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(54) Title: REPLICA GAS-POWERED FIREARM AND A SYSTEM INCORPORATING THE SAME

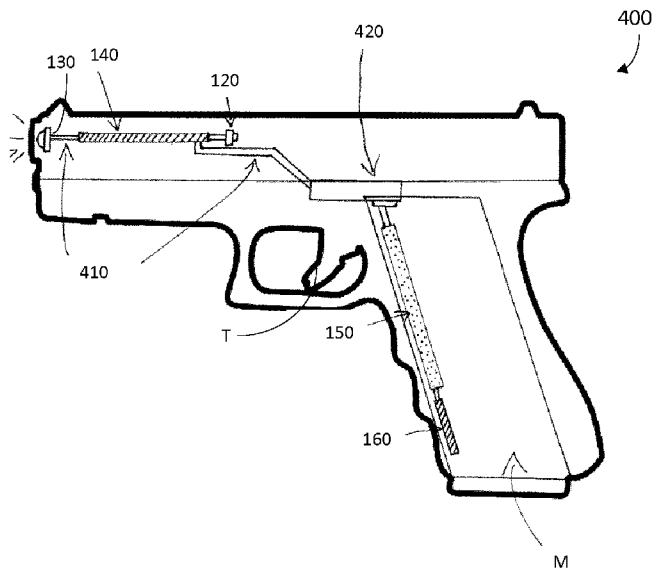


FIG. 4

(57) Abstract: A replica gas-powered firearm comprises a trigger button positioned to be actuated in response to trigger pull; at least one light emitting diode positioned within a barrel of the replica gas-powered firearm; a controller circuit coupled to the trigger button and the at least one light emitting diode and configured to receive a signal from the trigger button indicating trigger pull; and in response to receiving the signal from the trigger button indicating trigger pull, communicate a signal to cause the at least one light emitting diode to emit light.



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## **REPLICA GAS-POWERED FIREARM AND A SYSTEM INCORPORATING THE SAME**

### **CROSS-REFERENCE TO RELATED APPLICATIONS**

**[0001]** This application claims priority to U.S. Provisional Application No. 63/607,867, filed December 8, 2023, the entire contents of which are incorporated herein by reference.

### **TECHNICAL FIELD**

**[0002]** The present application relates to a replica gas-powered firearm and a system incorporating the same.

### **BACKGROUND**

**[0003]** Replica firearms are often used in the film industry. At least some of these replica firearms are capable of firing a projectile and this can put actors and film crew at risk.

**[0004]** Further, the amount of video and sound processing required to time special effects in response to the firing of the replica firearm is laboursome and inaccurate.

### **BRIEF DESCRIPTION OF THE DRAWINGS**

**[0005]** Embodiments are described in detail below, with reference to the following drawings:

**[0006]** FIG. 1 is a high-level schematic diagram illustrating components of a replica gas-powered firearm of an example embodiment;

**[0007]** FIG. 2 is a schematic diagram of an example replica gas-powered firearm of an example embodiment;

**[0008]** FIG. 3 is a schematic diagram of another example replica gas-powered firearm of an example embodiment;

**[0009]** FIG. 4 is a schematic diagram of yet another example replica gas-powered firearm of an example embodiment;

**[0010]** FIG. 5 is a schematic diagram of still yet another example replica gas-powered firearm of an example embodiment;

**[0011]** FIG. 6 is a schematic diagram of another example replica gas-powered firearm of an example embodiment; and

**[0012]** FIG. 7 is a high-level schematic diagram illustrating a system incorporating a replica gas-powered firearm.

**[0013]** Like reference numerals are used in the drawings to denote like elements and features.

#### DETAILED DESCRIPTION OF VARIOUS EMBODIMENTS

**[0014]** Accordingly, in one aspect there is provided a replica gas-powered firearm comprising a trigger button positioned to be actuated in response to trigger pull; at least one light emitting diode positioned within a barrel of the replica gas-powered firearm; a controller circuit coupled to the trigger button and the at least one light emitting diode and configured to receive a signal from the trigger button indicating trigger pull, and in response to receiving the signal from the trigger button indicating trigger pull, communicate a signal to cause the at least one light emitting diode to emit light.

**[0015]** In one or more embodiments, the controller circuit is configured to communicate via wireless communication.

**[0016]** In one or more embodiments, in response to receiving the signal from the trigger button indicating trigger pull, the controller circuit is configured to transmit a wireless signal indicating trigger pull.

**[0017]** In one or more embodiments, the wireless communication includes Bluetooth communication.

**[0018]** In one or more embodiments, the trigger button includes a mechanical trigger button that is actuated mechanically in response to trigger pull.

**[0019]** In one or more embodiments, the mechanical trigger button is positioned external of the replica gas-powered firearm adjacent to a trigger thereof such that the trigger mechanically actuates the mechanical trigger button in response to trigger pull.

**[0020]** In one or more embodiments, the mechanical trigger button is positioned internally within the replica gas-powered firearm such that the trigger mechanically actuates the mechanical trigger button in response to trigger pull.

**[0021]** In one or more embodiments, the mechanical trigger button is positioned internally within a gas magazine such that air pressure within the gas magazine actuates the mechanical trigger button in response to trigger pull.

**[0022]** In one or more embodiments, the controller circuit is positioned internally within a removable gas magazine.

**[0023]** In one or more embodiments, the removable gas magazine includes a first electrical connector coupled to the controller circuit and the replica gas-powered firearm includes a second electrical connector that is complementary to the first electrical connector and is coupled to the at least one light emitting diode, the first electrical connector mating with the second electrical connector when the removable gas magazine is within the replica gas-powered firearm to couple the controller circuit to the at least one light emitting diode.

**[0024]** In one or more embodiments, the trigger button includes a gas pressure trigger button that is actuated by air pressure expelled within the replica gas-powered firearm in response to trigger pull.

**[0025]** In one or more embodiments, the gas pressure trigger button is positioned within the barrel of the replica gas-powered firearm.

**[0026]** In one or more embodiments, the at least one light emitting diode includes a first light emitting diode positioned within the barrel of the replica gas-powered firearm emitting light in a direction of fire of the replica gas-powered firearm and a second light emitting diode positioned on an exterior of the replica gas-powered firearm emitting light in an opposite direction of fire of the replica gas-powered firearm and towards an operator of the replica gas-powered firearm.

**[0027]** In one or more embodiments, the controller circuit includes a controller and a power source providing power to the controller circuit.

**[0028]** In one or more embodiments, the replica gas-powered firearm includes one of a replica gas-powered pistol or a replica gas-powered rifle.

**[0029]** According to another aspect there is provided a replica gas-powered firearm comprising a gas pressure trigger button positioned inside a barrel of the replica gas-powered firearm that is actuated by air pressure expelled within the replica gas-powered firearm in response to trigger pull; at least one light emitting diode that includes a first light emitting diode positioned within the barrel of the replica gas-powered firearm emitting light in a direction of fire of the replica gas-powered firearm and a second light emitting diode positioned on an exterior of the replica gas-powered firearm emitting light in an opposite direction of fire of the replica gas-powered firearm and towards an operator of the replica gas-powered firearm; a controller circuit coupled to the trigger button and the at least one light emitting diode and configured to receive a signal from the trigger button indicating trigger pull; and in response to receiving the signal from the trigger button indicating trigger pull, communicate a signal to cause the at least one light emitting diode to emit light.

