

LIGHT ASSEMBLY OF PRE-DEFINED SHAPE

FIELD OF THE INVENTION

The present invention relates, in general, to the field of lighting devices. More particularly, it concerns a light assembly of pre-defined shape, for removable attachment to a mating guide.

BACKGROUND OF THE INVENTION

In the art, there are many designs of single purpose light assemblies which are or can be mounted on specific devices. There are also many designs of light assemblies which are used as independent light assemblies. However, few of them are designed to be readily removably mounted on any suitable device while being able to be readily used separately, as an independent light assembly.

More particularly, in the specific field of weapons, there has been a number of target illumination and/or aiming accessories, such as lasers, sights, flashlights or other accessories which can be mounted on firearms since, in this case, one major concern is proper target illumination and/or aiming at the target of interest. Most of these accessories use various forms of locking screws, captive screws, nut and bolt clamps or other similar techniques to clamp the accessory to the weapon, as opposed to a latch and rail groove mechanism which would safely guide and lock the accessory to the weapon. Examples of such prior art accessories are given in US patents or patent applications nos. US 2001/0027620 A1; US

2001/0045046 A1; US 5,555,662; US 5,584,137; US 5,941,489; and US 6,565,226.

As can be appreciated, the just-mentioned target illumination and/or aiming accessories present a number of caveats. Accordingly, such accessories can not be readily mounted on and detached from the weapon. In most cases, such mounting and detaching require the use of specific tools, or of both hands. Therefore, the weapon user can not simply grip the target illumination and/or aiming device with one hand and readily mount it on his/her weapon in order to proceed to a precise triggering.

Other related prior art documents also present significantly different types of attachment methods to weapons or involve weapons that do not have a standard rail which can be interfaced with target illumination and/or aiming accessories. Examples of such prior art accessories are given in US patents nos. US 2002/0007581 A1; US 2002/0100204 A1; US 4,707,772; US 4,777,754; US 5,040,322; US 5,727,346; US 5,816,683; US 5,822,905; US 6,318,014; and US 6,574,901. The problem of such prior art devices is again the cumbersome mounting process as well as the bulkiness of such devices. More specifically, if the accessories can not be readily mounted on the weapon, they have to be provided with their specific mounting device thus decreasing the motility of the weapon user.

Also known in the prior art is a clamping mechanism for attaching an auxiliary apparatus to the frame of a weapon, which is further characterized in that the actual attachment or removal of the apparatus can be accomplished by a user with one hand, without using separate brackets or other mechanical components. These elements are disclosed in US patent no. US 5,430,967 (Woodman *et al.*).

Further, prior art target illumination and/or aiming devices are all suited for use as an independent hand held light assembly, because of their protruding clamping mechanism, which makes them non-ergonomic. Further, their exposed clamping mechanism is often prone to breakage if
5 shocked and to contamination from exposure to dust, water, and other contaminants.

It is thus apparent, from the above-mentioned prior art documents, there is a lack for a light assembly which can be readily mounted on a mating
10 guide, which, in a preferred application, is provided on a weapon, and which can be readily used separately, as an independent light assembly.

SUMMARY OF THE INVENTION

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An object of the present invention is to provide a light assembly which satisfies the above-mentioned needs.

More specifically, an object of the present invention is to provide a light
20 assembly to be readily mounted on a mating guide provided on any convenient device and be readily removed therefrom while resuming its original pre-defined shape, in order to be usable as a separate entity.

In accordance with the present invention, this object is achieved with a
25 light assembly having a pre-defined shape, for removable attachment to a mating guide provided on a weapon or other device on which the light assembly is to be mounted. The light assembly comprises a housing, provided with suitable optics having a light source at one end thereof and batteries for powering the light source through a switch. The housing of
30 the light assembly has a pair of lateral members which can both be moved between a retracted position and an extended position. When the lateral

members are in the retracted position, the light assembly has the above-mentioned pre-defined shape. When the lateral members are in the extended position, these members are adapted to engage the mating guide provided on the weapon or other device on which the light assembly
5 is to be mounted. When the lateral members are in the extended position they are locked in place by a latch lock. Preferably, each one of the lateral members is provided with a longitudinal rail groove which is shaped and sized to slidably engage a corresponding flange on the mating guide. The housing of the light assembly of the present invention further has means
10 for preventing longitudinal movement of the light assembly on the mating guide.

