first range of positions extending from a first position to a second position; and wherein the user control is adapted to adjust a current brightness level of a second one of the light sources from a second minimum brightness level to a second maximum brightness level as the user control is adjusted over a second range of positions extending from a third position to a fourth position.

3. The lighting device of claim 2, wherein a portion of the first range overlaps with a portion of the second range.

4. The lighting device of claim 2, wherein the first and second ranges do not overlap with each other.

5. The lighting device of claim 1, further comprising a control circuit adapted to provide a plurality of light control signals to control the light sources in the staggered fashion in response to a user control signal received in response to an adjustment of the user control.

6. The lighting device of claim 1, wherein a first one of the light sources is adapted to emit a different beam pattern than a second one of the light sources.

7. The lighting device of claim 1, wherein a first one of the light sources is adapted to emit different wavelengths than a second one of the light sources.

8. The lighting device of claim 1, wherein the user control is a single knob.

9. The lighting device of claim 1, wherein the user control is a single slider.

10. The lighting device of claim 1, wherein the lighting device is a headlamp.

11. The lighting device of claim 1, wherein the lighting device is a flashlight.

12. A method of operating a lighting device comprising a user control and a plurality of light sources, wherein each light source is adapted to exhibit an associated current brightness level within a range of brightness levels associated with each light source extending from an associated minimum brightness level to an associated maximum brightness level, the method comprising:

detecting an adjustment of the user control; and

selectively adjusting the current brightness levels exhibited by the light sources in a staggered fashion in response to the detecting such that the light sources exhibit different current brightness levels from each other over at least a range of positions of the user control.

13. The method of claim 12, wherein the adjusting comprises:

adjusting a current brightness level of a first one of the light sources from a first minimum brightness level to a first maximum brightness level as the user control is adjusted over a first range of positions extending from a first position to a second position; and

adjusting a current brightness level of a second one of the light sources from a second minimum brightness level to a second maximum brightness level as the user control is adjusted over a second range of positions extending from a third position to a fourth position.

14. The method of claim 13, wherein a portion of the first range overlaps with a portion of the second range.

15. The method of claim 13, wherein the first and second ranges do not overlap with each other.

16. The method of claim 12, wherein the detecting comprises detecting a user control signal received in response to the adjustment of the user control; and

wherein the adjusting comprises providing a plurality of light control signals to control the light sources in the staggered fashion in response to the user control signal.

17. The method of claim 12, wherein a first one of the light sources is adapted to emit a different beam pattern than a second one of the light sources.

18. The method of claim 12, wherein a first one of the light sources is adapted to emit different wavelengths than a second one of the light sources.

19. The method of claim 12, wherein the user control is a single knob.

20. The method of claim 12, wherein the user control is a single slider.

21. The method of claim 12, wherein the lighting device is a headlamp.

22. The method of claim 12, wherein the lighting device is a flashlight.

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