United States Patent [19]

Elliott, Jr. et al.

[11] **3,914,873**

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[54] **ILLUMINATED GUN SIGHTS**

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[52] **U.S. Cl.** **33/241**; 240/6.41

[51] **Int. Cl.**[2] **F41G 1/32**

[58] **Field of Search** 33/241; 240/6.41

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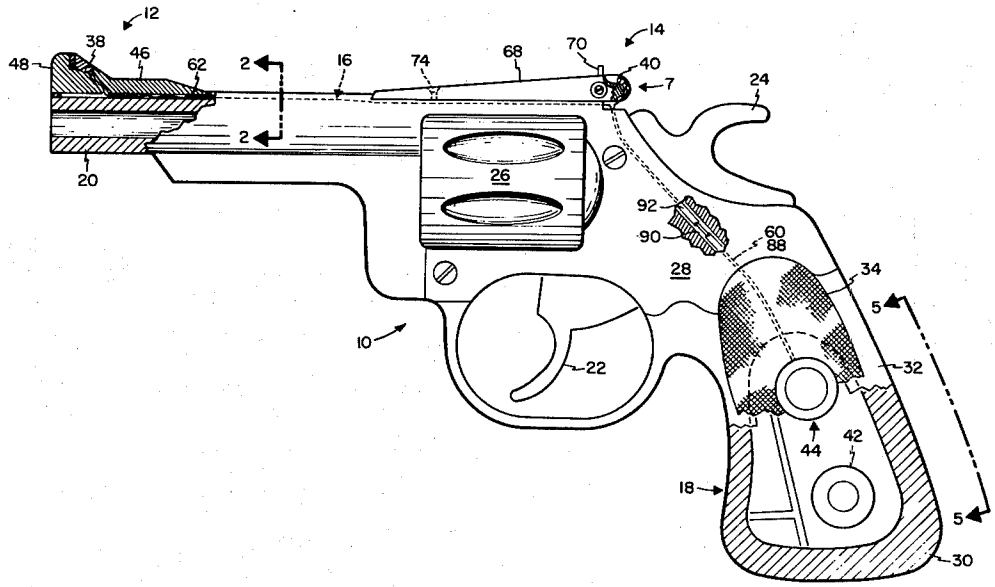
Assistant Examiner—Richard R. Stearns
Attorney, Agent, or Firm—Donald R. Nyhagen

[57] **ABSTRACT**

Battery powered illuminated gun sights for facilitating accurate aiming of a gun in the dark. The sight illumination is furnished by miniature shock-resistant light emitters, such as light emitting diodes, which are energized from batteries contained in the gun by operation of a switch on the gun. The sights are preferably illuminated with red light to avoid degrading of the user's night vision and in such a way that the illuminated portions of the sights are not visible from the front and sides of the gun and hence do not reveal the user's location. The front and rear sights may be distinguished by illumination of different intensity or color to facilitate proper alignment of the sights when aiming.

