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(54) **GUIDE ROD WITH INTEGRATED ILLUMINATION DEVICE**

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(76) Inventors: **Robert W. Sloan**, Indianapolis, IN (US); **David M. O'Donnell**, Indianapolis, IN (US); **Jason W. McEachran**, Howell, MI (US)

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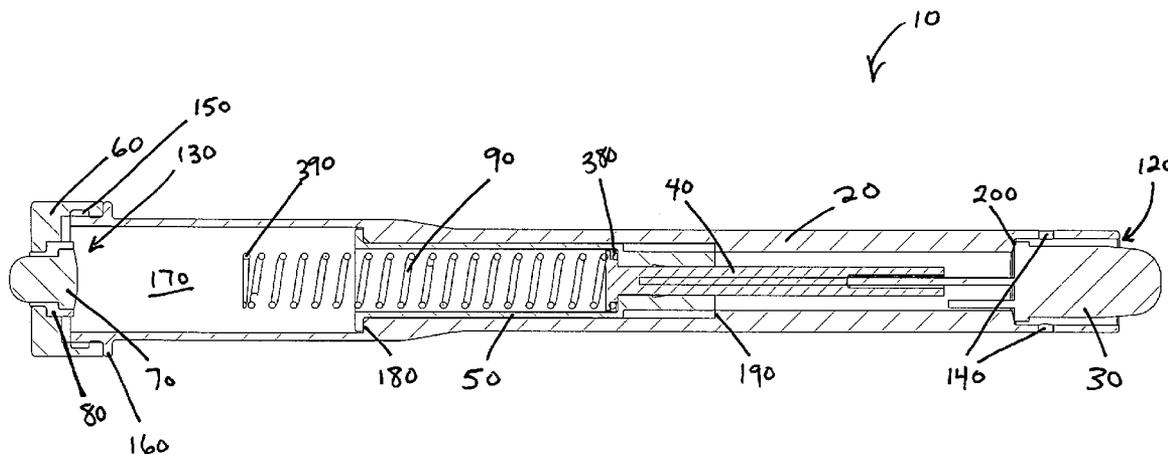
(57) **ABSTRACT**

Correspondence Address:
PAUL DEREK PRESSLEY
BAHRET & ASSOCIATES
320 NORTH MERIDIAN STREET
SUITE 510
INDIANAPOLIS, IN 46204 (US)

An illumination source to assist in the identification and verification of a target is preferably contained within a hollow, waterproof tube that is similar in dimension and also performs the function of the conventional guide rod it is designed to replace in a pistol. An activation switch will, in its preferred form, make or break the circuit between the power source and the LED's that provide the illumination. The power source is also contained within the aforementioned tube that preferably resides within the pistol directly under the barrel.

(21) Appl. No.: **10/846,271**

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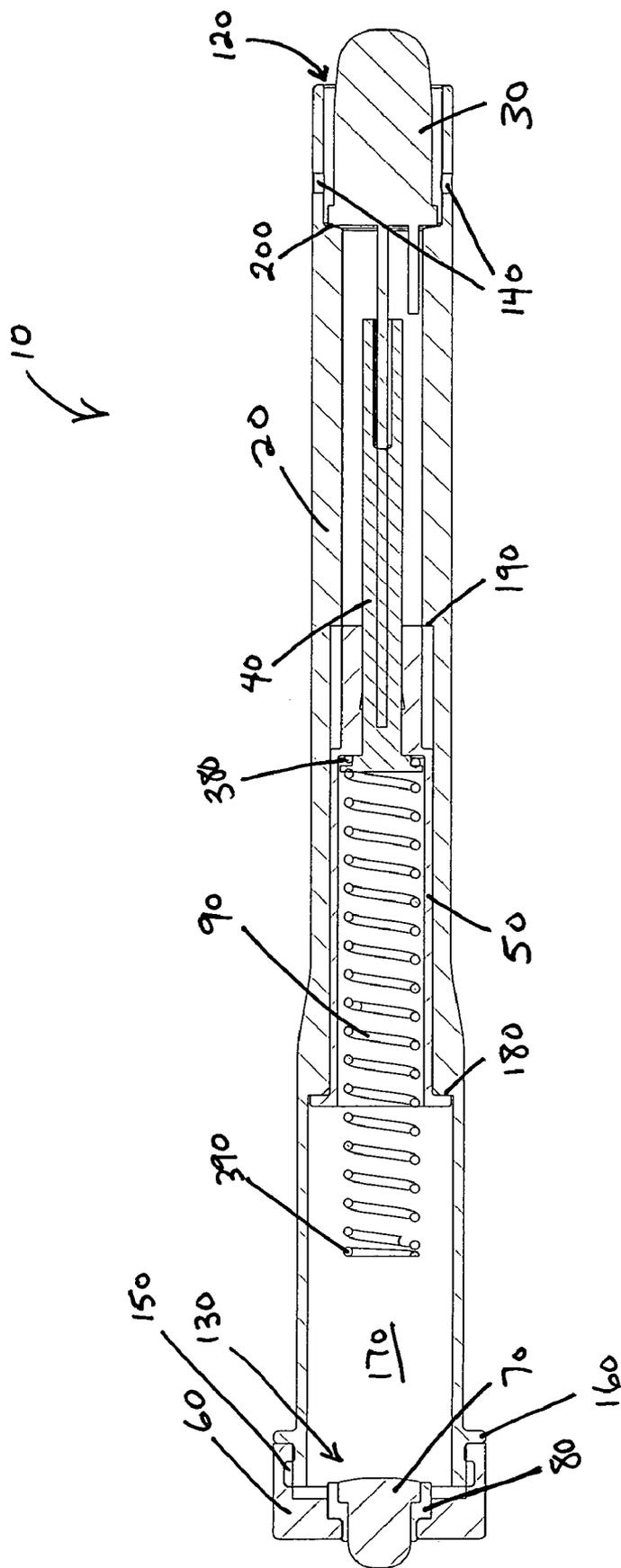


