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Joseph

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(54) **THEATRICAL PROP FOR PROVIDING REPEATABLE, DAYLIGHT-VIEWABLE MUZZLE FLASHES**

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F21V 3/00	(2015.01)
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F21W 131/406	(2006.01)
F21Y 115/10	(2016.01)
F41A 33/02	(2006.01)

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CPC ***F21V 14/02*** (2013.01); ***F21V 3/00*** (2013.01); ***F21V 23/0407*** (2013.01); ***F41A 33/02*** (2013.01); *F21W 2131/406* (2013.01); *F21Y 2115/10* (2016.08)

(58) **Field of Classification Search**

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USPC 362/111, 112, 113

See application file for complete search history.

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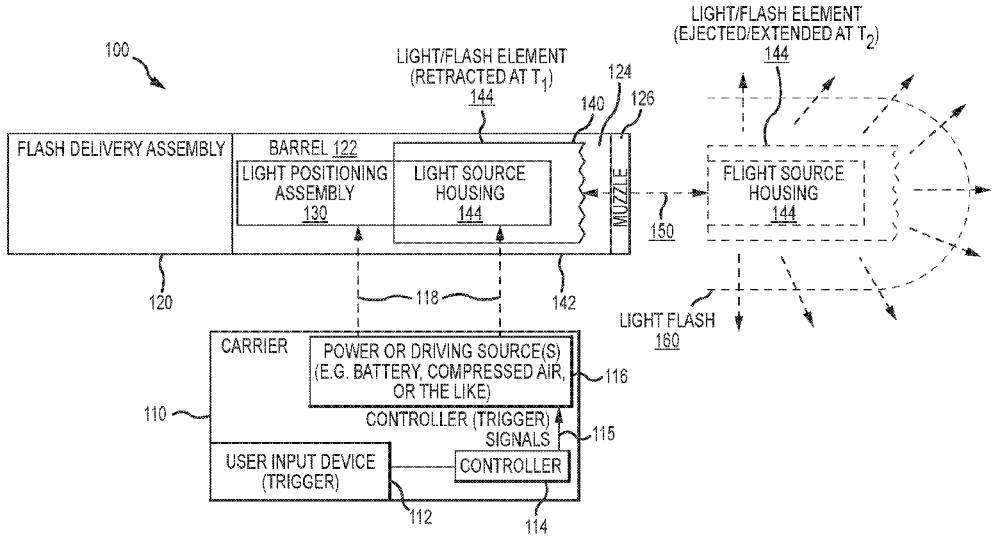
(57) **ABSTRACT**

An apparatus for generating light-based special effects viewable in daylight. The apparatus includes a barrel with opaque sidewalls defining an interior space accessible via a muzzle. The apparatus includes a light element positionable within the interior space and further includes a light positioning assembly. The apparatus includes a trigger element operable to receive user input to initiate operations of the light element and the light positioning assembly. A controller is provided that responds to the user input to operate the light positioning assembly to first move the light element out of the interior space through the muzzle and to second retract the light element back into the interior space. The controller concurrently operates the light element to generate the light when the light element is moved out of the interior space and to terminate the generating of the light when the light element is retracted back into the interior space.