**[0030]** According to another aspect there is provided a system comprising a replica gas-powered firearm comprising a trigger button positioned to be actuated in response to trigger pull;

a controller circuit coupled to the trigger button and configured to receive a signal from the trigger button indicating trigger pull; and in response to receiving the signal from the trigger button indicating trigger pull, communicate a wireless signal indicating trigger pull; and at least one wireless receiver paired to the controller circuit to receive the wireless signal indicating trigger pull.

**[0031]** In one or more embodiments, the at least one wireless receiver generates a signal in response to receiving the wireless signal indicating trigger pull and communicates the signal to at least one device to cause the at least one device to perform an action.

**[0032]** In one or more embodiments, the at least one device includes at least one squib.

**[0033]** Gas-powered firearms such as for example airsoft guns use compressed air or gas to propel projectiles such as for example ball bearings (BBs) or pellets at a high velocity. Generally, the projectiles are loaded into a magazine or hopper and travel down the barrel and out of the gun's muzzle when the gun is fired. Oftentimes, these gas-powered firearms use propane or green gas as the propellant.

**[0034]** One type of gas-powered firearm is a gas blowback firearm. In this type of gas-powered firearm, when the trigger is pulled, gas is released, propelling the projectile. Simultaneously, a portion of the gas is redirected to simulate the recoil of a real firearm. The slide or bolt moves back, and a new projectile is chambered.

**[0035]** These gas-powered firearms are dangerous as the projectiles are expelled at a high velocity which can result in injury or even death.

**[0036]** In embodiments described herein, a replica gas-powered firearm is described. The replica gas-powered firearm may include components that may be retrofit into the gas-powered firearms described above, such as for example an airsoft gun. As will be described in more detail, the components used to retrofit the gas-powered firearm may render the gas-powered firearm incapable of firing a projectile and as such may increase the overall safety of the replica gas-powered firearm.

**[0037]** FIG. 1 is a high-level schematic diagram illustrating components of the replica gas-powered firearm 100. As can be seen, the components include a controller circuit 110, a trigger button 120, and at least one light emitting diode (LED) 130.

**[0038]** The controller circuit 110 includes at least a controller 140 and a power source 150. The controller 140 may include a microcontroller such as for example an ESP32-C3 microcontroller. The controller 140 may include wireless communication such as for example communication via Wi-Fi and/or Bluetooth. The controller 140 may be programmed using program code that may define the functionality and behavior of the controller circuit 110. For example, the program code may cause the controller 140 to control a state of the at least one LED 130 based on specific conditions such as for example in response to actuation of the trigger button 120. As another example, the program code may cause the controller 140 to emit a wireless signal such as for example a Bluetooth signal in response to actuation of the trigger button 120.

**[0039]** The power source 150 may include one or more batteries. The one or more batteries may include a rechargeable battery such as for example a Lithium Polymer (LiPo) battery. The power source 150 is connected to and provides power to the controller 140 and may additionally provide power to the other components as required.

**[0040]** The trigger button 120 may include a mechanical trigger button or gas pressure trigger button. In embodiments where the trigger button 120 includes a mechanical trigger button, the trigger button may be pushed or actuated mechanically via contact with a physical object and this may be in response to trigger pull. In embodiments where the trigger button 120 includes a gas pressure trigger button, the trigger button may be pushed or actuated via to gas pressure and this may be in response to trigger pull. The trigger button 120 may be connected to a General Purpose Input/Output (GPIO) pin of the controller 140 and may communicate a signal to the controller 140 indicating actuation thereof.

**[0041]** The at least one LED 130 is configured to emit light when an electric current passes through it. The at least one LED 130 may be connected to a GPIO pin of the controller 140. The controller 140 may be programmed to turn the at least one LED 130 ON or OFF. For example,



when the GPIO pin is set to a logic high level, the at least one LED 130 is turned ON. Specifically, when the GPIO pin is set to the logic high level, current flows through the at least one LED 130 causing it to illuminate or emit light. When the GPIO pin is set to a logic low level, the at least one LED 130 is turned OFF.

**[0042]** The components may be installed or located within a gas-powered firearm and this may render the gas-powered firearm into a replica gas-powered firearm. Specifically, the trigger button 120 may be positioned to be actuated in response to trigger pull. The at least one LED 130 may be positioned within a barrel of the replica gas-powered firearm. The controller circuit 110 may be positioned within the replica gas-powered firearm and may be coupled or connected to the trigger button 120 and the at least one LED 130.

**[0043]** During operation, in response to trigger pull, the trigger button 120 may communicate a signal to the controller circuit 110, or more specifically, to the controller 140. The controller circuit 110 may receive the signal and in response, may communicate a signal to cause the at least one LED 130 to emit light. Put another way, in response to receiving the signal from the trigger button 120 indicating trigger pull, the controller 140 may be programmed to set the GPIO pin connected to the at least one LED 130 to switch to a logic high level, turning the at least one LED 130 ON. In this manner, the at least one LED 130 may be illuminated automatically to indicate trigger pull.

**[0044]** Further, in one or more embodiments, in response to receiving the signal from the trigger button 120 indicating trigger pull, the controller 140 may be programmed to emit a Bluetooth signal. In this manner, the Bluetooth signal may be emitted to indicate trigger pull.

**[0045]** It will be appreciated that additional components may be included. For example, in one or more embodiments an additional circuit board may be provided that may be used to charge the power source 150. The additional circuit board may be used in embodiments where the power source 150 is installed on a removable component such as for example a gas magazine and the controller 140 is installed within the replica gas-powered firearm.

**[0046]** As mentioned, the components of the replica gas-powered firearm may be retrofit into a gas-powered firearm. Turning to FIG. 2, a schematic diagram of an example replica gas-powered firearm 200 is shown. The replica gas-powered firearm 200 is a gas blowback firearm which, as can be seen, is in the form of a pistol.

**[0047]** In this example, the controller 140 and the power source 150 are positioned on magazine M of the replica gas-powered firearm 200. The magazine M may include a magazine to store compressed gas. At least a portion of the magazine M may have been used to store projectiles however in this example the controller 140 and the power source 150 are positioned to eliminate the portion of the magazine M used to store projectiles and this may contribute to rendering the replica gas-powered firearm 200 as being incapable of firing projectiles.

**[0048]** The trigger button 120 is in the form of a mechanical trigger button. The trigger button 120 is positioned external of the replica gas-powered firearm 200 adjacent to a trigger T thereof such that the trigger T mechanically actuates the mechanical trigger button in response to trigger pull.

**[0049]** The at least one LED 130 is positioned within a barrel or muzzle of the replica gas-powered firearm 200. The at least one LED 130 is positioned to illuminate or emit light out of the barrel such that it is visible. In this example, the at least one LED 130 is connected to the controller 140 via wiring 210.

**[0050]** During operation, a user may pull the trigger T and in response, gas may be released from the gas chamber. A portion of the gas that is released is redirected to simulate the recoil of a real firearm causing the slide or bolt to move back. Also in response to trigger pull, the trigger may actuate the trigger button 120. In response, the trigger button 120 may communicate a signal to the controller 140 of the controller circuit. The controller 140 may receive the signal and in response, may communicate a signal to cause the at least one LED 130 to emit light and this may be done in manners similar to that described herein with reference to FIG. 1. Although gas is released to simulate the recoil of a real firearm, it will be appreciated that no projectiles are fired out of the replica gas-powered firearm and as such safety risks are reduced.

**[0051]** It will be appreciated that, in response to receiving the signal from the trigger button 120 indicating trigger pull, the controller 140 may additionally or alternatively emit a wireless or Bluetooth signal to indicate trigger pull.