Figure 1

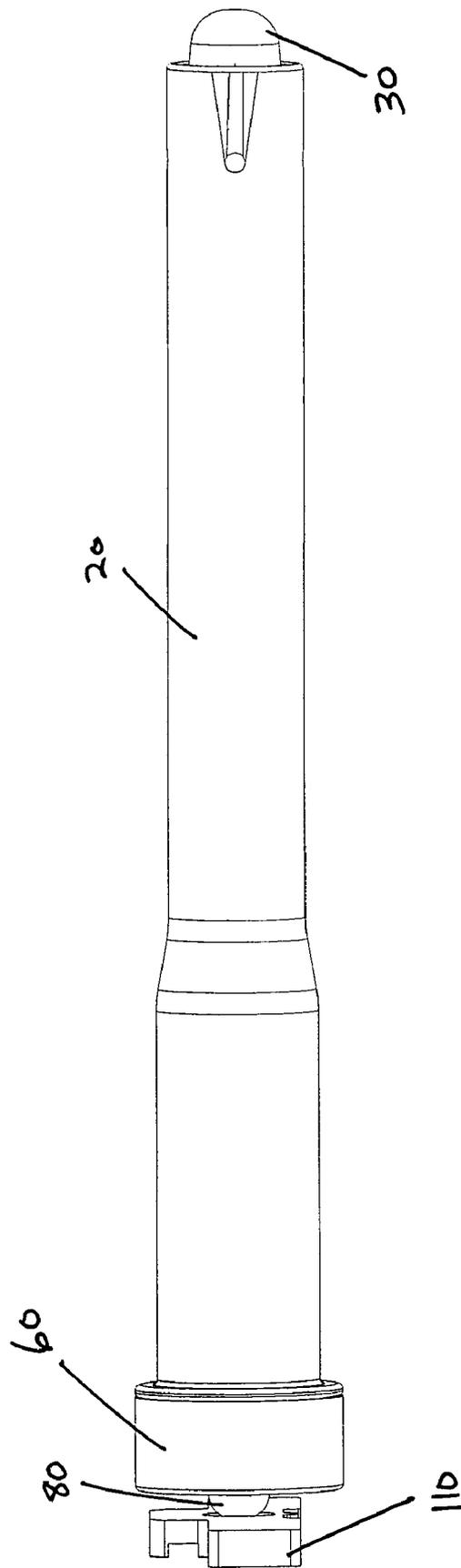


Figure 2

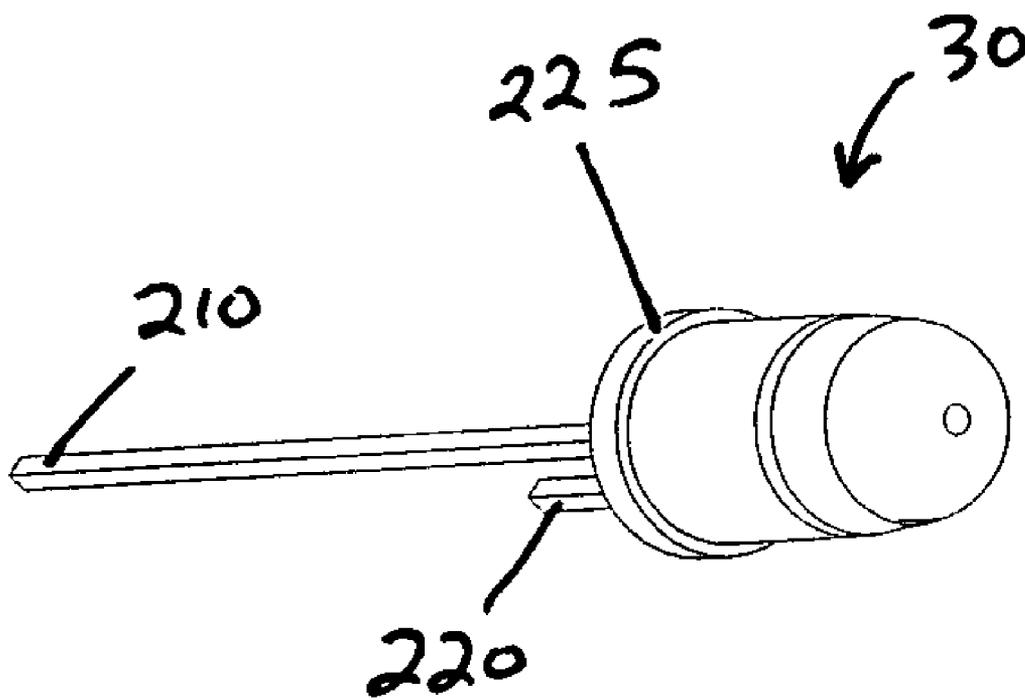


Figure 3

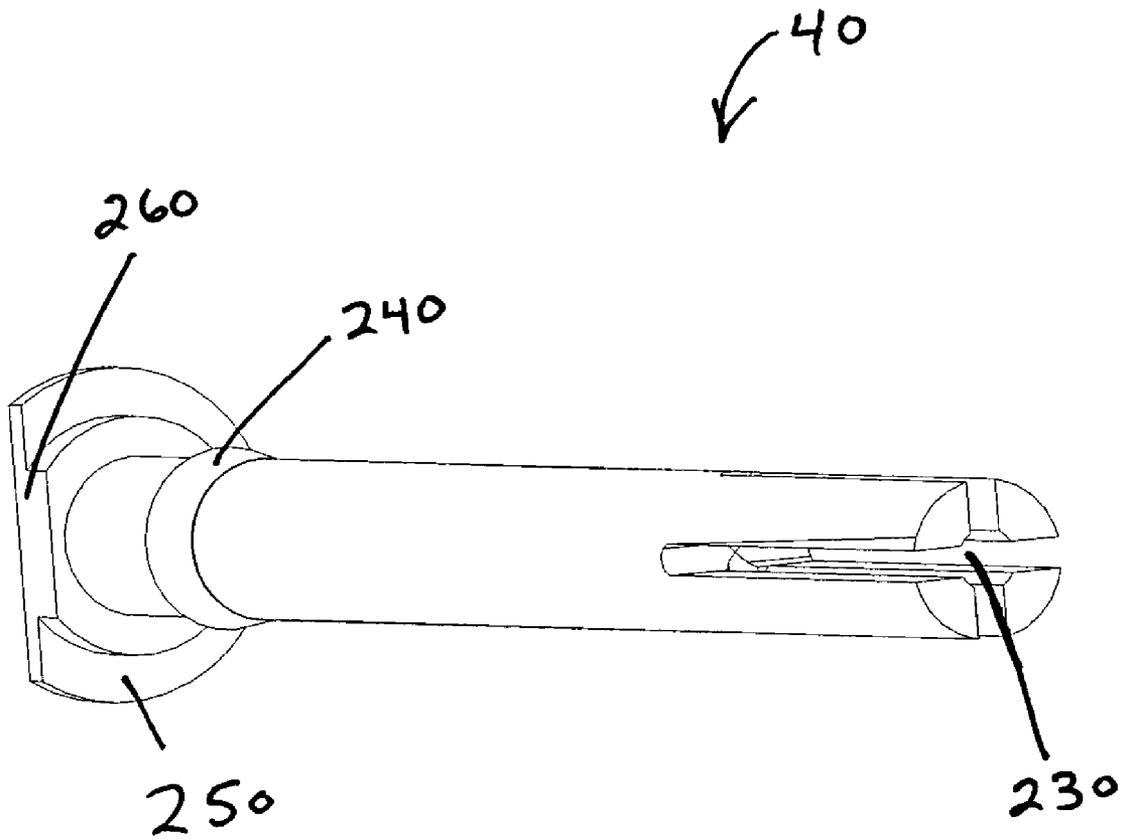


Figure 4