20 Claims, 4 Drawing Sheets



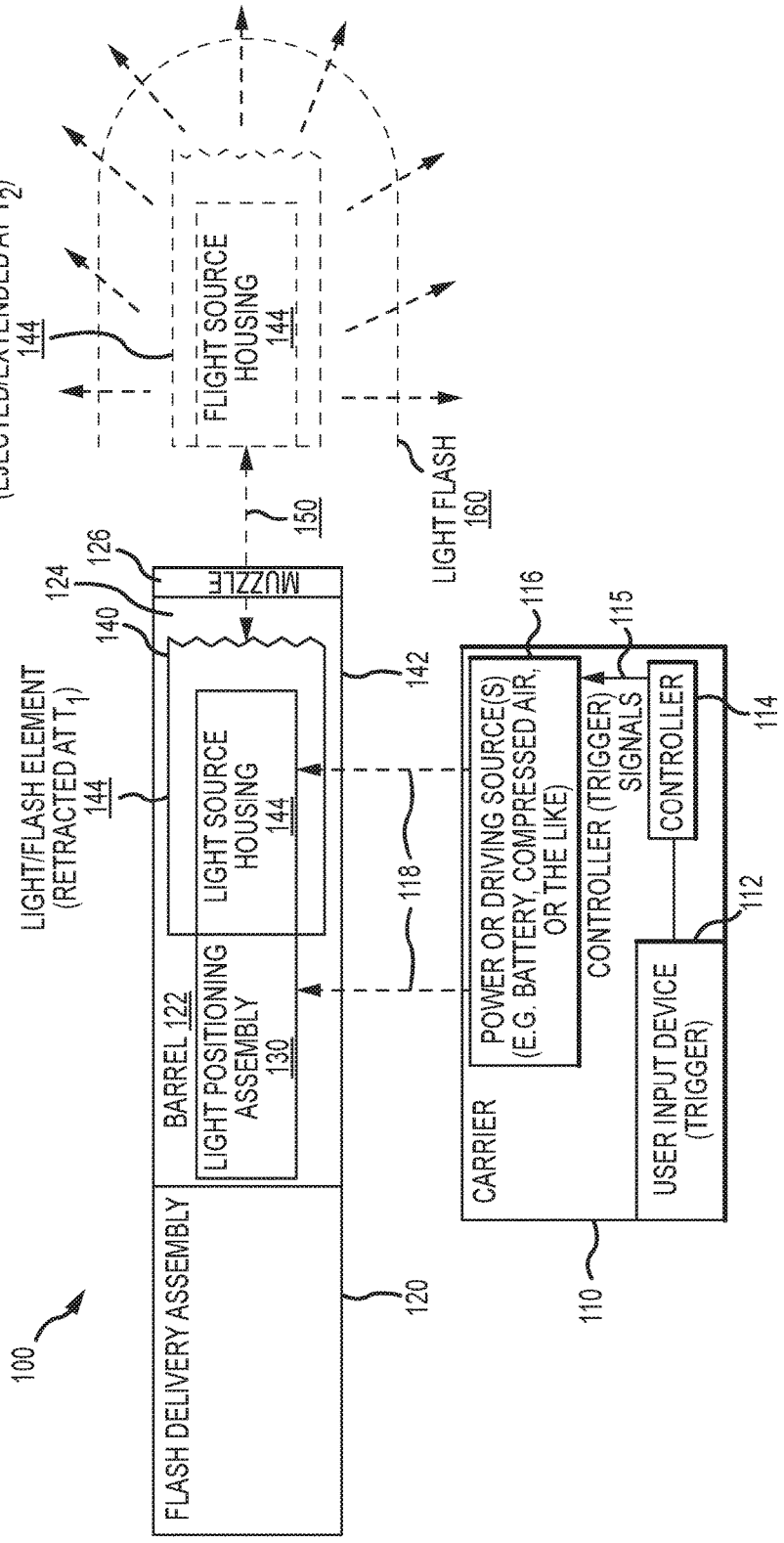

LIGHT/FLASH ELEMENT (EJECTED/EXTENDED AT T_2) 144
FLIGHT SOURCE HOUSING 144
150
LIGHT FLASH 160
MUZZLE
126
124
140
142
LIGHT/FLASH ELEMENT (RETRACTED AT T_1) 144
LIGHT SOURCE HOUSING 144
BARREL 122
LIGHT POSITIONING ASSEMBLY 130
118
116
115
POWER OR DRIVING SOURCE(S) (E.G. BATTERY, COMPRESSED AIR, OR THE LIKE)
CONTROLLER (TRIGGER) SIGNALS
CONTROLLER
114
112
CARRIER
USER INPUT DEVICE (TRIGGER)
FLASH DELIVERY ASSEMBLY
120
110
100