7 Claims, 11 Drawing Figures



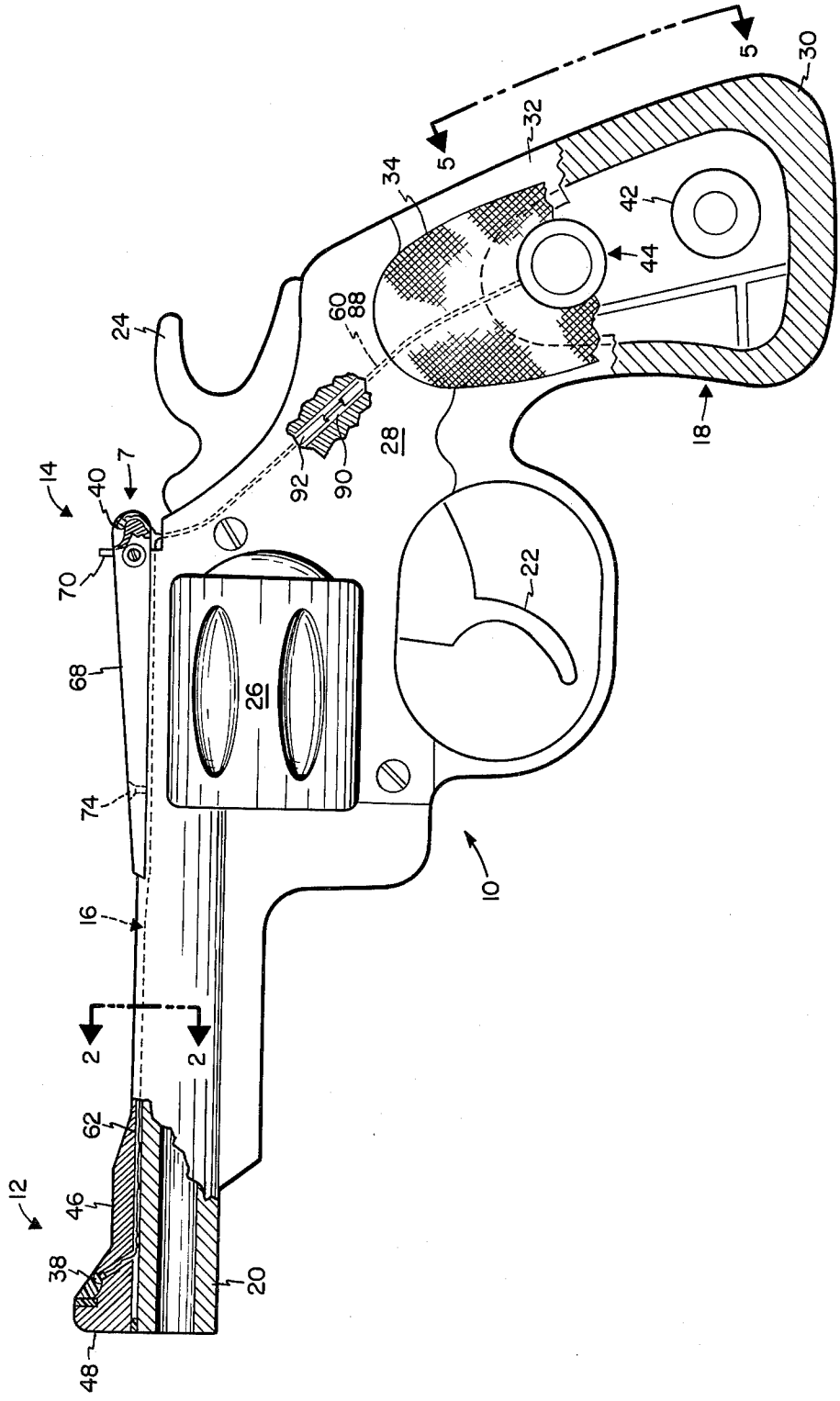

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Fig. 1

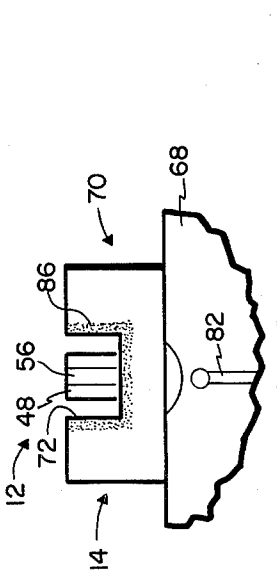

Fig. 7

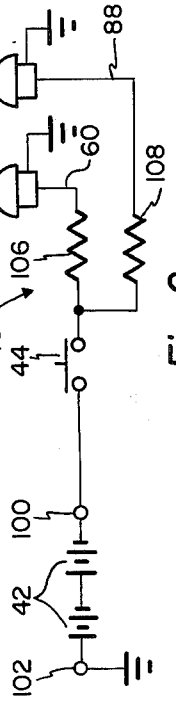

Fig. 8

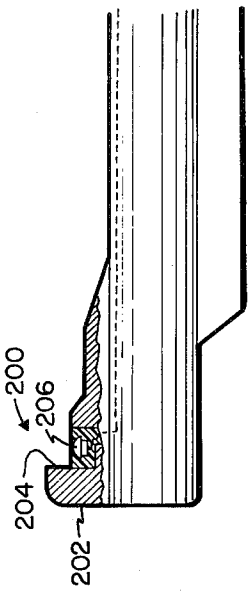

Fig. 9

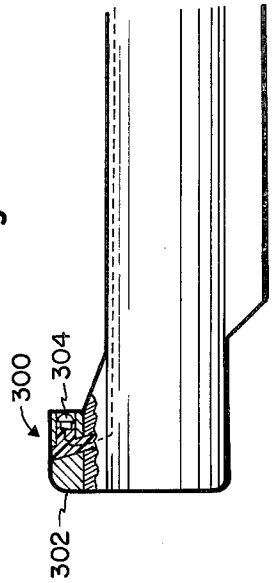

Fig. 10

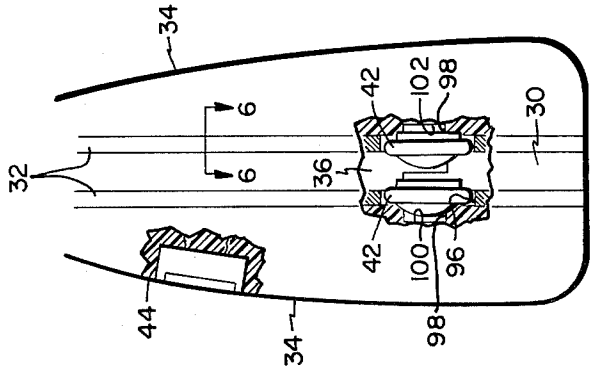

Fig. 5

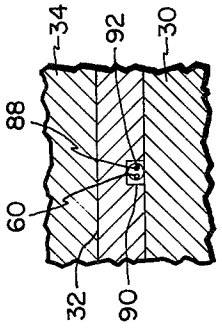

Fig. 6

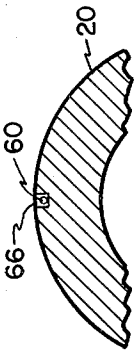

Fig. 2

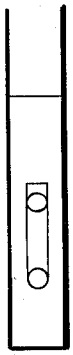

Fig. 3A

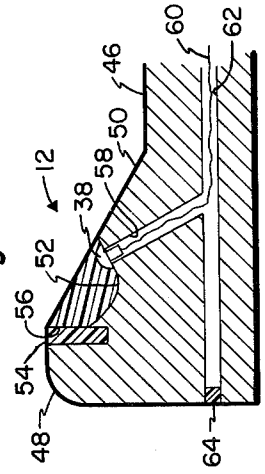

Fig. 3

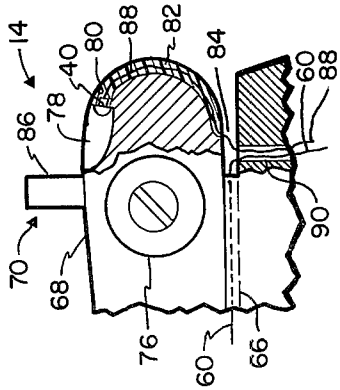

Fig. 4

ILLUMINATED GUN SIGHTS

BACKGROUND OF THE INVENTION

Field of the Invention

This invention relates generally to guns and more particularly to improved battery powered illuminated gun sights.

Discussion of the Prior Art

Aiming a conventional gun in the dark with any degree of accuracy is extremely difficult owing to the fact that the gun sights cannot be seen and hence the gun must be aimed or pointed by "feel." A variety of night aiming devices for guns have been proposed to overcome this problem, including light amplifying sights, light beam aiming devices, and illuminated gun sights. These aiming devices, however, have inherent disadvantages which restrict or prohibit their use by law enforcement officers and others who have a need for a night aiming device.

Light amplifying sights, for example, are costly, bulky, require a high voltage power supply, and are ill-suited for use on hand guns. Light beam aiming devices are similarly deficient and, in addition, reveal the user's location. Illuminated gun sights are the most practical from the standpoint of cost, compactness, adaptability to hand guns, and electrical power requirements. The existing illuminated sights of which we are aware, however, are deficient in other respects and hence have not been favored by widespread use, particularly by law enforcement agencies. A particularly serious deficiency of these illuminated sights, for example, resides in their use of small filament type incandescent light bulbs to furnish the sight illumination. Such bulbs are incapable of withstanding the shock of firing. Also, many illuminated sights are visible from the front and sides of the gun and hence reveal the user's location.