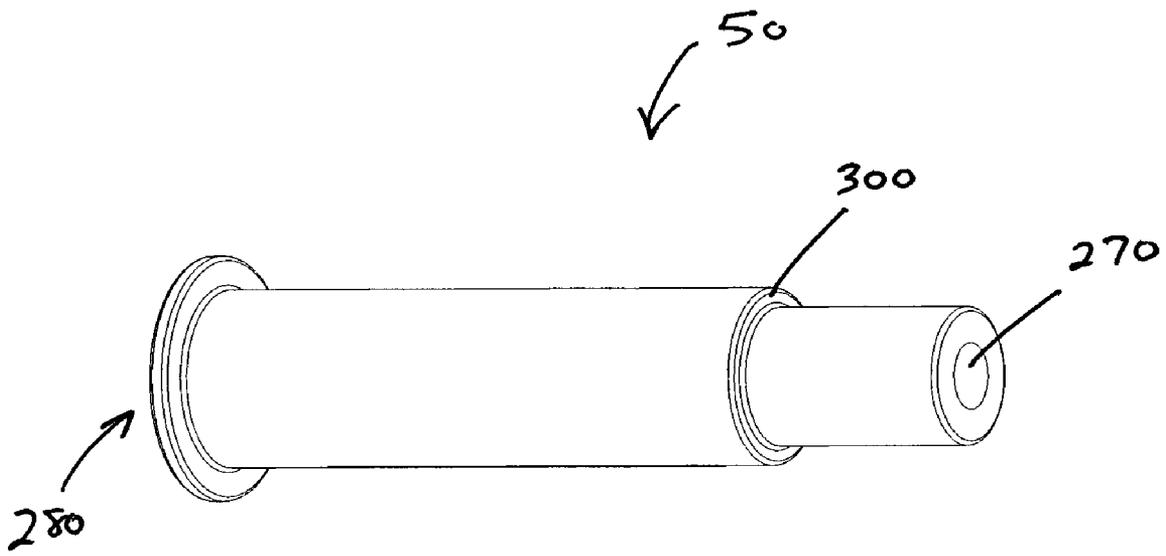


Figure 5

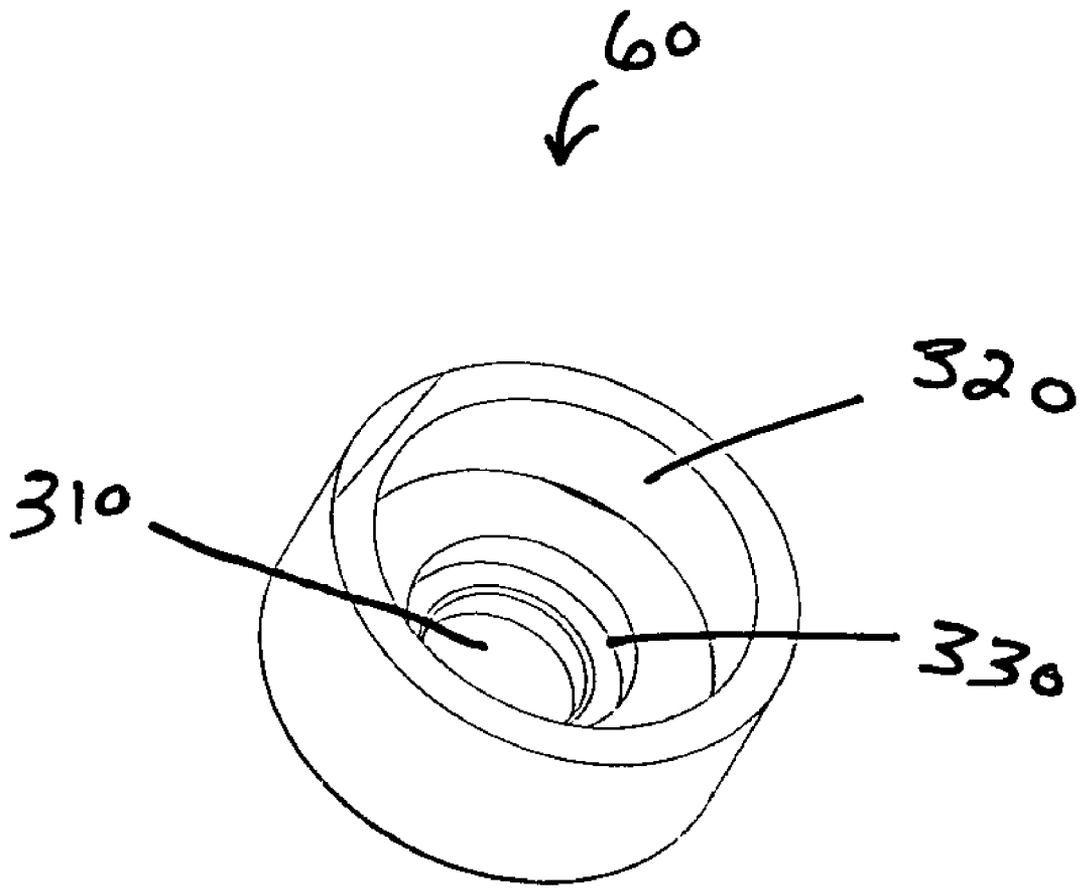


Figure 6

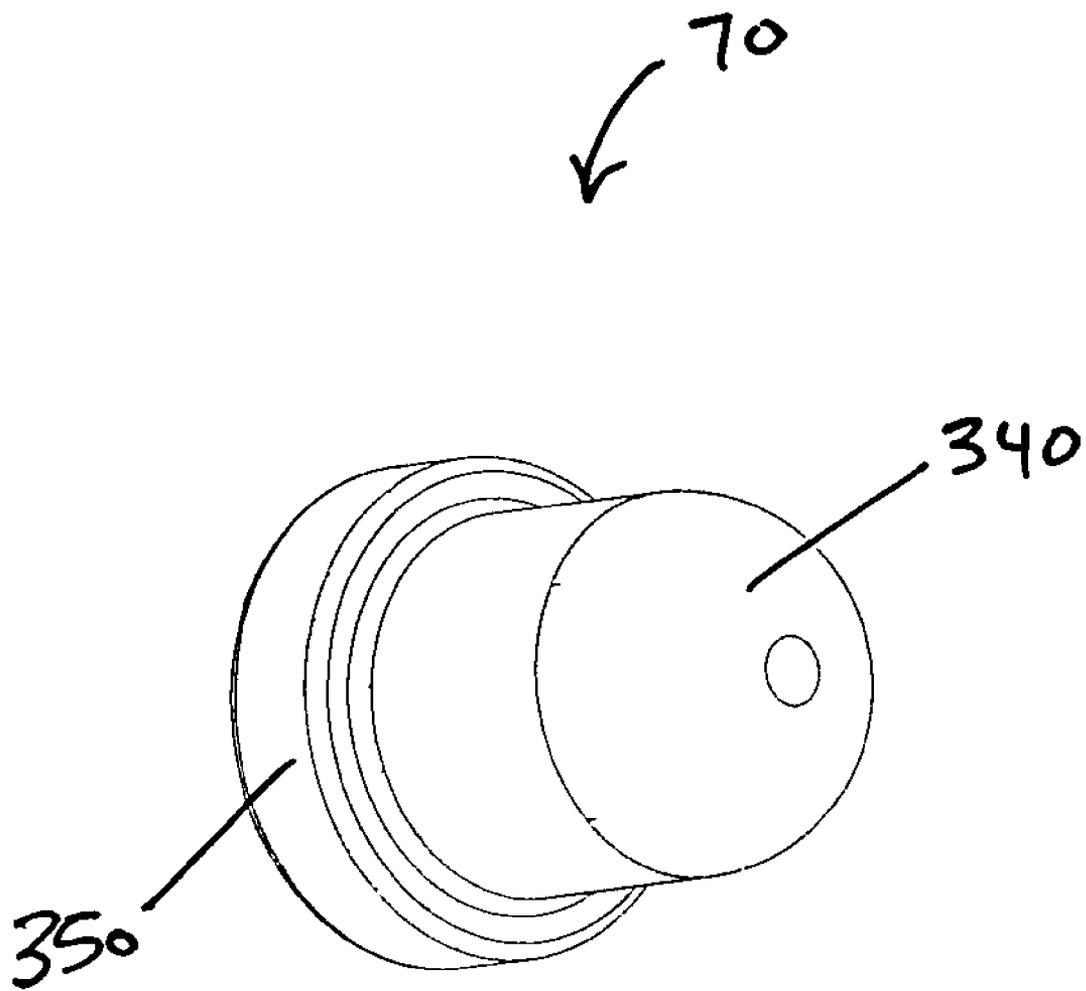


Figure 7

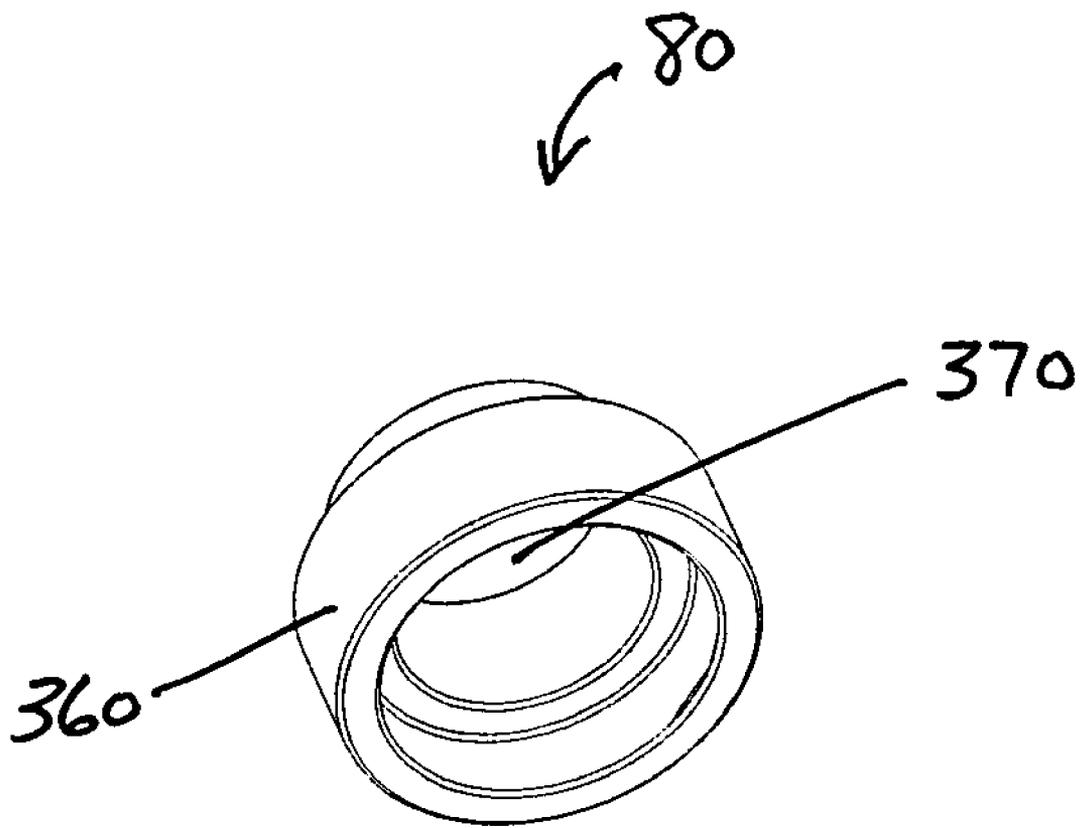