FIG. 1

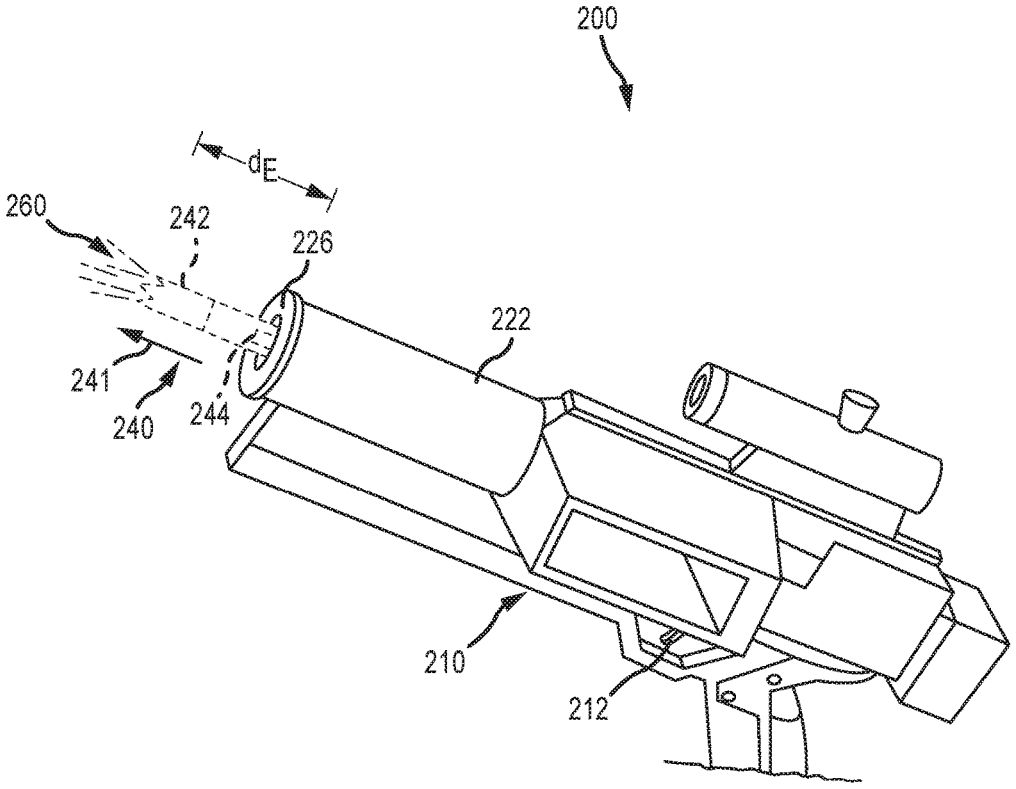


FIG.2A

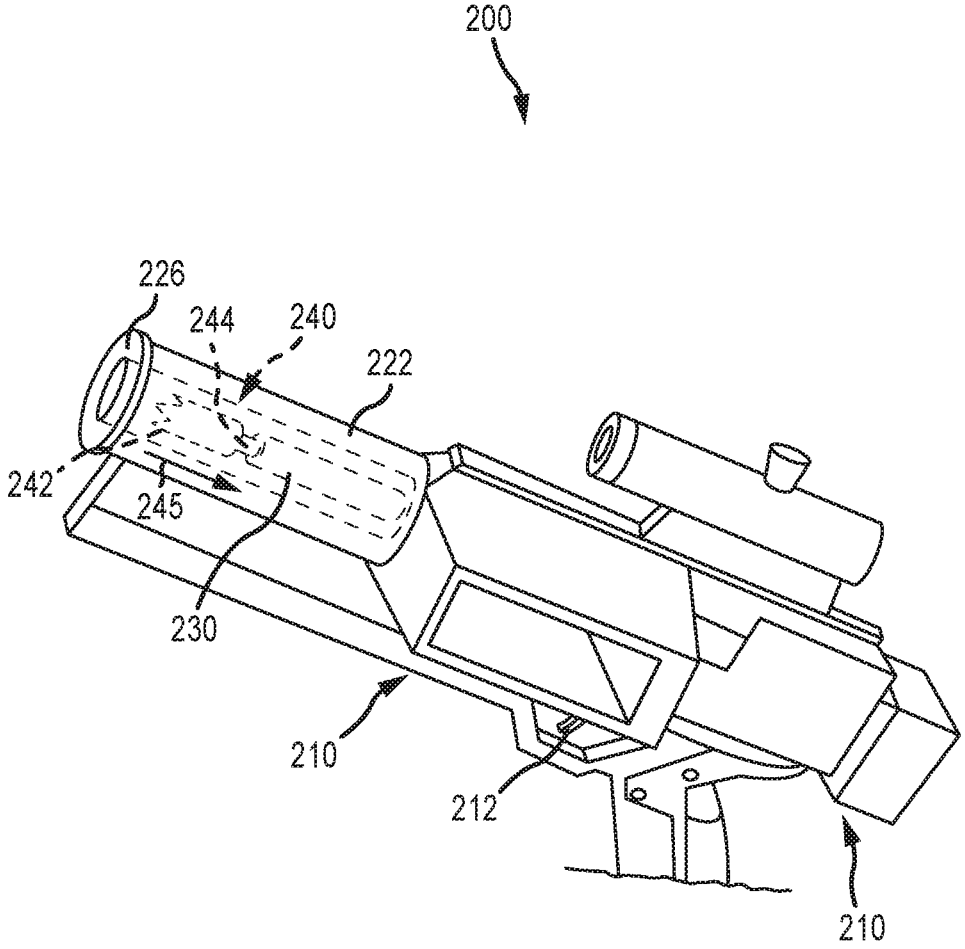


FIG.2B

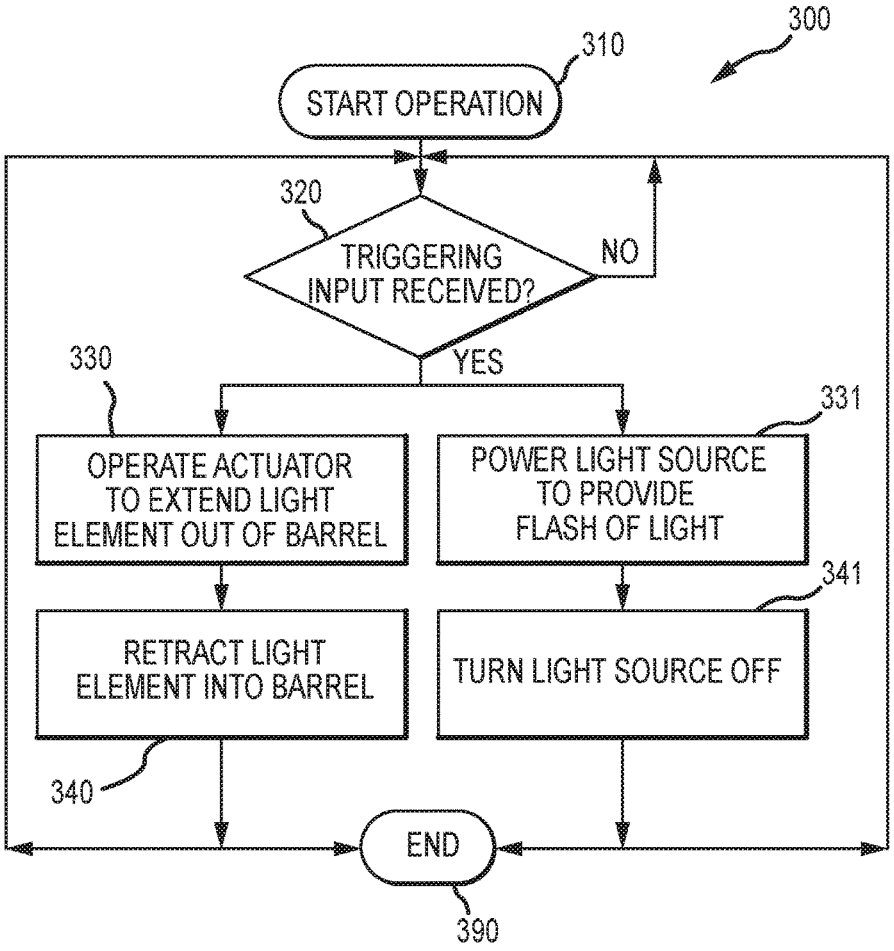

300
310
START OPERATION
320
TRIGGERING INPUT RECEIVED?
NO
YES
330
OPERATE ACTUATOR TO EXTEND LIGHT ELEMENT OUT OF BARREL
331
POWER LIGHT SOURCE TO PROVIDE FLASH OF LIGHT
341
RETRACT LIGHT ELEMENT INTO BARREL
TURN LIGHT SOURCE OFF
340
END
390