SUMMARY OF THE INVENTION

This invention provides improved battery powered illuminated gun sights which avoid the foregoing and other disadvantages of the existing illuminated sights. According to one feature of the invention, for example, the sight illumination is furnished by miniature shock resistant light emitters, such as light emitting diodes, capable of withstanding the shock forces involved in firing a gun.

According to another feature of the invention, the light emitters are recessed into the sights and illuminate the latter in such a way that the illuminated portions of the sights are not visible from the front and sides of the gun and hence do not reveal the user's location. In one described form of the invention, for example, the sights are provided with rearwardly facing reflecting surfaces, and the light emitters are recessed into the sights directly to the rear of these surfaces in such a way as to illuminate the surfaces. These illuminated sight surfaces are visible only from the rear of the gun by light reflected from the surfaces. In another described embodiment, the light emitter of the front sight is recessed into the sight and faces rearwardly so as to be directly visible from the rear of the gun.

The light emitters are connected to an energizing circuit including batteries housed in the gun and a switch on the gun. This switch is operable by the gun user to turn the emitters on and off. The particular gun described is a hand gun or pistol in which the battteries are housed within the hand grip of the gun, and the switch is mounted at one side of the grip for operation by the user's fingers or palm.

According to a further feature of the invention, the front and rear sights may be distinguished by illumination of different intensity or color to facilitate aiming of the gun with the illuminated sights. The sight illumination is preferably red light to avoid degrading of the user's night vision.

The light emitters and energizing circuit of the sight illumination means are sealed in such a way as to permit exposure of the gun to the elements, cleaning and other maintenance of the gun, and normal use of the gun without adverse effect on the illumination means. The sight illumination means is extremely compact and usable on virtually any type of gun including rifles, shot guns, and hand guns of both the civilian and military variety.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a side elevation of a gun, in this instance a hand gun, embodying illuminated sights according to the invention with portions of the gun broken away for clarity;

FIG. **2** is an enlarged section taken on line **2—2** in FIG. **1**;

FIG. **3** is an enlarged longitudinal section through the front gun sight;

FIG. **3A** is a top view of the front gun sight in FIG. **3**;

FIG. **4** is an enlarged side elevation, partly in section, of the rear gun sight;

FIG. **5** is a view looking in the direction of the arrows on line **5—5** in FIG. **1**;

FIG. **6** is an enlarged section taken on line **6—6** in FIG. **5**;

FIG. **7** is an enlarged view looking in the direction of arrow **7** in FIG. **1**;

FIG. **8** is a circuit diagram of the sight illumination system;

FIG. **9** illustrates a modified illuminated front gun sight according to the invention; and

FIG. **10** illustrates a further modified illuminated front gun sight according to the invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT

FIGS. **1–8** illustrate a gun **10** embodying illuminated sights **12** and **14** according to the invention and an energizing circuit **16** for the sights. The particular gun shown is a hand gun, specifically a revolver of the type commonly carried by police officers and other law enforcement officers. Except for the illuminated sights and their energizing circuit, the gun is conventional and hence need not be described in elaborate detail. Suffice it to say that the gun includes a hand grip **18,** barrel **20,** trigger **22,** hammer **24,** cylinder **26,** and inspection plate **28** which is removable to provide access to the interior mechanism of the gun. The hand grip **18** has a laminated construction including a center plate **30,** outer plates **32,** and face pieces **34.** The grip plates **30,** 32 define a void space **36** within the grip. The face pieces **34** are removably secured to the grip.

The illuminated gun sights **12** and **14** are front and rear sights, respectively. The illumination for these sights is furnished by miniature shock resistant light emitters **38** and **40.** These light emitters are preferably light emitting diodes, although it is considered to be

within the scope of the invention to utilize other suitable miniature shock resistant light emitters or sources. The sight energizing circuit **16** includes batteries **42** housed within the hand grip **18** of the gun and a switch **44** on the hand grip operable by the gun user to connect the light emitters **38, 40** to and disconnect the emitters from the batteries, thus to turn the emitters on and off.