Figure 8

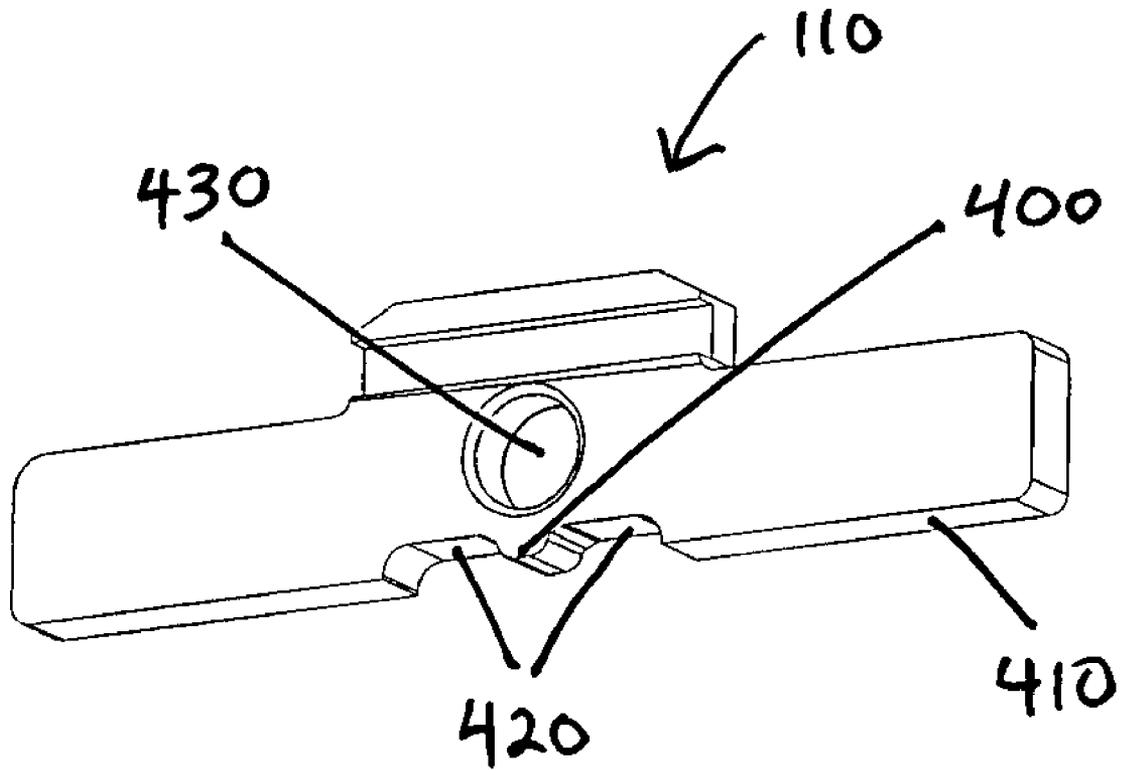


Figure 9

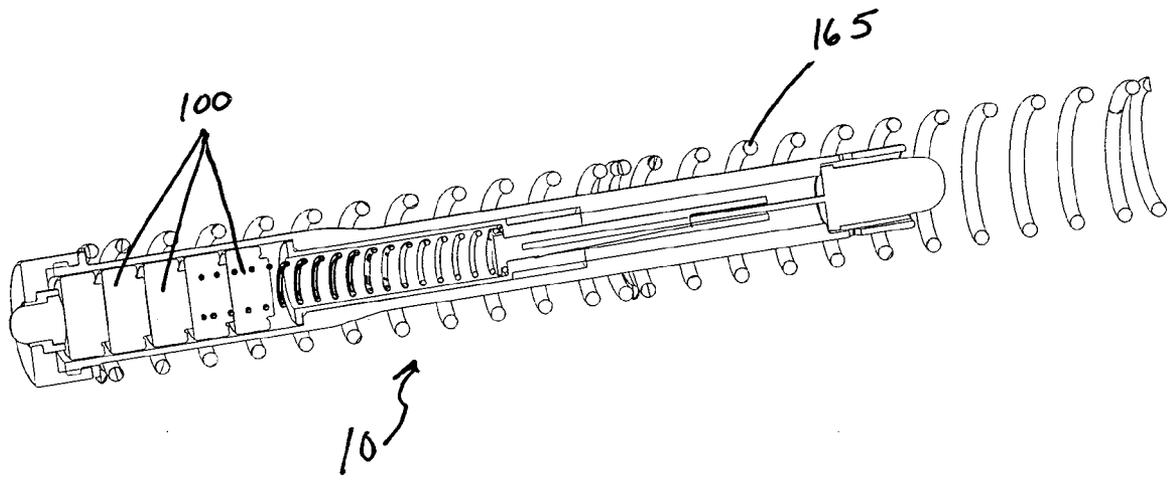


Figure 10

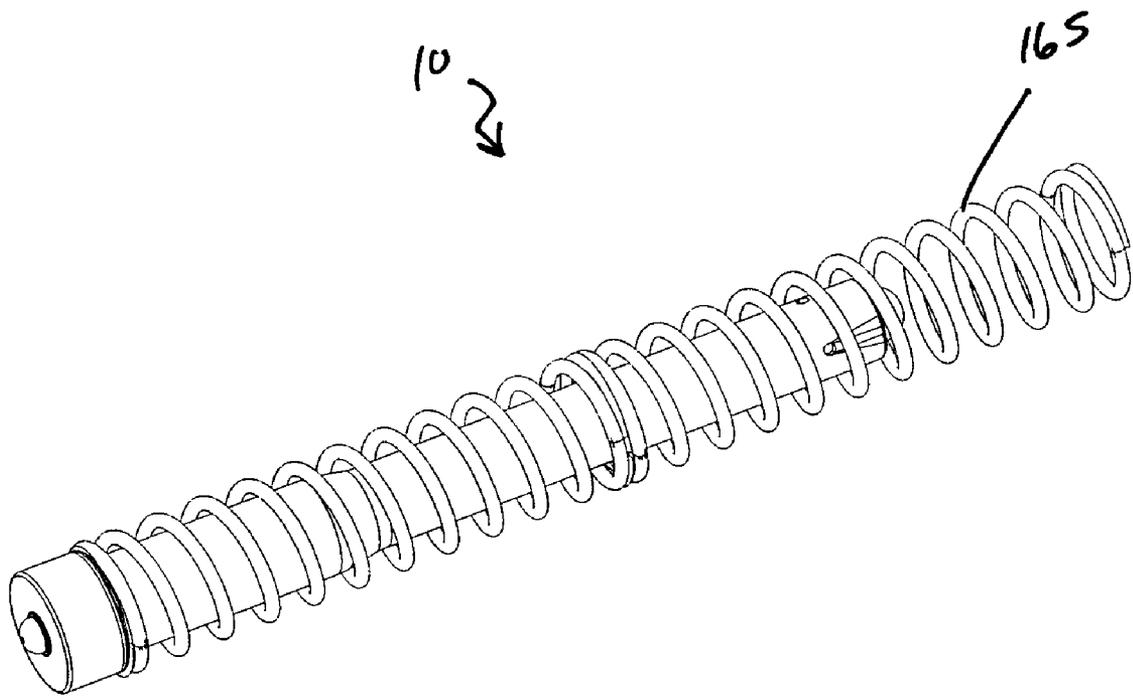


Figure 11

GUIDE ROD WITH INTEGRATED ILLUMINATION DEVICE

PRIOR HISTORY

[0001] This application claims the benefit of U.S. Provisional Application No. 60/471,014, filed May 16, 2003.