FIG.3

THEATRICAL PROP FOR PROVIDING REPEATABLE, DAYLIGHT-VIEWABLE MUZZLE FLASHES

BACKGROUND

1. Field of the Description

The present description relates, in general, to theatrical and other visual display props and special effect devices used to provide lighting in outdoor or daylight settings and, more particularly, to a special effect device (or "theatrical prop" or "theatrical prop lighting assembly" or the like) adapted to provide short-lived (e.g., milliseconds in duration) flashes of light (also called "muzzle flashes" herein) that are viewable in direct sunlight such as in an outdoor entertainment or theatrical venue or setting.

2. Relevant Background

In the entertainment industry, there are many settings or venues where it is desirable to provide entertainment in an outdoor setting or venue. For example, many cities have amphitheater and other facilities where theater groups present plays or bands provide concerts. In another example, theme parks may have outdoor worlds in which parades and shows may be provided to entertain each park's guests. An ongoing challenge in such outdoor entertainment venues or environments is how to achieve lighting-based special effects when these outdoor settings are used during daylight hours. Particularly, during the daytime, sunlight illuminates the actors, the sets, and any props, and it can be very difficult to replicate lighting effects that are easily achieved with conventional lighting systems in dark or light-controlled theatrical spaces.

One particular problem with providing daylight entertainment is how to provide bright flashes of light, and especially short-lived flashes, that can be observed and that can readily be repeated in a reliable and controllable manner. For example, there are many theatrical plays and shows where weapon-based battles or conflicts are recreated by actors for a crowd, and, in such settings, the actors may carry props that simulate historical weapons or guns, existing weapons, or even futuristic weapons. In each of these examples, it is desirable for a lighting-based effect to be used to provide the illusion that the theatrical prop has been fired by the actor or that a muzzle flash has occurred.

In some cases, the live theatrical performance is attempting to recreate a scene from a movie in which prop weapons are fired resulting in explosions and flashes (muzzle flashes) of volumetric light that comes out of the muzzle of the prop weapon with each firing. For a movie, this special effect is created post production with computer graphic imagery (CGI) or other tools. However, it has proven very difficult to provide a similar volumetric light flash effect for a character carrying a hand-held prop. Particularly, it has not been possible with conventional special effect devices to provide a prop that the actor or user can operate to choose when their prop weapon is fired and that provide a "wow" illusion for viewers even when used in an outdoor theatrical venue in direct sunlight as well as in darker settings or nighttime performances.

SUMMARY

Briefly, a special effects device (or theatrical prop or theatrical prop lighting assembly) is provided that includes a flash delivery assembly supported within or on a housing (or carrier). Specifically, the flash delivery assembly includes a barrel housing a flash or light element and a light positioning assembly or device that, in response to a trigger (e.g., a control signal from an on/off switch or triggering element), acts quickly (e.g., a number of milliseconds or a fraction of a second) to move the flash/light element from a retracted position within an interior space of the barrel to a position outside the barrel (e.g., an exposed position outside the muzzle of the barrel).

The flash/light element may include one or more light sources (such as one or more light emitting diodes (LEDs)) chosen to provide a very bright light (e.g., 2000 to 5000 lumens or more), and, after a very short extended duration (e.g., less than a second such as several milliseconds), the light positioning assembly acts to retract the light source back into the interior space of the barrel where it is hidden (and, typically, turned off so it stops emitting light). The flash/light element may also include a housing or enclosure to further the muzzle flash illusion such as an irregular shaped, hollow piece of translucent plastic or the like in which the light source (e.g., an LED) is positioned. In one prototype, the outer surfaces of the light source housing are shaped in the form of a group of flames (e.g., a rectangular base with a volumetric flamed or jagged peak top to enclose a light source(s)).

Operation of the special effects device or theatrical prop provides a light-based effect that provides the illusion that a physical thing or object is ejected or shot of the end of the barrel's muzzle and that a real explosion has occurred. The special effects device or theatrical prop can be controlled or triggered by the operator to "fire" or be shot off repeatedly without maintenance or "reloading" as may be required for a pyrotechnic-type device and without any possible danger as would be the case with pyrotechnics.

The special effects device or theatrical prop provides a significant improvement over past devices that used a light fixed at the end of a gun muzzle as this light is always present and visible to viewers especially in daylight settings. The prior techniques may have also been more complex as they added mist or fog. A problem with prior devices was that they never wholly looked real as nothing was actually traveling out of the muzzle. Another issues with prior devices using fog/mist is that they were not portable since a fog/water supply was required. Other devices used an actual but small pyrotechnic. These, however, had to be reloaded and typically only can be loaded or configured to have a finite number of shots and their use presents a number of safety concerns. In contrast, the new theatrical prop can be fired over and over again without any expendables or need for reloading. It also appears during its use to creatively look much more like a "real life CGI" effect, such that it is useful for recreating well-known and/or crowd-expected movie scenes. Some planned models of the theatrical prop can be used by human characters during a theatrical performance or may be put on animatronic or robotic creatures or figures for automated operations during displays or shows.