**[0052]** Turning to FIG. 3, a schematic diagram of another example replica gas-powered firearm 300 is shown. The replica gas-powered firearm 300 is a gas blowback firearm which, as can be seen, is in the form of a pistol.

**[0053]** In this example, the controller 140 and the power source 150 are positioned on magazine M of the replica gas-powered firearm 300. The magazine M may include a magazine to store compressed gas. At least a portion of the magazine M may have been used to store projectiles however in this example the controller 140 and the power source 150 are positioned to eliminate the portion of the magazine M used to store projectiles and this may contribute to rendering the replica gas-powered firearm 300 as being incapable of firing projectiles.

**[0054]** The trigger button 120 is in the form of a mechanical trigger button. The trigger button 120 is positioned internally within the replica gas-powered firearm 300 such that the trigger T mechanically actuates the mechanical trigger button in response to trigger pull.

**[0055]** The at least one LED 130 is positioned within a barrel or muzzle of the replica gas-powered firearm 300. The at least one LED 130 is positioned to illuminate or emit light out of the barrel such that it is visible.

**[0056]** In this example, the magazine M of the replica gas-powered firearm 300 may be removable and as such the gas-powered firearm 300 includes wiring 310 and an electrical connector 320. The electrical connector 320 is connected to the at least one LED 130 via the wiring 310. The electrical connector 320 includes a female component positioned within the gas-powered firearm 300 and a male component positioned on the removable magazine M. The female component connects or mates with the male component when the magazine M is positioned within the replica gas-powered firearm 300. The wiring 310 and the electrical connector 320 electrically

connect the controller 140 and the power source 150 to the at least one LED 130 when the magazine M is positioned within the replica gas-powered firearm 300.

**[0057]** During operation, the magazine M is positioned within the replica gas-powered firearm 300 and as such an electrical connection is established between the at least one LED 130 and the controller 140 and the power source 150. A user may pull the trigger T and in response, gas may be released from the gas chamber. A portion of the gas that is released is redirected to simulate the recoil of a real firearm causing the slide or bolt to move back. Also in response to trigger pull, the trigger may actuate the trigger button 120. In response, the trigger button 120 may communicate a signal to the controller 140 of the controller circuit. The controller 140 may receive the signal and in response, may communicate a signal to cause the at least one LED 130 to emit light and this may be done in manners similar to that described herein with reference to FIG. 1. Although gas is released to simulate the recoil of a real firearm, it will be appreciated that no projectiles are fired out of the replica gas-powered firearm and as such safety risks are reduced.

**[0058]** It will be appreciated that, in response to receiving the signal from the trigger button 120 indicating trigger pull, the controller 140 may additionally or alternatively emit a wireless or Bluetooth signal to indicate trigger pull.

**[0059]** Turning to FIG. 4, a schematic diagram of yet another example replica gas-powered firearm 400 is shown. The replica gas-powered firearm 400 is a gas blowback firearm which, as can be seen, is in the form of a pistol.

**[0060]** In this example, the controller 140 is positioned within the barrel of the replica gas-powered firearm 400 and the power source 150 is positioned on the magazine M of the replica gas-powered firearm 400. The magazine M may include a magazine to store compressed gas. At least a portion of the magazine M may have been used to store projectiles however in this example the power source 150 is positioned to eliminate the portion of the magazine M used to store projectiles and this may contribute to rendering the replica gas-powered firearm 400 as being incapable of firing projectiles.

**[0061]** As mentioned, in one or more embodiments an additional circuit board may be used in embodiments where the power source 150 is installed on a removable component such as for example a gas magazine and the controller 140 is installed within the replica gas-powered firearm. As such, an additional circuit board 160 is positioned on the magazine M of the replica gas-powered firearm 400 adjacent to the power source 150.

**[0062]** The trigger button 120 is in the form of a gas pressure trigger button. The trigger button 120 is positioned internally within the replica gas-powered firearm 400 such that the trigger T actuates in response to air or gas pressure expelled within the replica gas-powered firearm 400 in response to trigger pull.

**[0063]** The at least one LED 130 is positioned within a barrel or muzzle of the replica gas-powered firearm 400. The at least one LED 130 is positioned to illuminate or emit light out of the barrel such that it is visible.

**[0064]** In this example, the magazine M of the replica gas-powered firearm 400 may be removable and as such the replica gas-powered firearm 400 includes wiring 410 and an electrical connector 420. The electrical connector 420 is connected to the controller 140 via the wiring 410. The electrical connector 420 includes a female component positioned within the gas-powered firearm 400 and a male component positioned on the removable magazine M. The female component connects or mates with the male component when the magazine M is positioned within the replica gas-powered firearm 400. The wiring 410 and the electrical connector 420 electrically connect the power source 150 to controller 140 and the at least one LED 130 when the magazine M is positioned within the replica gas-powered firearm 400.

**[0065]** During operation, the magazine M is positioned within the replica gas-powered firearm 400 and as such an electrical connection is established between the power source 150 and the controller 140 and the at least one LED 130. A user may pull the trigger T and in response, gas may be released from the gas chamber. A portion of the gas that is released is redirected to simulate the recoil of a real firearm causing the slide or bolt to move back. The air or gas pressure released from the gas chamber actuates the trigger button 120. In response, the trigger button 120 may

communicate a signal to the controller 140 of the controller circuit. The controller 140 may receive the signal and in response, may communicate a signal to cause the at least one LED 130 to emit light and this may be done in manners similar to that described herein with reference to FIG. 1. Although gas is released to simulate the recoil of a real firearm, it will be appreciated that no projectiles are fired out of the replica gas-powered firearm and as such safety risks are reduced.

**[0066]** It will be appreciated that, in response to receiving the signal from the trigger button 120 indicating trigger pull, the controller 140 may additionally or alternatively emit a wireless or Bluetooth signal to indicate trigger pull.

**[0067]** Turning to FIG. 5, a schematic diagram of still yet another example replica gas-powered firearm 500 is shown. The replica gas-powered firearm 500 is a gas blowback firearm which, as can be seen, is in the form of a rifle.

**[0068]** In this example, the controller 140 and the power source 150 are positioned within a pistol grip P of the replica gas-powered firearm 500.

**[0069]** The trigger button 120 is in the form of a mechanical trigger button. The trigger button 120 is positioned external of the replica gas-powered firearm 500 adjacent to a trigger T thereof such that the trigger T mechanically actuates the mechanical trigger button in response to trigger pull.

**[0070]** The at least one LED 130 includes two LEDs. A first LED 130a is positioned within a barrel or muzzle of the replica gas-powered firearm 500. The first LED 130a is positioned to illuminate or emit light out of the barrel such that it is visible. A second LED 130b is positioned on an exterior of the replica gas-powered firearm 500. The second LED 130b is positioned to illuminate or emit light in an opposite direction of fire of the replica gas-powered firearm 500 and towards an operator of the replica gas-powered firearm 500. In this example, the first LED 130a and the second LED 130b are connected to the controller 140 via wiring 510.

**[0071]** During operation, a user may pull the trigger T and in response, gas may be released from the gas chamber. A portion of the gas that is released is redirected to simulate the recoil of a

real firearm causing the slide or bolt to move back. Also in response to trigger pull, the trigger may actuate the trigger button 120. In response, the trigger button 120 may communicate a signal to the controller 140 of the controller circuit. The controller 140 may receive the signal and in response, may communicate a signal to cause the first LED 130a and the second LED 130b to simultaneously emit light and this may be done in manners similar to that described herein with reference to FIG. 1. Although gas is released to simulate the recoil of a real firearm, it will be appreciated that no projectiles are fired out of the replica gas-powered firearm and as such safety risks are reduced.