BACKGROUND OF THE INVENTION

[0002] 1. Field of the Invention

[0003] The invention relates to illumination devices integrated in pistols. In its preferred form, the invention replaces the factory guide rod of certain pistols and also performs as a guide rod with a device that, when activated, emits a beam of light from one or more LED's to aid target and threat verification in low or no-light conditions.

[0004] 2. Description of the Prior Art

[0005] Statistics compiled by the United States F.B.I. show that the majority of gunfights take place in conditions of low ambient light or total darkness. Law enforcement and civilian firearms instructors currently teach two methods to search for and/or identify a target in low or no-light conditions prior to engaging it as a threat.

[0006] The first method utilizes a pistol in the dominant hand and a flashlight in the opposite hand. Such techniques require the light and pistol to be accessed separately and simultaneously, then applied conjunctively. This is difficult and time consuming on a static training range (especially compared to simply drawing a pistol) and even more problematic in a high stress, reactive or dynamic encounter. If the pistol must be fired, it will be with one hand instead of the more accurate and preferred two-hand hold. It is not possible to use the weapon and light with one hand while the other hand opens a door, uses communication equipment, retrieves handcuffs, etc.

[0007] The second method is mounting a light to the exterior of the weapon, either semi permanently affixing it to the weapon or mounting it on an accessory rail that is incorporated on the frame of the pistol. Multi-task capability is less affected, but at the cost of significant bulk and weight, which negatively affects the pistol's handling characteristics and balance. Existing holsters must be replaced or radically modified for use. Many law enforcement agencies are reluctant accept the financial burden to change holsters and reissue them, so while many models of weapon-mounted lights are currently in use, they are proactive by nature, meaning that the user must have the time and foreknowledge to equip a pistol with a light or access a weapon with a dedicated light. Furthermore, many current models of safety devices (e.g., trigger locks) are not compatible with exterior weapon-mounted lights. Still further, exterior mounted lights are exposed to and are therefore much more vulnerable to the elements and damage. It is also noted that flashlights using incandescent bulbs are only as durable as their relatively frail filament, which can break or burn up with a lifespan of 500 to 1,000 hours at best, compared the L.E.D. illumination device described herein, which has no filament and a life expectancy of 100,000 hours.

[0008] Recognized cognoscenti in the field of firearms training and tactics, such as Louis Awerbuck, director of the Yavapai Firearms Academy, Clint Smith, director of Thun-

der Ranch, and Massad Ayoob, director of the Lethal Force Institute, all recommend that students carry not one flashlight, but whenever possible, two. An often-used maxim in training classes is, "If you carry a gun, carry a light." There exists the need for a light source that is always present and available for use when the weapon is present, but does not sacrifice proper weapon handling, balance or portability.

SUMMARY OF THE INVENTION

[0009] In various embodiments, this invention meets those needs and others by providing a constantly and instantly available light source to aid in finding, identifying and assessing a target, while being contained within the pistol itself. The unit's ambidextrous on/off switch can be instantly activated by the primary or support hand, allowing for one or two-handed operation of the pistol and light as an integrated unit. Able to be installed by persons of ordinary skill, the preferred embodiment of the invention does not permanently alter the function, dimensions or handling characteristics of the pistol in any significant way. The use of existing holsters, safety devices, and the like are unaffected.

[0010] As a device made and used according to this invention is ever present and primarily contained within the firearm, ready for activation, there are several advantages gained over conventional hand-held and/or exterior weapon-mounted lights. It deploys eminently faster than any hand-held flashlight and pistol technique. Contained within a watertight guide rod, the illumination device is not subject to nor affected by the elements. The risk of an external force damaging the device (without also destroying the pistol) is minimal.

[0011] The guide rod of a pistol resides directly under the barrel. When the light source is also contained therein, only the muzzle of the pistol would need to be clear of an object of cover or concealment to further search for, identify, asses or engage a target. It should be noted that any part of the user or the pistol itself that is exposed beyond cover is also exposed to whatever threat lies beyond. With hand held (especially) or exterior mounted lights in general, a little to a lot more of the user and pistol must be exposed past the point of cover or concealment.

[0012] Finally, by virtue of being constantly and instantly available, certain embodiments of this invention provide for the reactive use of a light with a pistol in a dynamic encounter to illuminate and identify a target.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] FIG. 1. A cross sectional view of the guide rod with integrated illumination device.

[0014] FIG. 2. A side view of the guide rod with integrated illumination device.

[0015] FIG. 3. A perspective view of the LED.

[0016] FIG. 4. A perspective view of the contact pin.

[0017] FIG. 5. A perspective view of the insulator tube.

[0018] FIG. 6. A perspective view of the end cap.

[0019] FIG. 7. A perspective view of the contact button.

[0020] FIG. 8. A perspective view of the button sleeve.

[0021] FIG. 9. A perspective view of the take down lever.

[0022] FIG. 10. A perspective cross sectional view of the device with recoil spring.

[0023] FIG. 11. A perspective view of the device with recoil spring.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0024] For the purposes of promoting an understanding of the principles of the invention, reference will now be made to the embodiments illustrated in the drawings and specific language will be used to describe the embodiments. It will nevertheless be understood that no limitation of the scope of the invention is thereby intended, such alterations and further modifications in the illustrated device, and such further applications of the principles of the invention as illustrated therein being contemplated as would normally occur to one skilled in the art to which the invention relates.

[0025] The Figures accompanying this specification illustrate one embodiment of the pistol guide rod with integrated illumination device 10 intended for use with the GLOCK 23 pistol. It should be understood that guide rods of differing shape and size used with other types of pistols may be assembled following the teachings of the claimed invention and are contemplated as being within the scope of the claimed invention. FIGS. 1 and 2 show the GLOCK 23 model of the device 10 generally comprising a guide rod housing 20, at least one light emitting diode (LED) 30, a contact pin 40, an insulator tube 50, an end cap 60, a contact button 70, a button sleeve 80, a biasing member 90, a power source 100, and a take down lever 110.