More particularly, an apparatus is provided for generating light-based special effects viewable in daylight and other brightly lit settings. The apparatus (or theatrical prop or special effects device) includes a barrel with opaque sidewalls defining an interior space accessible via a muzzle. The apparatus also includes a light element positionable within the interior space, the light element being operable to selectively output light and further includes a light positioning assembly. The apparatus further includes a trigger element operable to receive user input to initiate operations of

the light element and the light positioning assembly. A controller is provided that responds to the user input to operate the light positioning assembly to first move the light element at least partially out of the interior space through the muzzle and to second retract the light element back into the interior space. The controller concurrently operates the light element to generate the light when the light element is moved out of the interior space and to terminate the generating of the light when the light element is retracted back into the interior space.

The operations of the light positioning assembly are both performed very rapidly such less than 1 second (e.g., within milliseconds). To perform this rapid positioning, the light positioning assembly may include a pneumatic actuator (e.g., an air cylinder) operable to move the light element out of the interior space of the muzzle and a spring-based return element to retract the light element back into the interior space. In other cases, though, the light positioning assembly includes an electric actuator (or solenoid-based device) operable to move the light element out of the interior space of the muzzle and a return element (mechanical such as a spring or electrical) to retract the light element back into the interior space. In some cases, the light positioning assembly extends the light element out a distance of at least 2 inches (such as 4 or more inches) past the muzzle when the light element is moved out of the interior space of the barrel.

In some embodiments, the light element includes a 1000-Lumen or greater light source. For example, the light element is a white light emitting diode (LED) with a rating in the range of 1000 to 5000 Lumens. The light element further may include an enclosure housing the light source, and the enclosure may be a hollow, volumetric shape formed of plastic, glass, or ceramic to be transparent-to-translucent to light that may have a length exceeding a length of excursion of the light element from the muzzle (and, in some cases, a conical end that may simulate an explosion/muzzle flash with a plurality of flame shapes). In some cases, the interior space is defined by inner surfaces of the sidewalls of the barrel, the inner surfaces are colored black, and exterior surfaces of the transparent enclosure are painted or dyed with transparent paint or dye. In the same or other cases, a colored lens or gel is applied to one or more interior surfaces of the enclosure to color the light output by the light source.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a functional block diagram of a special effects device (or theatrical prop) showing its operations to move a light/flash element between a retracted/hidden position and an ejected/exposed position;

FIGS. **2**A and **2**B illustrate one prototype of the theatrical prop of the present description (e.g., an embodiment of the device of FIG. **1**) showing it during operations to provide the light-based special effect (e.g., a triggered explosion at the end of a barrel or a muzzle flash) and during operations after (or prior) completion of the light-based special effect (e.g., with the light/flash element retracted back into the barrel's interior space where it is hidden from view); and

FIG. **3** is a flow diagram of a method of operating a special effects device of the present description such as operation of the devices shown in FIGS. **1**-**2**B.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Briefly, a theatrical prop (also called a special effects device) is described that is operable to provide a visual effect that is visible even in daylight venues. The visual effect is a light-based effect that simulates an explosion or similar event that causes a bright flash of light. Particular embodiments of the theatrical prop provide this "explosion" or bright light flash is provided at the end of a barrel of a simulated weapon such as a historical gun or a futuristic gun (e.g., a laser blaster or the like). When operations of the theatrical prop is initiated or "triggered" by an operator (e.g., an actor in a theatrical production), a light or flash element is quickly moved (by a light positioning assembly) from a concealed location within the interior space of a barrel to an exposed location outside barrel by moving it quickly out the barrel's muzzle. A light source(s) is turned on (powered on)) while the light element is exposed (extended outward from the barrel's muzzle) to create the bright flash and also to provide the illusion that an object has traveled out of the barrel. Then, the light or flash element is retracted back into the barrel's interior space, and the light source(s) is turned off (powered off).

FIG. **1** is a functional block diagram of a special effects device (or theatrical prop) **100** showing its operations to move a light/flash element **140** between a retracted/hidden position and an ejected/exposed position to generate a bright flash of light ("explosion" of light) that is visible even in brightly lit venues (e.g., during daytime outdoor shows or displays). The special effects device **100** includes a carrier or stock **110** (or housing) for supporting a flash delivery assembly **120** and facilitating a user/operator (e.g., an actor in a show) to carry and use the special effects device **100** (e.g., to make the device **100** a hand-held prop or the like). The carrier/stock **110** may take nearly any form to practice the device **100** and may be designed to have the appearance of a simulated weapon for a particular theatrical show (e.g., appearance of a futuristic weapon from a particular movie or the like).

A user input device or trigger **112** is provided on the carrier **110** to allow a user/operator to initiate operations (to trigger) the special effects device **100** to provide the bright light flashing effect (e.g., to cause the prop weapon to "fire"). The user input device/trigger **112** is linked as shown at **113** to a controller **114**, which may take the form of relatively simple set of hardware/software, that generates control signals or trigger signals **115**. These signals **115** are used to operate one or more power sources **116** in the carrier **110** (or coupled with the carrier **110** or to the light positioning assembly **130** through the carrier **130** (such as with tubing, wiring, and the like)), which are shown to be linked to the light positioning assembly **130** and light source(s) **144** so as to power or trigger the operations of these two devices in a concurrent (or very closely timed sequential manner such as eject and fire the light source **142** or perform both concurrently). In some embodiments, the controller **114** triggers the light positioning assembly **130** and the light source **144** via relays, and both are triggered concurrently (On/Off together for same period of time such as when an air cylinder is supplied air an LED is On).