Referring now in greater detail to the particular sight illumination means illustrated, the front sight **12** is located at the front end of the gun barrel **20** and has a lower upstanding base or ramp **46** integral with and extending longitudinally along the upper side of the barrel. Rising from this ramp in a plane containing the longitudinal axis of the barrel is a relatively thin sight rib **48** which constitutes the front sight member of the conventional gun. Sight rib **48** has a rear beveled, rearwardly facing edge **50** which slopes rearwardly and downwardly from the upper tip edge of the rib to the sight ramp **46.**

Milled or otherwise formed in the sight rib **48** and entering its rear sloping edge **50** is a semicircular recess **52.** A small bore **54** enters the upper tip edge of the sight rib normal to the axis of the barrel **20** and intersects the front end of the sight rib. The front wall surface **56** of this bore is painted white or otherwise treated to form a reflecting surface. This reflecting surface **56** faces rearwardly of the barrel **20** and is visible from the rear of the gun through the rearwardly facing open side of the sight rib recess **52.**

The light emitter **38** of the front sight **12** is a light emitting diode which is fixed within a bore **58** entering the bottom wall of the sight rib recess **52** adjacent the front end of the recess and at an oblique angle to the axis of the gun barrel **20.** Bore **58** slopes forwardly and upwardly, and the light emitter or diode **38** is positioned in the upper end of the bore and projects into the recess **52** so as to illuminate the reflecting surface **56** of the sight when the diode is energized. As will be explained in more detail presently, the front sight **12,** when illuminated in the dark by the light emitting diode **38,** may be seen from the rear end of the gun by light reflection from the sight surface **56.** According to a preferred feature of the invention, the sight recess **52** and bore **54** are filled with a transparent potting compound or other suitable transparent substance to seal the front sight illumination means against dirt, dust, moisture and the like.

One terminal of the light emitting diode **38** is grounded to the metal of the front sight **12.** The other diode terminal is connected to a wire lead **60** which extends downwardly through the sight bore **58** and then rearwardly through a bore **62** which extends longitudinally through the front sight ramp **46** in intersecting relation to the bore **58.** The bore **62** may be drilled through the ramp **46** from its front end, after which the front end of the bore is sealed by potting compound **64** or the like. The rear end of the bore **62** opens to a groove **66** extending along the top of the gun barrel **20** and through which the diode lead **60** extends to the rear end of the barrel. The rear end of the bore **62** and the groove **66** are sealed with potting compound. As will be explained presently, the diode **38** is energized through the lead **60** to illuminate the front sight **12.**

The rear sight **14** is located adjacent the rear end of the barrel **20** and includes a ramp **68** seating on top of the barrel. Rising from the upper side of this ramp is a rear sight member **70** which, in this instance, is an open sight having a sight opening **72** in the form of a slot entering the upper edge of the sight member. The gun **10** is aimed in the usual way by aligning the front sight rib **48** and rear sight opening **72** in the manner shown in FIG. **7.** The rear sight ramp **68** is pivotally attached at its front end to the gun barrel **20** by a pivot **74** and has a rear windage adjustment screw **76** for adjusting the rear end of the ramp and hence the rear sight member **70** laterally of the gun barrel to correct for windage in the well known way. The rear gun sight described to this point is the standard rear sight.

According to the present invention the upper side of the rear sight ramp **68,** rearwardly of the rear sight member **70,** is recessed at **78** and has a bore **80** entering the rear end of the ramp at an oblique angle to the longitudinal axis of the ramp and sloping forwardly and upwardly to the ramp recess **78.** a groove **82** extends from the rear end of the bore **80,** around the rear curved end of the ramp, to the underside of the ramp. The lower end of groove **82** opens to a clearance space **84** between the underside of the rear end of the ramp and the rear end of the gun barrel **20.** The rear end of the barrel groove **66** extends under the rear ramp **68** and opens rearwardly to the clearance space **84.**

The light emitter **40** of the rear sight **14** is a light emitting diode which is fixed in the upper end of the rear ramp bore **80** and projects into the ramp recess **78** to illuminate the rear side of the rear sight member **70** when the diode is energized. A portion **86** of the rear surface of the sight member about its opening **72** is painted white or otherwise rendered reflective to outline the opening when illuminated by the diode.