According to a preferred embodiment of the present invention, the mating guide is provided with a plurality of cross-slots and each one of the lateral
15 members further includes a latch having an upper portion and a lower portion. The upper portion and the lower portion of the latch have an inner face adjacent to the side of the housing and an outer face. The lower portion of the latch also has a latch projection projecting inwardly from the inner face of the lower portion of the latch, for engaging any one of the
20 above-mentioned cross-slots. The latch is pivotable between an operative and an inoperative position so that when the latch is in the operative position, it is normally inwardly biased, with the latch projection protruding into the side of the housing, thus providing the means for preventing longitudinal movement of the light assembly on the mating guide. When
25 the latch is in the inoperative position, the upper portion is pivoted inwardly toward the housing while the lower portion is pivoted outwardly away from the housing, thereby preventing the latch projection from engaging the cross-slots.

30 In a further preferred embodiment of the present invention, the mating guide is provided on a weapon.

According to a further aspect of the present invention, there is also provided a method for removably attaching the light assembly as defined above, to a mating guide.

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The method for removably attaching the light assembly, as defined above, to a mating guide comprises the steps of:

- a) providing a light assembly as described above;
- b) depressing the latches to the inoperative position so as to allow
10 the lateral members to slide until they are in the extended position and the latch lock engaged ;
- c) engaging the longitudinal rail grooves of the light assembly into the flanges of the mating guide;
- d) moving and maintaining the latches in their inoperative position,
15 while sliding the light assembly on the mating guide; and
- e) moving the latches in their operative position so as to lock the light assembly in place on the mating guide.

Preferably, the method for removably attaching the light assembly further
20 comprises the step of detaching the light assembly from the mating guide, the step of detaching comprising the sub-steps of:

- f) moving and maintaining the latches in their inoperative position, while sliding the light assembly longitudinally off the flanges of the mating guide; and
- 25 g) depressing the latch lock so that the latches slide back into the light assembly, so that the light assembly resumes its pre-defined shape.

In a further preferred embodiment, the method further comprises the initial step of mounting the mating guide on a weapon.

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As can be appreciated, the light assembly according to the invention is very versatile, as it can be mounted on any suitably shaped mating guide (either integrated into or mounted through appropriate fasteners) provided on any suitable device while still being usable as a separate entity aside
5 from the device and the mating guide.

These and other features, objects and advantages of the present invention will be better understood upon reading the following non-restrictive description of preferred embodiments thereof, made with reference to the
10 accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

15 Figure 1A is a side view of a light assembly, according to a preferred embodiment of the invention.

Figure 1B is a front view of the light assembly shown in Figure 1A, the lateral members being in the extended position.

Figure 1C is a front perspective view of the light assembly of Figure 1A.

20 Figure 1D is a front perspective view of the light assembly shown in Figure 1B.

Figure 2A is a side perspective view of the light assembly of Figure 1A which is mounted on a generic weapon guide.

25 Figure 2B is a side perspective view of the light assembly of Figure 1A which is mounted on a long gun such as a rifle guide.

Figure 2C is a side perspective view of the light assembly of Figure 1A which is mounted on a hand gun guide.

30 While the invention will be described in conjunction with preferred embodiments, it will be understood that it is not intended to limit the scope of the invention to such embodiments. On the contrary, it is intended to

cover all alternatives, modifications and equivalents which may be included, as defined by the appended claims.

5 DESCRIPTION OF PREFERRED EMBODIMENTS

In the following description, similar features in the drawings have been given similar reference numerals and, in order to lighten the figures, some elements are not referred to in some figures if they were already identified
10 in a previous figure.

Throughout the present description, the light assembly of the present invention will mostly be described and illustrated with respect to a mating guide provided on a weapon, but it should be understood that such a
15 mating guide could be provided on any suitable device, such as for non limitative examples, a paintball gun, a bicycle, a protecting helmet (for use in mining, caving or other applications) or other headgear, a watercraft, a wristband, scuba diving gear, a belt clip, a building, a post or other construction, a tent, or any other device which could advantageously make
20 use of a lighting assembly.

Referring to Figures 1A to 1D, and 2A to 2C, there is shown a light assembly **10** according to a preferred embodiment of the present invention. The light assembly **10** has a pre-defined shape, and is
25 removably attachable to a mating guide **20**, which is preferably provided on a weapon. Any mating guide, preferably provided with parallel flanges **22** can be used to slidably engage the longitudinal rail groove **32** on the lateral members of the light assembly's housing. This allows any guide, such as a railing system (an example of which is the M-1913
30 (Picatinny)rail) or any equivalent thereof, to engage a light assembly while

being mounted on the device of interest, advantageously on the weapon of interest.