On (or in) the carrier **110**, a flash delivery assembly **120** is provided, and this assembly **120** includes a barrel **122** with an opening or muzzle **126** at one end that provides access to the interior space **124** within the barrel **122**. For example, the barrel **122** may be cylindrical in shape with a length and bore/inner diameter to create an interior space **124** large enough to contain all or portions of a light positioning assembly **130** and light/flash element **140**, and the shape and size of the barrel **122** may be chosen to replicate a movie or

story-based weapon's barrel. The barrel **122** is also formed so as to be opaque and hide the light/flash element **140** when it is retracted.

The light positioning assembly **130** is configured (or chosen if off-the-shelf) to be able to respond to a control/trigger signal **115** to very quickly (fraction of a second) move the light/flash element **140** from a first or retracted position within the interior space **124** of the barrel **122** to a second or extended position in which at least a portion of the light/flash element **140** is moved through the muzzle **126** and is extending a distance past the end of the barrel **122**. These "firing" operations can be seen in FIG. **1** with the light/flash element **140** in a retracted position at a first time, T_1 (before triggering by operations of the user input device/trigger **112**) and at a second time, T_2 (upon triggering) with the light/flash element **140** in an extended position outside the barrel **122**. The travel or excursion may vary, too, but some embodiments based on the size of the housing **142** and/or light source **144**, with some embodiments having an excursion in the range of 2 to 8 inches (with one prototype having a 3.5 to 4.5-inch excursion (e.g., extend 3 to 4 inches out and be recessed from the muzzle by 0.5 inches when retracted)). Although not shown, the controller **114** may also trigger corresponding sound effects during the "firing" operations such as with on-board Bluetooth/WiFi devices, with on-board speakers or off-board sound systems.

The light positioning assembly **130** may take a wide variety of forms to practice the device **100** as long as it is configured to provide the fast extension and retraction actions (within a fraction of a second so the human eye perceives movement out of the barrel **122** but does not perceive specific shape of the extended object or the retraction (in most cases)). In one example, the light positioning assembly **130** takes the form of a pneumatic device, and the power source **116** takes the form of pressurized (or compressed) air. For example, the assembly **130** may be a pneumatic cylinder with the light/flash element attached at the end of a rod at the end of this cylinder. A spring or other type of return may be used to automatically retract the rod into the cylinder upon removal of driving/powering air from power or driving source **116** (e.g., the positioning assembly **130** may include a pneumatic or air cylinder (or actuator) available from Bimba Manufacturing Company or the like). In other embodiments, an electric actuator may be used to allow the device **100** to be more portable (e.g., not require a compressed air source) with the power source **116** taking the form of a battery. Again, a spring or similar return may be used to retract the "fired" actuator **130** and return the light/flash element **140** to its retracted position where it is hidden from view within the interior space **124** of the barrel **122**.

The light/flash element **140** is shown to include a light source **144** positioned within a housing/enclosure **142**, which is coupled to the driving end of the actuator of the light positioning assembly **130**. The source **144** may take the form of an LED with high illumination capabilities such as 1000 to 5000 or more Lumens with one embodiment using a 5000-Lumen LED (e.g., from Cree or the like). The enclosure **142** may enclose this LED or include the LED box, and it further may include an extension or optical component that extends outward from the LED box to provide a volumetric aspect and to disperse the light from the source **144** during each flash. In some embodiments, the housing **142** is not rigid but is adapted to increase in form factor or volume as it passes through the muzzle **126** and to then be retracted to its original/hidden volume upon retraction of the light/flash element **140** within the barrel by the light positioning assembly **130**.

For example, the housing **142** may be formed of a transparent to translucent plastic (or glass or ceramic) that is shaped generally conical but often with an irregular surface such as a group of flames to further the illusion of an explosion or laser blast coming out of the muzzle **126** of the barrel **122**. In some embodiments, the exterior of the housing **142** is painted or covered with a transparent black paint (or dyed with a transparent black dye) so as to hide its existence from view when the light/flash element **140** including the housing **142** are retracted back into the interior space **124** of the barrel **122**. The interior space **124** (or inner walls of the barrel **122**) may also be black (or dark colored) to further hide its contents (hide the light/flash element **140** and housing **142**). The color of the light source **144** may vary, but some embodiments create desired effect of an explosion by using a white LED (as these are available in brighter rangers than colored LEDs) combined with a colored gel/lens inside the housing **142** (e.g., a red gel) to get color through the transparent black paint/dye on the outer surfaces of the housing **142**.

FIGS. **2**A and **2**B illustrate one prototype of the theatrical prop **200** of the present description (e.g., an embodiment of the device of FIG. **1**). The prop (or special effects device) **200** is shown in FIG. **2**A during operations to provide the light-based special effect, e.g., a triggered explosion at the end of a barrel or a muzzle flash, as seen at **260** and is shown in FIG. **2**B during operations after (or prior) completion of the light-based special effect, with the light/flash element **240** retracted back into the barrel's interior space where it is hidden from view.