**[0072]** It will be appreciated that, in response to receiving the signal from the trigger button 120 indicating trigger pull, the controller 140 may additionally or alternatively emit a wireless or Bluetooth signal to indicate trigger pull.

**[0073]** Turning to FIG. 6, a schematic diagram of another example replica gas-powered firearm 600 is shown. The replica gas-powered firearm 600 is a gas blowback firearm which, as can be seen, is in the form of a rifle.

**[0074]** In this example, the controller 140 and the power source 150 are positioned within a barrel of the replica gas-powered firearm 600.

**[0075]** The trigger button 120 is in the form of a gas pressure trigger button. The trigger button 120 is positioned internally within the replica gas-powered firearm 600 such that the trigger button 120 actuates in response to air or gas pressure expelled within the replica gas-powered firearm 600 in response to trigger pull.

**[0076]** It will be appreciated that the trigger button 120 may alternatively be in the form of a mechanical trigger button. For example, since the replica gas-powered firearm 600 is in the form of a rifle, the air or gas pressure expelled within the replica gas-powered firearm 600 may be enough to actuate a mechanical trigger button.

**[0077]** The at least one LED 130 includes two LEDs. A first LED 130a is positioned within a barrel or muzzle of the replica gas-powered firearm 600. The first LED 130a is positioned to

illuminate or emit light out of the barrel such that it is visible. A second LED 130b is positioned on an exterior of the replica gas-powered firearm 600. The second LED 130b is positioned to illuminate or emit light in an opposite direction of fire of the replica gas-powered firearm 600 and towards an operator of the replica gas-powered firearm 600. In this example, the first LED 130a and the second LED 130b are connected to the controller 140 via wiring 610.

**[0078]** During operation, a user may pull the trigger T and in response, gas may be released from the gas chamber. A portion of the gas that is released is redirected to simulate the recoil of a real firearm causing the slide or bolt to move back. The air or gas pressure released from the gas chamber actuates the trigger button 120. In response, the trigger button 120 may communicate a signal to the controller 140 of the controller circuit. The controller 140 may receive the signal and in response, may communicate a signal to cause the first LED 130a and the second LED 130b to simultaneously emit light and this may be done in manners similar to that described herein with reference to FIG. 1. Although gas is released to simulate the recoil of a real firearm, it will be appreciated that no projectiles are fired out of the replica gas-powered firearm and as such safety risks are reduced.

**[0079]** It will be appreciated that, in response to receiving the signal from the trigger button 120 indicating trigger pull, the controller 140 may additionally or alternatively emit a wireless or Bluetooth signal to indicate trigger pull.

**[0080]** In one or more embodiments, the replica gas-powered firearm may be incorporated into a system that may be used to trigger special effects. An example system 700 is shown in FIG. 7.

**[0081]** As can be seen, the system 700 includes the replica gas-powered firearm 100 that includes the controller circuit 110, the trigger button 120, the at least one LED 130, the controller 140 and the power source 150.



**[0082]** The system 700 additionally includes a receiver 710. The receiver 710 may include a wireless receiver that may be configured to receive and/or emit wireless signals such as for example Bluetooth signals.

**[0083]** The receiver 710 may pair with the controller 140 via wireless communication. For example, the receiver 710 may pair with the controller 140 via Bluetooth. In one or more embodiments, the receiver 710 may pair with the controller 140 in response to a first trigger pull. For example, when the replica gas-powered firearm 100 and the receiver 710 are first turned ON, they may be unpaired. The controller 140 may be programmed to initiate Bluetooth communication in response to a first trigger pull. As such, in response to the first trigger pull, the controller 140 may initiate Bluetooth communication and this may cause the controller 140 to pair with the receiver 710.

**[0084]** Once paired, the receiver 710 may receive signals from the controller 140. For example, as mentioned, the controller 140 may be configured to emit a wireless or Bluetooth signal to indicate trigger pull. In this example, the receiver 710 may receive the signal indicating trigger pull.

**[0085]** The receiver 710 may perform one or more operations in response to receiving the wireless signal indicating trigger pull. For example, the receiver 710 may include at least one LED that may flash in response to receiving the wireless signal indicating trigger pull.

**[0086]** The receiver 710 may include one or more input or output ports that may be used to connect to one or more devices that may be used, for example, to create special effects in response to trigger pull. For example, the receiver 710 may connect to one or more squibs. The one or more squibs may be miniature explosive devices that may be used to generate or create special effects in response to trigger pull. In response to receiving a signal indicating trigger pull, the receiver 710 may send a signal causing the one or more squibs to detonate.

**[0087]** Although in embodiments described herein the replica gas-powered firearm 100 is described as being installed as a retro-fit to an existing gas-powered firearm, it will be appreciated

that in one or more embodiments, the replica gas-powered firearm may be built as its own gas-powered firearm that is incapable of firing projectiles.

**[0088]** The methods described above may be modified and/or operations of such methods combined to provide other methods.

**[0089]** Example embodiments of the present application are not limited to any particular operating system, system architecture, mobile device architecture, server architecture, or computer programming language.

**[0090]** It will be understood that the applications, modules, routines, processes, threads, or other software components implementing the described method/process may be realized using standard computer programming techniques and languages. The present application is not limited to particular processors, computer languages, computer programming conventions, data structures, or other such implementation details. Those skilled in the art will recognize that the described processes may be implemented as a part of computer-executable code stored in volatile or non-volatile memory, as part of an application-specific integrated chip (ASIC), etc.

**[0091]** As noted, certain adaptations and modifications of the described embodiments can be made. Therefore, the above discussed embodiments are considered to be illustrative and not restrictive.

What is claimed is:

1. A replica gas-powered firearm comprising:  
a trigger button positioned to be actuated in response to trigger pull;  
at least one light emitting diode positioned within a barrel of the replica gas-powered firearm;  
a controller circuit coupled to the trigger button and the at least one light emitting diode and configured to:  
receive a signal from the trigger button indicating trigger pull; and  
in response to receiving the signal from the trigger button indicating trigger pull, communicate a signal to cause the at least one light emitting diode to emit light.
2. The replica gas-powered firearm of claim 1, wherein the controller circuit is configured to communicate via wireless communication.
3. The replica gas-powered firearm of claim 2, wherein in response to receiving the signal from the trigger button indicating trigger pull, the controller circuit is configured to transmit a wireless signal indicating trigger pull.
4. The replica gas-powered firearm of claim 2, wherein the wireless communication includes Bluetooth communication.
5. The replica gas-powered firearm of claim 1, wherein the trigger button includes a mechanical trigger button that is actuated mechanically in response to trigger pull.
6. The replica gas-powered firearm of claim 5, wherein the mechanical trigger button is positioned external of the replica gas-powered firearm adjacent to a trigger thereof such that the trigger mechanically actuates the mechanical trigger button in response to trigger pull.

7. The replica gas-powered firearm of claim 5, wherein the mechanical trigger button is positioned internally within the replica gas-powered firearm such that the trigger mechanically actuates the mechanical trigger button in response to trigger pull.

8. The replica gas-powered firearm of claim 5, wherein the mechanical trigger button is positioned internally within a gas magazine such that air pressure within the gas magazine actuates the mechanical trigger button in response to trigger pull.