One terminal of the light emitting diode **40** is grounded to the metal of the rear ramp **68** and hence to the metal of the gun barrel **20.** The other diode terminal is connected to a wire lead **88** which extends downwardly through the ramp bore **80** to the ramp groove **82** and then through this groove to the clearance space **84.** Preferably, groove **82** is filled with potting compound or other suitable substance. The portion of the lead **88** within the clearance space **84** is provided with sufficient slack to permit elevation adjustment of the rear sight.

The diode leads **60, 88** comprise part of the light emitter energizing circuit **16.** These leads extend from the barrel groove **66** and ramp groove **82,** respectively, through space **84** into a groove **90** in the inner side of the gun inspection plate **28** and then downwardly through this groove to the switch **44** of the energizing circuit. Preferably, the portions of the leads within the inspection plate groove are encased in a plastic sleeve or sheath **92.**

Referring to FIG. **5,** it will be seen that the batteries **42** are arranged end to end within the interior space **36** of the gun hand grip **18.** Any suitable batteries may be used, such as nickel-cadmium batteries. The batteries are held in position by any convenient battery holding means. The particular holding means shown comprises holes **96** in the hand grip plates **32** which receive the batteries and contacts **98** in the inner sides of the hand grip plates **34** into which the outer ends of the batteries project. Mounted on the outer bottom walls of the recesses **98** are battery contacts **100, 102.** The energizing circuit switch **44** is a normally open switch recessed into the outer side of one hand grip face plate **34,** in this

instance the left-hand face plate, in a position for engagement by the user's fingers or palm.

Turning now to FIG. 8, illustrating in schematic diagram fashion the energizing circuit 16, the batteries 42 are arranged in electrical series between the battery contacts 100, 102. The front and rear sight light emitting diodes 38, 40 are connected in electrical parallel to one terminal of switch 44 through the diode leads 60, 88. The other switch terminal is connected to the battery contact 100. The other battery contact 102 is grounded to the metal of the gun body. Accordingly, closure of the switch 44 energizes the diodes 38, 40 to illuminate the front and rear gun sights 12, 14.

As noted earlier, the diode 38, when energized, illuminates the rearwardly facing reflecting surface 56 of the front sight 12. The diode 40, when energized illuminates the rearwardly facing reflecting surface portion 86 of the rear sight 14. The illuminated sights are thus seen from the rear of the gun by light reflection from these sight surfaces. Referring to FIG. 7, it will be seen that the illuminated front sight appears as a small rectangle of light. The illuminated rear sight appears as a U-shaped patch of light which bounds the rear sight opening 72. The gun is aimed by aligning the front rectangle of light with the opening 72 defined by the rear patch of light, as shown in FIG. 7. It is important to note that the illuminated portions of the gun sights are not visible from the front or sides of the gun and hence do not reveal the shooter's position.

According to a preferred feature of the invention, the sights 12, 14 emit red light when illuminated to avoid degrading the user's night vision. This may be accomplished by utilizing red light emitting diodes for the light emitters 38, 40. However, it is considered to be within the scope of the invention to use light emitters of other colors. According to another preferred feature, the front and rear sights are distinguished by illumination of different characteristics, such as color or intensity, to facilitate alignment of the illuminated front sight with the illumination bounded opening in the rear sight. In the particular gun shown, for example, the sights are distinguished by illumination of differing intensity. To this end, resistors, 106, 108 are serially connected in the diode leads 62, 88. The resistor 106 has a lower resistance value than resistor 108, such that the illumination intensity of the front sight is slightly greater than the illumination intensity of the rear sight.

In the particular gun shown, the batteries 42 are replaced when necessary by removing from the hand grip 18 one or both of the hand grip face pieces 34. If desired, rechargeable batteries may be used, and the gun may be equipped with a battery recharging circuit including a jack accessible on the outside of the hand grip for connection to a suitable recharging power source.