As shown in FIGS. **2**A and **2**B, the prop **200** includes a carrier or stock **210** from which a user input or trigger element **212** is accessible (e.g., at a lower portion of the carrier **210** or any other exposed surface of the carrier **210**) to an operator or user of the prop **200** (e.g., an actor in a show may carry the prop **200** and, when the light-based effect or muzzle flash is desired, pull the trigger **212**). The prop **200** also includes a barrel **222** that is coupled with or supported upon/by the carrier/stock **210**, and the barrel **222** includes an interior space (e.g., a cylinder) not shown in FIG. **2**A that opens up at one end with a muzzle **226** of the barrel **222**.

FIG. **2**A shows the prop **200** when its light-based effects **260** have been triggered via operation of the trigger/user input element **212**. A controller/relay inside the carrier **210** operates (as discussed with reference to FIG. **1** and prop **100**) to trigger or initiate concurrent operations of the flash delivery assembly and to power on a light source(s) to provide a flash of light as the light element is moved out of the barrel **222**. This can be seen with the prop **200** as the light element **240** has been extend out or ejected from the interior space of the barrel **222** via the muzzle **226** with this outward movement shown with arrow **241**.

In this example, the flash delivery assembly has moved **241** the light element **240** physically out of the barrel **222** an excursion distance or length, d_E, such as 1 to 6 inches or more with 2 to 4.5 inches being useful in some cases (with one prototype having a 4-inch excursion). Correspondingly, the enclosure or housing **242** of the light element **240** has a length matching or exceeding the excursion distance, d_E, such that all of the light element enclosure **242** is moved out of the barrel **222** or a portion is retained within the interior space of the barrel **222** when the light element **240** is moved **241** out of the barrel **222**. The enclosure **242** is shown to have a rectangular base portion that is attached to the flash

delivery assembly and has outer dimensions less than the bore of the interior space of the barrel **222**, and this base portion houses the light source **244** (e.g., the base portion may be provided as an LED box or the like). The outer-most portion of the enclosure **242** may be configured to further the volumetric effect and/or appearance of the light element **240** during its extension/ejection from the barrel **222**, and it may be generally conical in shape (with the cone tip distal from the barrel **222** when the element **240** is ejected/extended **241**) with the specific embodiment being a plurality of 3D flames to further the illusion of an explosion or muzzle flash coming out of the muzzle **226** of the barrel **222**.

As shown, the light source **244** is housed within the transparent-to-translucent enclosure **242**. The light source **244** is "on" or has powered from a battery or other power source provided to it during the ejection/extension **241** such that it emits light that hits the interior surfaces of the housing **242** and passes through the enclosures sidewalls to provide the "ball" or cylindrical-shaped column of bright light (e.g., "bright" as the source **244** may be a 1000 to 5000-Lumen or brighter LED in some preferred embodiments). The source **244** may be colored to provide the light **260** as colored light or the coloring may come from a lens within or on the enclosure **240** and/or a coloring medium (such as a red or other colored gel provided on the interior spaces of the enclosure **242** such as within the outer, conical shaped tip portion of the enclosure **242**).

FIG. **2**B shows that the light source **244** and the light positioning assembly **230** (e.g., a pneumatic actuator or air cylinder in this example) are operated concurrently after the flash effect is completed to hide the light element **240** within the barrel **222**. To this end, the light positioning assembly **230** typically is deactivated (e.g., supply of compressed air when the assembly **230** includes an air cylinder, supply of electricity when the assembly **230** utilizes an electric actuator/solenoid, and the like) and a return device such as a spring-based component acts to automatically retract **245** the light element **240** back into the interior space of the barrel **222**. The light source **244** is turned "off" or has its electric power source switched to terminate electricity flow to the source **244** such that it stops emitting light as it is retracted **245** (and when it is positioned within the barrel **222** until it is again ejected from the barrel **222**).

To hide the presence of the light element **240** in the barrel **222**, the retraction **245** typically is configured to move the outer end/tip of the enclosure **242** past the muzzle **226** (e.g., 0.25 to 1 inch within the barrel's interior space). Further, the inner walls defining the interior space of the barrel **222** may be darkly colored (e.g., painted black or another color), and the exterior surfaces of the enclosure **242** may also be painted or dyed a dark color (e.g., paint or dye the exterior surfaces of at least the outer end/tip of the enclosure with transparent black paint or dye).

FIG. **3** illustrates one method **300** of operating a special effects device (such as devices **100** and **200**) of the present description to provide a muzzle flash-type effect that is viewable even in brightly lit settings such as during a daytime, outdoor (sunlit) venue. The method **300** starts at **310** such as with providing an actor (or actors) of a show with a special effects device or theatrical prop as taught herein. At **320**, the method **300** continues with determining whether or not a triggering input has been received (e.g., has the trigger been pulled/activated or a user input element been operated?). If not, the method **300** continues at **320** with waiting for a triggering activity/action.

If a triggering input is detected/received at **320**, the method **300** continues concurrently with performance of steps **330** and **331**. In step **330**, the method **300** includes operating the actuator (or light positioning assembly **130** such as an air cylinder or electric solenoid) to extend the light element (or a portion of the light element) out of the barrel of the special effects device (e.g., extend a light source enclosure out 2 to 6 inches or more from the muzzle of the barrel). In step **331**, the light source is powered or switched on to cause it to provide a bright flash of light (in and out of the end of the barrel or at and just past the muzzle of the barrel).

Next, the method **300** involves performing steps **340** and **341** concurrently (or at least partially concurrently as the retraction may take longer than the powering off of the light source). In step **340**, the actuator/light positioning assembly operates to retract the light element into the interior space of the barrel (e.g., a predefined distance past the muzzle). In step **341**, the light source is powered or switched off so that the light source no longer emits or generates light while it is positioned within the barrel's interior space. The method **300** may then continue at **320** with waiting for a next triggering action/input or may end at **390**.