9. The replica gas-powered firearm of claim 1, wherein the controller circuit is positioned internally within a removable gas magazine.

10. The replica gas-powered firearm of claim 9, wherein the removable gas magazine includes a first electrical connector coupled to the controller circuit and the replica gas-powered firearm includes a second electrical connector that is complementary to the first electrical connector and is coupled to the at least one light emitting diode, the first electrical connector mating with the second electrical connector when the removable gas magazine is within the replica gas-powered firearm to couple the controller circuit to the at least one light emitting diode.

11. The replica gas-powered firearm of claim 1, wherein the trigger button includes a gas pressure trigger button that is actuated by air pressure expelled within the replica gas-powered firearm in response to trigger pull.

12. The replica gas-powered firearm of claim 11, wherein the gas pressure trigger button is positioned within the barrel of the replica gas-powered firearm.

13. The replica gas-powered firearm of claim 1, wherein the at least one light emitting diode includes a first light emitting diode positioned within the barrel of the replica gas-powered firearm emitting light in a direction of fire of the replica gas-powered firearm and a second light

emitting diode positioned on an exterior of the replica gas-powered firearm emitting light in an opposite direction of fire of the replica gas-powered firearm and towards an operator of the replica gas-powered firearm.

14. The replica gas-powered firearm of claim 1, wherein the controller circuit includes a controller and a power source providing power to the controller circuit.

15. The replica gas-powered firearm of claim 1, wherein the replica gas-powered firearm includes one of a replica gas-powered pistol or a replica gas-powered rifle.

16. A replica gas-powered firearm comprising:

- a gas pressure trigger button positioned inside a barrel of the replica gas-powered firearm that is actuated by air pressure expelled within the replica gas-powered firearm in response to trigger pull;

- at least one light emitting diode that includes a first light emitting diode positioned within the barrel of the replica gas-powered firearm emitting light in a direction of fire of the replica gas-powered firearm and a second light emitting diode positioned on an exterior of the replica gas-powered firearm emitting light in an opposite direction of fire of the replica gas-powered firearm and towards an operator of the replica gas-powered firearm;

- a controller circuit coupled to the trigger button and the at least one light emitting diode and configured to:

- receive a signal from the trigger button indicating trigger pull; and

- in response to receiving the signal from the trigger button indicating trigger pull, communicate a signal to cause the at least one light emitting diode to emit light.

17. A system comprising:

- a replica gas-powered firearm comprising:

- a trigger button positioned to be actuated in response to trigger pull;

- a controller circuit coupled to the trigger button and configured to:

receive a signal from the trigger button indicating trigger pull; and  
in response to receiving the signal from the trigger button indicating trigger pull, communicate a wireless signal indicating trigger pull; and  
at least one wireless receiver paired to the controller circuit to receive the wireless signal indicating trigger pull.

18. The system of claim 17, wherein the at least one wireless receiver generates a signal in response to receiving the wireless signal indicating trigger pull and communicates the signal to at least one device to cause the at least one device to perform an action.