[0026] The guide rod housing 20 shown in FIG. 1 is preferably made of metal and is generally sized like a standard guide rod for a GLOCK 23 pistol. The housing 20 is hollow and has an open first 120 end and an open second end 130 with a plurality of through hole apertures 140 positioned adjacent the open first end 120 of the housing 20. The housing 20 has an external set of threads 150 for receiving the end cap 60 adjacent the second open end 130 and an external flange 160 adjacent the threads 150 for receiving the recoil spring 165 of the pistol as shown in FIGS. 10 and 11. In commercial sales of the device 10, a replacement recoil spring will also accompany the device 10 to replace the standard recoil spring. The internal hollow cavity 170 of the housing 20 has four different diameters providing three different shoulders 180, 190, 200 at different intervals along the length of the housing 20.

[0027] The LED 30 shown in FIGS. 1 and 3 is a 5 mm through hole LED producing 10,000 milicandellas of illumination. The LED 30 has a first lead 210 that is connected to the contact pin 40 and a second lead 220 that is positioned between the insulation sleeve 50 and the inner walls of the housing 20. A rim 225 about the LED 30 engages the third internal shoulder 200 of the housing 20 when assembled.

[0028] The contact pin 40 shown in FIGS. 1 and 4 is preferably made of metal and has a multidirectional slot 230 for receiving the first lead 210 of the LED 30, an external rib 240 for frictionally engaging the insulator tube 50 during assembly and a stepped base 250 with a flattened side 260 for engagement with the biasing member 90.

[0029] The insulator tube 50 shown in FIGS. 1 and 5 is preferably made of a nonconductive plastic such as DELRIN and is hollow with an open first end 270 and an open second end 280. The insulator tube 50 has an external flange 290 adjacent the open second end 280 for engaging the first internal shoulder 180 of the housing 20 during assembly and an external shoulder 300 for engaging the second internal shoulder 190 of the housing 20 during assembly.

[0030] The end cap 60 shown in FIGS. 1 and 6 is made of metal and has a centrally located through hole aperture 310 for receiving the contact button 70 and button sleeve 80. In other embodiments of the claimed invention, the end cap 70 is made of a nonconductive plastic such as DELRIN eliminating the need for the button sleeve 80. The end cap 60 has internal threads 320 for fastening upon the external threads 150 of the housing 20 and a shoulder 330 adjacent the through hole aperture 310 for receiving the button sleeve 80.

[0031] The contact button 70 shown in FIGS. 1 and 7 is preferably made of metal and has a rounded first end 340 for engaging the take down lever 110 and a flat stepped based second end 350 for engaging the power source 100 and the button sleeve 80.

[0032] The button sleeve 80 shown in FIGS. 1 and 8 is preferably made of a nonconductive plastic such as DELRIN and is sized and shaped to engage the shoulder 330 and through hole aperture 310 of the end cap 60. The button sleeve 80 has a skirt 360 surrounding a centrally located through hole aperture 370 for insulating the flat stepped base 350 of the contact button 70.

[0033] The biasing member 90 shown in FIG. 1 is preferably a metal compression spring. The first end 380 of the spring 90 is connected to the contact pin 40 when assembled and the second end 390 simultaneously makes electrical contact with the power source 100 and biases the power source 100 toward the end cap 60 causing the contact button 70 to protrude through the through hole aperture 310 of the end cap 60.

[0034] The power source 100 shown in FIG. 10 is preferably a number of 1.5 Volt dry cell batteries. When assembled, the batteries 100 make contact with the spring 90 and the contact button 70 to provide power to the device 10.

[0035] The take down lever 110 shown in FIGS. 2 and 9 is preferably made of metal and has many of the same features of a standard take down lever that would be included in a standard GLOCK 23 when sold. The take down lever 110 of the claimed invention has several additional features to facilitate operation. The take down lever 110 of the claimed invention has a centrally located lobe 400 along the bottom edge 410 defined by a pair of cutouts 420. When assembled, the lobe 400 of the take down lever 110 rests upon the locking spring (not shown) within the receiver (not shown). During use, the take down lever 110 may be moved laterally in either direction such that the one of the cutouts 420 of the take down lever 110 rests upon the locking spring. The take down lever 110 of the claimed invention also has a centrally located nonconductive portion 430 positioned above the lobe 400 that is sized and shaped slightly larger than the diameter of the contact button 70 so that the contact button 70 does not make contact with the take down lever 110 when the take down lever 110 is centered over the

locking spring. The nonconductive portion **430** shown in **FIG. 10** is a through hole aperture.

[0036] The device **10** is assembled as shown in **FIG. 1** by first securing the spring **90** to the stepped base **250** of the contact pin **40**. The flattened side **260** of the stepped base **250** allows the first end **380** of the spring **90** to be rotated onto the stepped base **250** capturing the stepped base **250** between the first two turns of the spring **90**. The contact pin **40** is then inserted into the insulator tube **50** such that the external rib **240** frictionally engages the insulator tube **50** to hold the contact pin **40** within the insulator tube **50**. The insulator tube **50** is then inserted into the housing **20** through the open second end **130** until the external flange **290** engages the first internal shoulder **180** of the housing **20**. The LED **30** is then inserted through the first open end **120** of the housing **20** such that the first lead **210** of the LED **30** is inserted within the multidirectional slot **230** of the contact pin **40** to create a secure electrical connection. The second lead **220** of the LED **30** is preferably secured to the internal wall of the housing **20** by soldering or other method that results in an electrically conductive path being formed between the second lead **220** and the housing **20**. The LED **30** is then secured in place by placing epoxy about the LED **30** such that epoxy flows through the plurality of hole **140** adjacent the open first end **120** of the housing **20** so that, when dried, the LED **30** will be held in place. The plurality of batteries **100** are then inserted through the second open end **130** of the housing **20** adjacent the spring **90**. The contact button **70** is then inserted in the button sleeve **80** and the button sleeve **80** is in turn inserted in the through hole aperture **310** of the end cap **60**. The end cap **60** is then screwed onto the external threads **150** of the housing **20**. **FIG. 2** shows a perspective view of the assembled device **10**.