The modified front gun sight 200 in FIG. 9 is similar to that of FIGS. 1–8 except that the sight rib 202 is cut away to form the sight reflecting surface 204. This surface may be painted white or otherwise rendered reflective in the same manner as the reflecting surface of the front sight in FIGS. 1–8. The light emitter or light emitting diode 206 of the sight 200 is recessed into the bottom edge of the sight rib contact, just to the rear of the surface 204, as shown, so as to illuminate the surface when energized. The diode is potted in place, as illustrated.

The modified illuminated front sight 300 of FIG. 10 has a sight rib 302 with a rear edge into which the light emitter or light emitting diode 304 of the sight is recessed, as shown. In this sight configuration, the diode faces rearwardly along the gun barrel and is viewed directly through the rear sight opening. The recess or bore receiving the diode is sealed with a suitable potting compound.

What is claimed is:

1. In a gun having a barrel, the improvements comprising:
- a rear illuminated sight along said barrel comprising an upstanding sight member at the breech end of said barrel having a sighting aperture and a reflecting surface about said aperture facing rearwardly of said barrel,
- a light emitter recessed into said gun rearwardly of said sight member so as to be located below the level of said sight member and facing said sight member for illuminating said sight surface, whereby the illuminated sight member is visible in the dark from the breech end of the gun by light reflection from said sight surface,
- an energizing circuit connected to said light emitter including switch means on said gun to be operated by the gun user for switching said light emitter on and off, and
- said light emitter comprising a light emitting diode which produces light by electro-luminescence.

2. In a gun having a barrel, the improvements comprising:
- a front illuminated sight along said barrel comprising a relatively thin upstanding sight rib at the muzzle end of said barrel having a recess entering an edge of said rib and a reflecting surface within the front end of said recess and facing rearwardly along said barrel,
- a light emitter within said recess below the level of said reflecting surface for illuminating said surface, whereby the illuminated front sight is visible in the dark from the breech end of the gun by light reflection from said surface,
- a transparent filler material filling said recess,
- an energizing circuit connected to said light emitter including switch means on said gun to be operated by the gun user for switching said light emitter on and off, and
- said light emitter comprising a light emitting diode which produces light by electro-luminescence.

3. In a gun having a barrel, the improvements comprising:
- two illuminated sights spaced along said barrel each having a reflecting surface facing rearwardly along the barrel and a light emitter for illuminating said reflecting surface,
- the light emitter for each sight being recessed into said gun rearwardly of the respective sight reflecting surface so as to be located below the level of the respective surface and facing the respective surface, whereby the illuminated sights are visible in the dark from the breech end of the gun by light reflection from said sight surfaces,
- an energizing circuit connected to said light emitters including switch means on said gun to be operated by the gun user for switching said light emitters on and off, and
- said light emitters comprising light emitting diodes which produce light by electro-luminescence.

4. In a gun having a barrel, the improvements comprising:

two illuminated sights spaced along said barrel each including a light emitter for illuminating the respective sight,

one sight being a front sight comprising a relatively thin upstanding longitudinal sight rib at the muzzle end of said barrel having a recess entering an edge of the rib and containing the front sight light emitter in such a way that light from said front emitter is visible at the breech end of said barrel,

the other sight being a rear sight comprising an upstanding sight member at the breech end of said barrel having a sighting aperture and a reflecting surface about said aperture facing rearwardly of said barrel, the rear sight light emitter being recessed into the gun rearwardly of said sight member so as to be located below the level of the sight member and facing said sight surface for illuminating said surface, whereby the illuminated sight member is visible by light reflection from the surface,

an energizing circuit connected to said light emitters including switch means on said gun to be operated by the gun user for switching said light emitters on and off, and

said light emitters comprising light emitting diodes which produce light by electro-luminescence.

5. The improvements according to claim 4 wherein:

said sight rib has a reflecting surface at the front end of said sight rib recess and facing rearwardly along said barrel, and said front light emitter is located below the level of and illuminates said later surface, whereby the illuminated front sight is viewed by light reflection from the latter surface.

6. The improvements according to claim 5 wherein:

said sight rib reflecting surface is located within the front end of said rib recess and,

said sight rib recess is filled with a transparent filler material.

7. The improvements according to claim 4 wherein:

said sight rib edge faces rearwardly along said barrel, and said front light emitter faces rearwardly so as to be visible from the rear of said gun.

* * * * *