Although the invention has been described and illustrated with a certain degree of particularity, it is understood that the present disclosure has been made only by way of example, and that numerous changes in the combination and arrangement of parts can be resorted to by those skilled in the art without departing from the spirit and scope of the invention, as hereinafter claimed.

I claim:

1. An apparatus for generating light-based special effects viewable in daylight and other brightly lit settings, comprising:

a barrel with opaque sidewalls defining an interior space accessible via a muzzle;

a light element positionable within the interior space, the light element being operable to selectively output light;

a light positioning assembly;

a trigger element operable to receive user input to initiate operations of the light element and the light positioning assembly; and

a controller responding to the user input to operate the light positioning assembly to first move the light element at least partially out of the interior space through the muzzle and to second retract the light element back into the interior space, wherein the controller concurrently operates the light element to generate the light when the light element is moved out of the interior space and to terminate the generating of the light when the light element is retracted back into the interior space.

2. The apparatus of claim **1**, wherein the operations of the light positioning assembly are both performed in less than 1 second.

3. The apparatus of claim **1**, wherein the light positioning assembly comprises a pneumatic actuator operable to move the light element out of the interior space of the muzzle and a spring-based return element to retract the light element back into the interior space.

4. The apparatus of claim **1**, wherein the light positioning assembly comprises an electric actuator operable to move the light element out of the interior space of the muzzle and a return element to retract the light element back into the interior space.

5. The apparatus of claim **1**, wherein the light positioning assembly extends the light element out a distance of at least 2 inches past the muzzle when the light element is moved out of the interior space of the barrel.

6. The apparatus of claim 1, wherein the light element comprises a 1000-Lumen or greater light source.

7. The apparatus of claim 6, wherein the light element comprises a white light emitting diode (LED) with a rating in the range of 1000 to 5000 Lumens.

8. The apparatus of claim 6, wherein the light element further comprises an enclosure housing the light source and wherein the enclosure is transparent-to-translucent to light and has a length exceeding a length of excursion of the light element from the muzzle.

9. The apparatus of claim 8, wherein the interior space is defined by inner surfaces of the sidewalls of the barrel, wherein the inner surfaces are colored black, and wherein exterior surfaces of the enclosure are painted or dyed with transparent black paint or dye.

10. The apparatus of claim 8, wherein a colored lens or gel is applied to one or more interior surfaces of the enclosure to color the light output by the light source.

11. An apparatus for providing flashes of light in a repeatable manner, comprising:

a barrel with an interior space accessible through an open end of the barrel;

a light element positioned in the interior space, the light element comprising a light source and an enclosure housing the light source;

an actuator attached to a first end of the enclosure operable for moving the enclosure between a first position wholly within the interior space and a second position with at least a second end opposite the first end a distance from the open end of the barrel; and

a controller operating the actuator to move the light element from the first position to the second position and back to the first position,

wherein the controller concurrently operates the light source to generate light when the enclosure is moved to the second position and to halt generation of the light when the enclosure is moved to the first position, and

wherein the actuator moves the enclosure from the first position to the second position and back to the first position in less than one second.

12. The apparatus of claim 11, wherein the actuator comprises a pneumatic actuator or electric actuator operable to move the enclosure out of the interior space through the open end of the barrel and a spring-based return element to retract the enclosure from the second position to the first position.

13. The apparatus of claim 11, wherein the enclosure travels through an excursion length in the range of 2 to 6 inches when moved from the first position to the second position.

14. The apparatus of claim 11, wherein the light element comprises a 1000-Lumen or greater light source.

15. The apparatus of claim 14, wherein the light element comprises a white light emitting diode (LED) with a rating in the range of 1000 to 5000 Lumens.

16. The apparatus of claim 11, wherein the enclosure is transparent-to-translucent to light and wherein exterior surfaces of the enclosure are painted or dyed with transparent black paint or dye.

17. The apparatus of claim 16, wherein a colored lens or gel is applied to one or more interior surfaces of the enclosure to color the light output by the light source.

18. An apparatus for generating light-based special effects viewable in daylight and other brightly lit settings, comprising:

a barrel with sidewalls defining an interior space accessible via a muzzle;

a light element positionable within the interior space;

a light positioning assembly; and

a controller responding to user input to operate the light positioning assembly to first move the light element at least partially out of the interior space through the muzzle and to second retract the light element back into the interior space,

wherein the controller concurrently operates the light element to generate the light when the light element is moved out of the interior space and to terminate the generating of the light when the light element is retracted back into the interior space,

wherein the light element comprises light emitting diode (LED) with a rating in the range of 1000 to 5000 Lumens,

wherein the light element further comprises an enclosure housing the light source, and

wherein exterior surfaces of the enclosure are painted or dyed with transparent black paint or dye.

19. The apparatus of claim 18, wherein the LED is a white LED with a rating in the range of 1000 to 5000 Lumens and wherein a colored lens or gel is applied to one or more interior surfaces of the enclosure to color the light output by the light source.

20. The apparatus of claim 18, wherein the operations of the light positioning assembly are both performed in less than 1 second and wherein the light positioning assembly comprises a pneumatic or electric actuator operable to move the light element out of the interior space of the muzzle and a spring-based return element to retract the light element back into the interior space.

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