[0037] Generally, to use the guide rod with integrated illumination device **10** according to the claimed invention, one field strips the pistol (that is, disassembles it down to its primary components), then reassembles the pistol using a guide rod and take down lever of the claimed invention adapted for use with the particular model of pistol according to the claimed invention. Disassembly and reassembly are performed according to the model-specific instructions provided by the manufacturer of the pistol, observing all proper safety recommendations, principles and procedures.

[0038] With the exemplary embodiment above, which is tailored for use with a GLOCK model 23, one installs the guide rod with integrated illumination device **10** by removing the magazine and clearing the chamber of the pistol by retracting the slide. When all rounds have been removed, the pistol is pointed in a safe direction, and the trigger is pulled. The user secures the pistol by wrapping all fingers around the slide, with the thumb resting on the back side of the receiver. The slide is pulled back about $\frac{1}{8}$ inch, and the slide lock is pressed to the bottom of its slide using the other hand. Noting that the recoil spring is under high pressure (so caution should be used); the user removes the slide from the receiver. He or she grasps the recoil spring, pushes forward, and lifts the recoil spring with guide rod out of the slide of the pistol.

[0039] To remove the original take down lever, the user presses the locking spring down, then turns the pistol on its side and removes the take down lever. The user then inserts

the take down lever **110** of the claimed invention. The user then places the replacement recoil spring **165** over the guide rod with integrated illumination device **10**. Then, while pushing forward and down, the user inserts the guide rod **10** and recoil spring **165**. The user reassembles the slide to the pistol with the new guide rod and recoil spring installed. It is recommended that the user cycle the slide several times to assure proper operation.

[0040] While the invention has been illustrated and described in detail in the drawings and foregoing description, the same is to be considered as illustrative and not restrictive in character, it being understood that only the preferred embodiment has been shown and described and that all changes and modifications that come within the spirit of the invention are desired to be protected.

We claim:

1. A pistol guide rod with an integrated illumination device for identifying a potential target, the device comprising:

a hollow guide rod housing having an open first end and an open second end;

at least one broad spectrum light emitting diode partially protruding from the first open end of the housing and having a first lead and a second lead, the partial protrusion providing diffused illumination of an area adjacent the first end of the housing;

a contact pin within the housing electrically connected to the first lead of the light emitting diode;

a hollow insulator tube within the housing surrounding a portion of the light emitting diode and the contact pin, the second lead of the light emitting diode positioned outside the hollow insulator;

an end cap sized and shaped to cover the second end of the housing having an aperture therethrough;

a contact button partially extending through the aperture of the end cap;

a biasing member within the insulator tube adjacent the contact pin;

a self contained power source within the housing biased against the contact button by the biasing member; and

a take down lever with a centrally located lobe along one side and a nonconductive portion centrally positioned adjacent the lobe, lateral movement of the take down lever against the contact button moving the nonconductive portion away from the contact button providing a conductive path for the power source to illuminate the light emitting diode.

2. The device of claim 1 wherein the light emitting diode further comprises a rim about the light emitting diode engaging an internal shoulder of the housing.

3. The device of claim 1 wherein the electrical connection of the first lead to the contact pin comprises a multidirectional slot within an end of the contact pin frictionally receiving the first lead.

4. The device of claim 3 further comprising a button sleeve about the contact button isolating the contact button from the end cap.

5. The device of claim 4 wherein the end cap further comprises a set of internal threads for threaded engagement with external threads about the housing adjacent the second open end.

6. A pistol guide rod with an integrated illumination device for identifying a potential target, the device comprising:

- a hollow guide rod housing having an open first end and an open second end;
- at least one broad spectrum light emitting diode partially protruding from the first open end of the housing, the partial protrusion providing diffused illumination of an area adjacent the first end of the housing;
- a contact pin within the housing electrically connected to the light emitting diode;
- an insulator insulating the contact pin and a portion of the light emitting diode;
- an end cap sized and shaped to cover the second end of the housing having an aperture therethrough;
- a contact button partially extending through the aperture of the end cap;
- a biasing member within the insulator adjacent the contact pin; and
- a take down lever with a centrally located lobe along one side and a non-conductive portion centrally positioned adjacent the lobe.

7. The device of claim 6 further comprising a button sleeve about the contact button isolating the contact button from the end cap.

8. The device of claim 6 wherein the electrical connection of the light emitting diode to the contact pin comprises a first lead extending from the light emitting diode frictionally engaged with a multidirectional slot within an end of the contact pin.

9. The device of claim 8 wherein the light emitting diode further comprises a rim about the light emitting diode engaging an internal shoulder of the housing.

10. The device of claim 9 wherein the end cap further comprises a set of internal threads for threaded engagement with external threads about the housing adjacent the second open end.

11. A guide rod with integrated electric illumination device for a pistol providing diffused illumination for target identification activated by movement of a pistol take down lever completing an electric circuit of the illumination device.

12. The guide rod of claim 11 wherein the electric illumination device is a light emitting diode protruding from a flange of a slide of the pistol connected in the electric circuit.

13. The guide rod of claim 12 wherein the light emitting diode is powered by a power source within the guide rod.

14. The guide rod of claim 13 wherein the electric circuit contacts the power source through an electrically conductive biasing member biasing the power source against a contact button providing selective completion of the electric circuit during movement of the take down lever against the contact button.

15. The guide rod of claim 14 wherein the light emitting diode further comprises a rim about the light emitting diode engaging an internal shoulder of the housing.

16. The guide rod of claim 15 further comprising a button sleeve about the contact button electrically isolating the contact button from the guide rod.

17. A pistol guide rod with an integrated illumination device for identifying a potential target, the device comprising:

- a hollow guide rod housing having an open first end and an open second end;
- a light emitting diode providing diffused illumination of an area adjacent the first end of the housing;
- a contact pin within the housing electrically connected to the light emitting diode;
- an insulator insulating the contact pin and a portion of the light emitting diode;
- an end cap sized and shaped to cover the second end of the housing having an aperture therethrough;
- a contact button partially extending through the aperture of the end cap;
- a biasing member within the insulator connected to the contact pin providing an electrical connection to a power source during use; and
- a take down lever with a centrally located lobe along one side and a non-conductive portion centrally positioned adjacent the lobe.

18. The device of claim 17 further comprising a button sleeve about the contact button electrically isolating the contact button from the end cap.

19. The device of claim 18 wherein the electrical connection of the light emitting diode to the contact pin comprises a first lead extending from the light emitting diode frictionally engaged with a multidirectional slot within an end of the contact pin.

20. The device of claim 19 wherein the light emitting diode protrudes from the open first end of the housing through a flange of a slide of a pistol during use.

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