19. The system of claim 18, wherein the at least one device includes at least one squib.

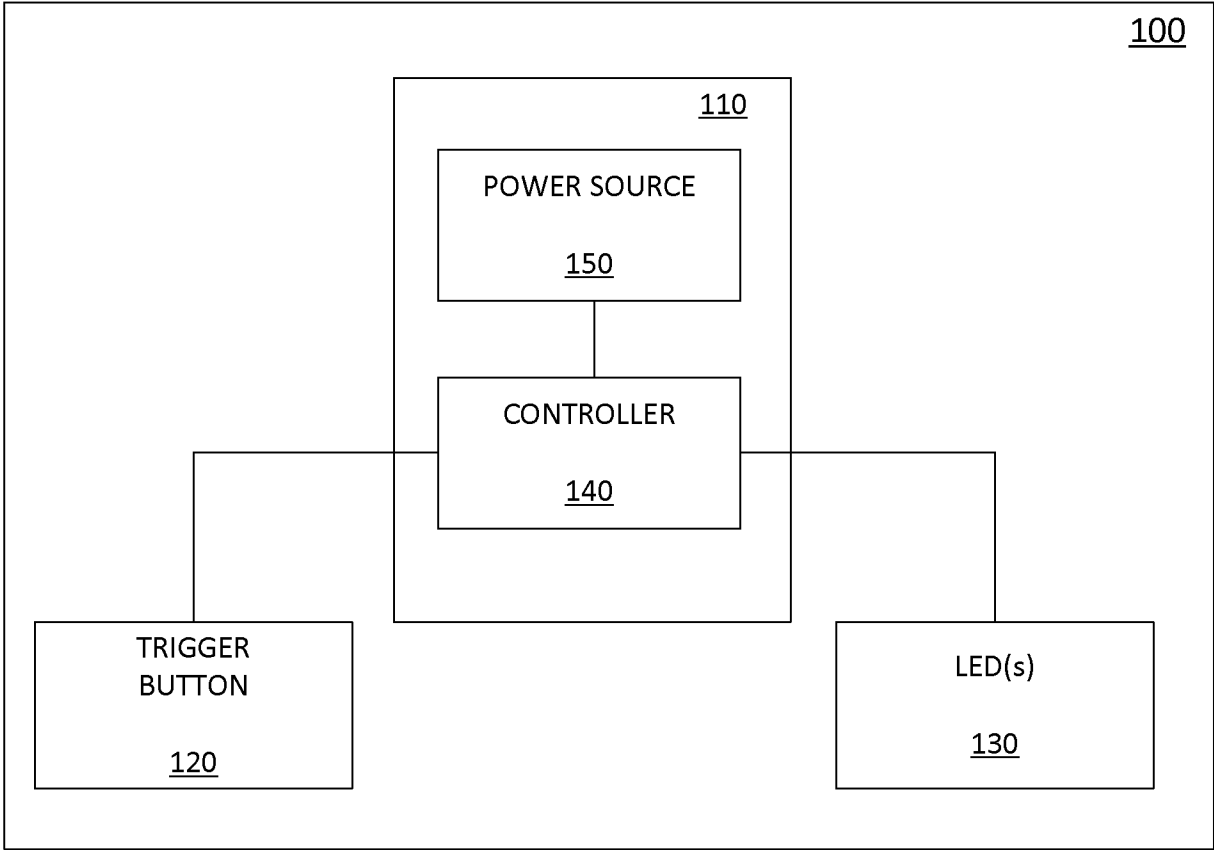


FIG. 1

2/7

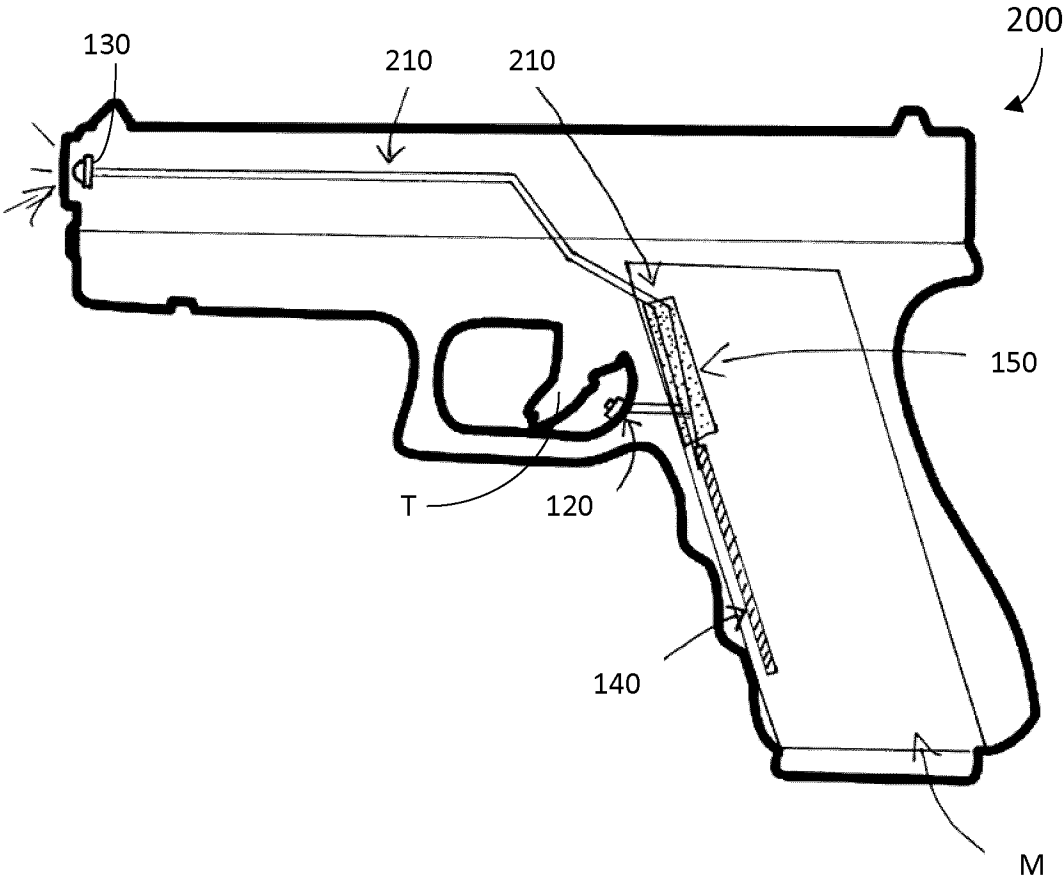


FIG. 2



3/7

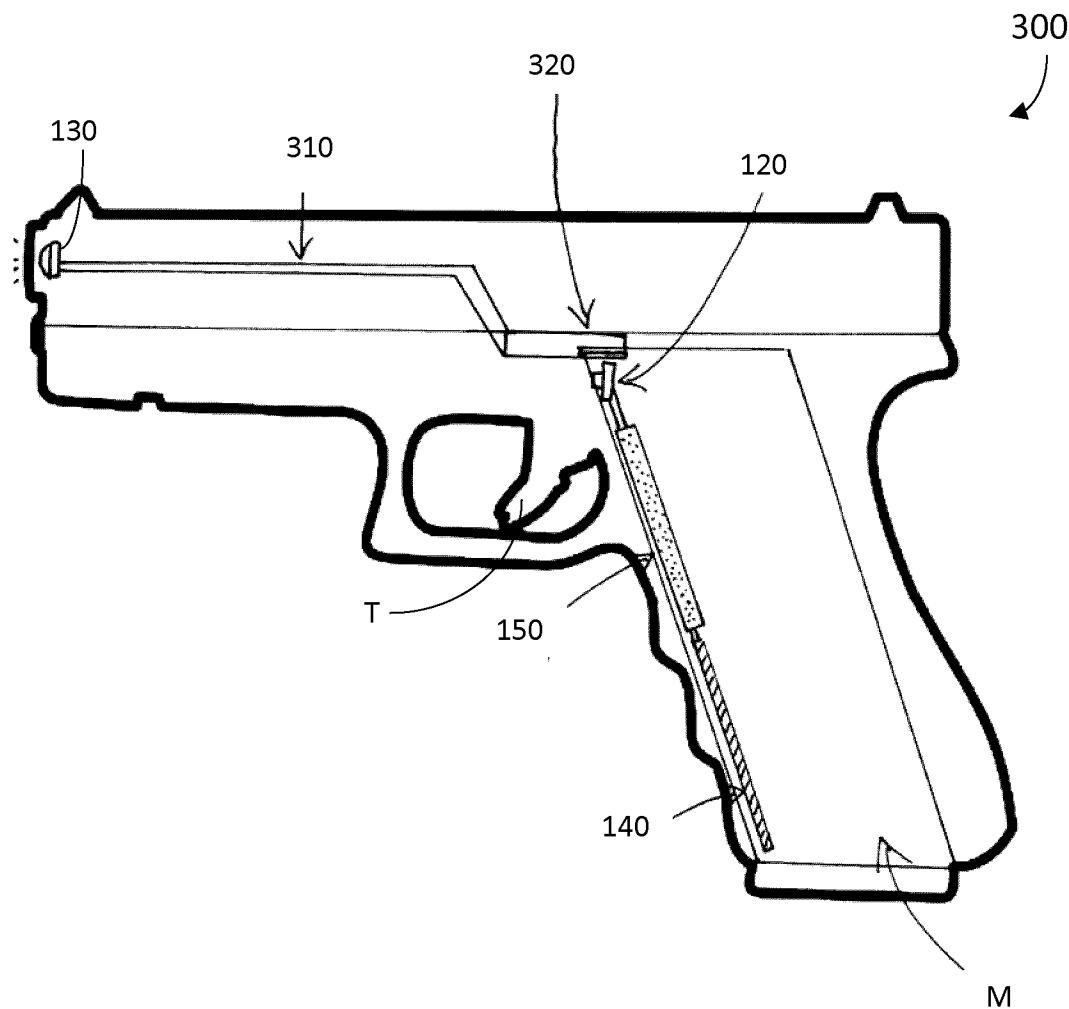
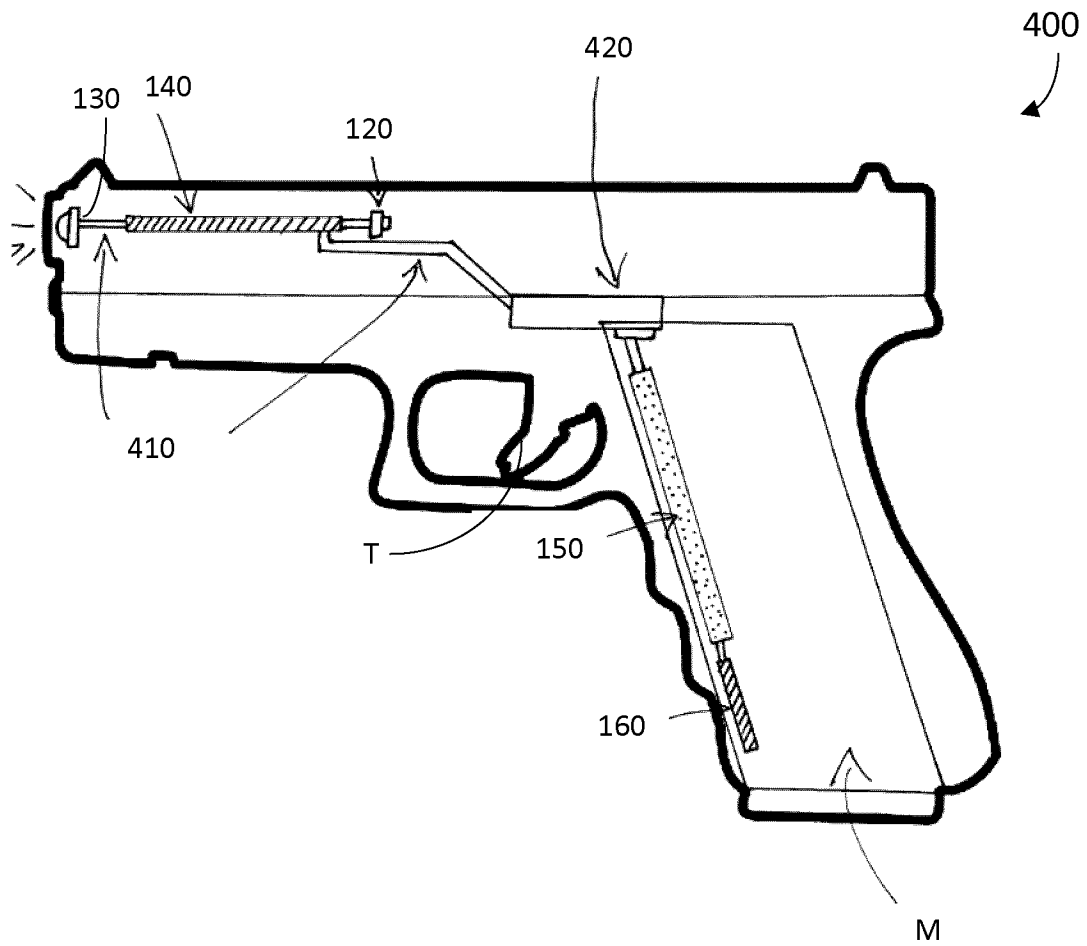


FIG. 3

4/7



**FIG. 4**

5/7

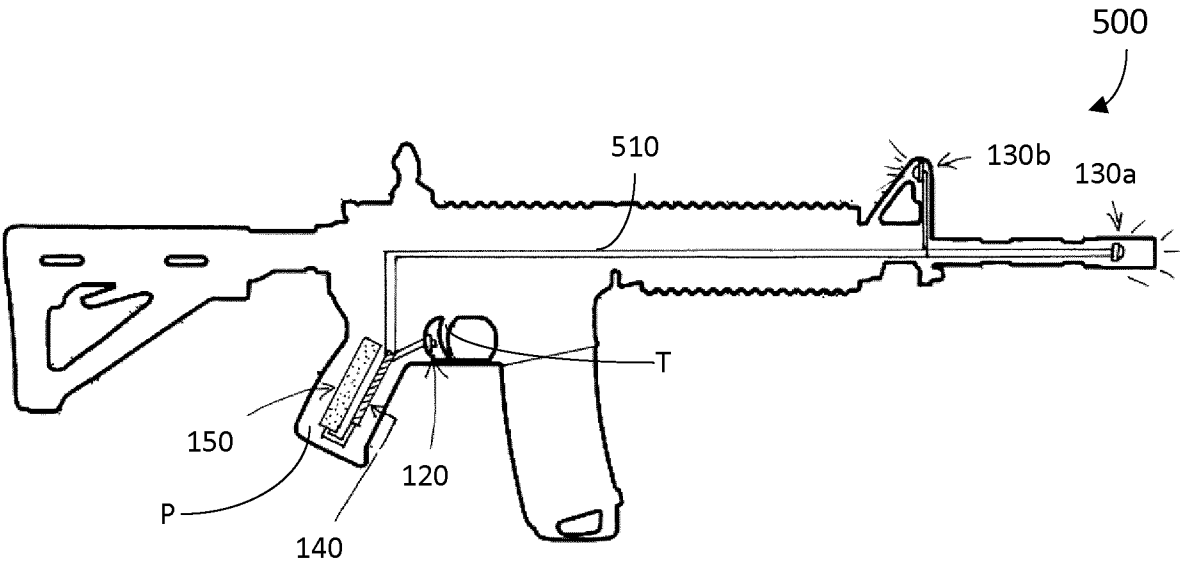


FIG. 5

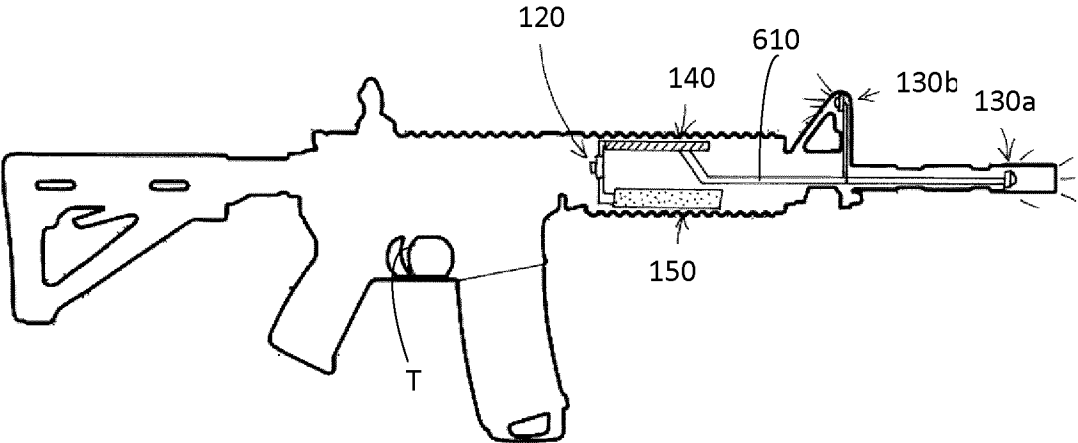


FIG. 6

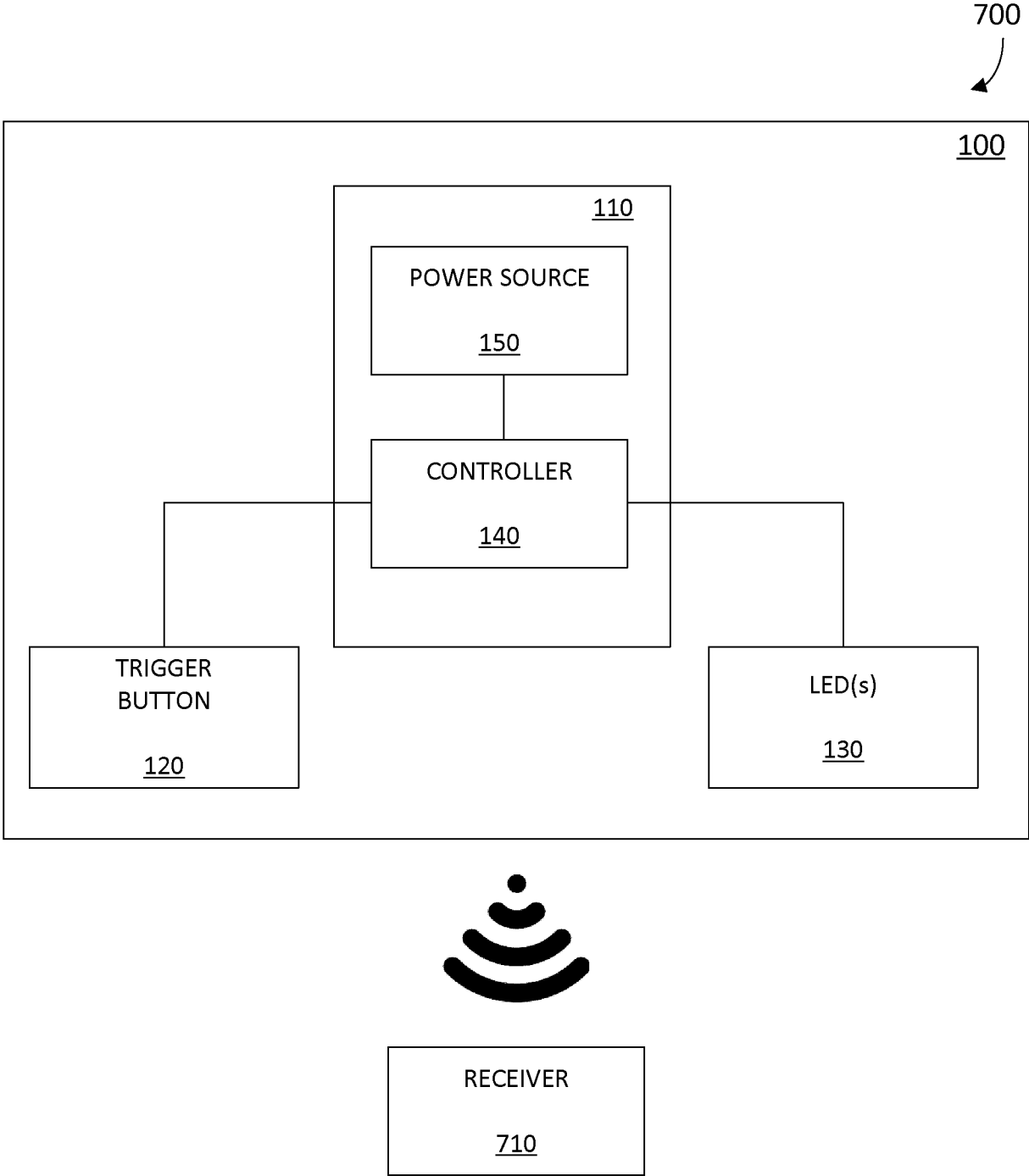


FIG. 7

## INTERNATIONAL SEARCH REPORT

International application No.

**PCT/CA2024/051624**

## A. CLASSIFICATION OF SUBJECT MATTER

IPC: **F41B 11/70** (2013.01), **F21V 33/00** (2006.01), **F41B 11/71** (2013.01), **F41B 11/80** (2013.01),  
**F41C 27/00** (2006.01)

CPC: F21V 33/0008 (2013.01), F41B 11/70 (2013.01), F41B 11/80 (2013.01), **F41B 11/71** (2013.01), **F41C 27/00** (2006.01)

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

CPC: F21V 33/0008 (2013.01), F41B 11/70 (2013.01), F41B 11/80 (2013.01), **F41B 11/71** (2013.01), **F41C 27/00** (2006.01); IPC: **F41B 11/70** (2013.01), **F21V 33/00** (2006.01), **F41B 11/71** (2013.01), **F41B 11/80** (2013.01), **F41B 11/89** (2013.01),  
**F41C 27/00** (2006.01)

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic database(s) consulted during the international search (name of database(s) and, where practicable, search terms used)

Questel-Orbit: gun, firearm, toy, replica, airsoft, blowback, wireless, signal, light, LED, diode, switch, button, gas, air, pneumatic, film, cinema, simulat+

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages                                                                                                    | Relevant to claim No.                              |
|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|
| X<br>Y    | US5947738 A (MUEHLE, E.G., et al.) 7 September 1999 (07-09-1999)<br>(abstract; Fig. 1; col. 2, ln. 22-25; col. 3, ln. 47-48; col. 3, ln. 56-57; col. 4, ln. 32-39; col. 6, ln. 49-54) | 1, 5, 7, 8, 11, 12, 14, and 15<br>9, 10, 13 and 16 |
| X<br>Y    | US20050191601 A1 (DVORAK, V.) 1 September 2005 (01-09-2005)<br>(abstract; pars. [0043], [0046], [0048], [0051], [0054].)                                                              | 1, 5, 7, 8, 11, 12, 14 and 15<br>9, 10, 13 and 16  |
| X<br>Y    | US20130319216 A1 (POIRIER, J.M., et AL.) 5 December 2013 (05-12-2013)<br>(abstract; pars. [0007], [0033], [0037], [0043], [0052])                                                     | 1-5, 7, 11, 12, 14, 15 and 17<br>9, 10, 13 and 16  |
| X<br>Y    | US20180306548 A1 (HUNT, J.E.) 25 October 2018 (25-10-2018)<br>(abstract; pars. [0042], [0104]-[0106])                                                                                 | 1-7, 14, 15 and 17-19<br>13, 16                    |

☒ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

|                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|---------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| *<br>"A"<br>"D"<br>"E"<br>"L"<br>"O"<br>"P" | Special categories of cited documents:<br>document defining the general state of the art which is not considered to be of particular relevance<br>document cited by the applicant in the international application earlier application or patent but published on or after the international filing date<br>document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)<br>document referring to an oral disclosure, use, exhibition or other means<br>document published prior to the international filing date but later than the priority date claimed | "T"<br>"X"<br>"Y"<br>"&" | later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention<br>document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone<br>document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art<br>document member of the same patent family |
|---------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Date of the actual completion of the international search  
31 January 2025 (31-01-2025)

Date of mailing of the international search report  
12 March 2025 (12-03-2025)

Name and mailing address of the ISA/CA  
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Authorized officer  
  
Geordan Vine (873) 354-9760

## INTERNATIONAL SEARCH REPORT

International application No.

**PCT/CA2024/051624**

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages                                                    | Relevant to claim No.           |
|-----------|---------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|
| X<br>Y    | US20160169608 A1 (SCHULZ, K.S., et al.) 16 June 2016 (16-06-2016)<br>(abstract; pars [0005], [0006], [0043], [0044], [0057], [0084].) | 1-6, 14, 15 and 17<br>13 and 16 |
| Y         | US20090253103 A1 (HOGAN, R.R. JR.) 8 October 2009 (08-10-2009)<br>(abstract; (par. [0013], [0016], [0019], [0022], [0034], [0040]))   | 9, 10, 13 and 16                |

**INTERNATIONAL SEARCH REPORT**  
Information on patent family members

International application No.

**PCT/CA2024/051624**

| Patent Document<br>Cited in Search Report | Publication<br>Date            | Patent Family<br>Member(s)                      | Publication<br>Date                                                                             |
|-------------------------------------------|--------------------------------|-------------------------------------------------|-------------------------------------------------------------------------------------------------|
| US5947738A                                | 07 September 1999 (07-09-1999) | None                                            |                                                                                                 |
| US2005191601A1                            | 01 September 2005 (01-09-2005) | None                                            |                                                                                                 |
| US2013319216A1                            | 05 December 2013 (05-12-2013)  | US9417035B2<br>CA2817476A1                      | 16 August 2016 (16-08-2016)<br>01 December 2013 (01-12-2013)                                    |
| US2018306548A1                            | 25 October 2018 (25-10-2018)   | US2014272806A1<br>US10036608B2                  | 18 September 2014 (18-09-2014)<br>31 July 2018 (31-07-2018)                                     |
| US2016169608A1                            | 16 June 2016 (16-06-2016)      | US10451376B2<br>US2019390932A1<br>US11112204B2  | 22 October 2019 (22-10-2019)<br>26 December 2019 (26-12-2019)<br>07 September 2021 (07-09-2021) |
| US2009253103A1                            | 08 October 2009 (08-10-2009)   | US8827706B2<br>WO2010014126A2<br>WO2010014126A3 | 09 September 2014 (09-09-2014)<br>04 February 2010 (04-02-2010)<br>01 April 2010 (01-04-2010)   |