The light assembly **10** comprises a housing, preferably with two sides.
5 Each side of the housing of the light assembly **10** is provided with a pair of lateral members **30**, preferably received by corresponding channels **40** provided on each side of the housing. As shown in Figures 1A to 1D, each channel **40** preferably comprises a back face **42** and stop screw **41** for maintaining the lateral member **30** within each channel **40**. Alternatively
10 and as shown in Figures 2A to 2C, the channel **40** can be substantially U-shaped and sized to receive a corresponding lateral member **30**. This channel **40** is provided with guiding members **46** protruding from the channel **40**, preferably from the back face **42** thereof, for slidably engaging corresponding grooves **48**.

15 The lateral members **30** are movable between a retracted position, as shown in Figure 1C, and an extended position, as shown in Figure 1D, by a distance at least equal to distance **x**. Distance **x** is the distance between the longitudinal rail groove **38** and the lowest point **A** of the housing, as
20 shown in Figures 1B and 1D.

In order for the lateral members **30** to remain in the retracted position, locking means are provided by the latch lock **31**. Similarly, locking means are provided to prevent the lateral members **30** from extending beyond the
25 extended position by stop screws **41**.

When the lateral members **30** are locked in their retracted position, these lateral members **30** are adapted to engage the housing. Referring especially to Figure 1D, one can appreciate that each channel **40**
30 comprises a back face **42** and sidewalls **44**.

When the lateral members **30** are locked in their extended position, they are positioned so that the lowest point **A** of the housing is as close as possible to the mating guide **20** in order to allow the eventual sliding movement of the light assembly **10** on the mating guide **20**. Referring
5 more specifically to Figure 1B, one can appreciate that each lateral member **30** comprises an inner substantially inner planar face **32**. The inner planar face **32** of the lateral members **30** is further characterized in that it is adjacent to the side of the housing and provided with a longitudinal rail groove **38**. The longitudinal rail groove **38** is shaped and
10 sized to slidably engage a corresponding flange **22** of the mating guide **20**.

Preferably, the mating guide is provided with a plurality of cross-slots **60** and each lateral member **30** further includes a latch **70** with an upper portion **72** and a lower portion **74**. Each one of the upper portion **72** and
15 the lower portion **74** has an inner face, adjacent to the side of the housing, and an outer face.

Each latch further has a latch projection **78** projecting inwardly from the inner face of the lower portion **74** of the latch, for engaging any one of the
20 cross-slots **60**. Each latch **70** is further characterized in that it is preferably rotatable about a pivot between an operative position and an inoperative position.

Without departing from the scope of the present invention, it will be
25 apparent for any person skilled in the art that the means for preventing longitudinal movement of the light assembly can comprise at least two, and preferably a plurality of projections protruding downwardly and outwardly from the area below the housing closest to the guide. Such projections would serve the same purpose as the latch projections **78** in
30 their operative position.

Referring again to Figures 1B to 1C, the housing is provided with a suitable optics **12** having a light source **14** at one end thereof and batteries **16** for powering the light source **14**, such as a LED assembly, incandescent light bulb and/or laser or a combination thereof, through a switch, such as a push button switch **19**. The switch can be any type of electro-mechanical switching device including, but not limited to, a mechanically activated, electronically activated, or radio-frequency controlled switch. The light assembly **10** is further characterized in that the suitable optics, the batteries and the switch, enclosed in the housing, pre-define the shape of the light assembly **10**. By "pre-defined shape", it will be understood that the light assembly **10** has an advantageously uninterrupted profile when considered as a whole. More specifically, the uninterrupted profile of the light assembly **10** means that all the components of the housing have the same general shape, even though the optical piece is larger than the battery portion which, in turn, is smaller than the switch portion of the housing. The light assembly **10** may advantageously have an ergonomic shape so that the user can comfortably grip it with one hand. The light assembly **10** may thus have a rectangular, oval or triangular shape, but preferably, a substantially cylindrical shape.

As can also be appreciated from Figures 1A and 1C, the uninterrupted profile of the light assembly is best depicted when the lateral members **30** are in the retracted position. More specifically, the outer face of both the upper and lower portions **72**, **74** of the latch, as well as the outer face of the lateral members, are shaped so that they form this uninterrupted profile with the rest of the housing.

Furthermore, the light assembly **10** may advantageously be of dimensions similar to the dimensions of the mating guide **20**, as best shown in Figures 2A to 2C. More specifically, the width of the light assembly **10** is preferably

somewhat similar to the width of the mating guide. As can be understood, the width of the light assembly and the guide is determined along the axis perpendicular to the main axis of each of these elements. It is thus clear that, in the particular field of target illumination and/or aiming, the present
5 invention alleviates the need to use bulky light assemblies as target illumination and/or aiming device accessories, which are not practical on site where vigilance, accuracy and rapidity are of the essence.

The present invention also provides a method for removably attaching the
10 light assembly, as defined above, to a mating guide, preferably provided on a weapon. The method comprises the steps of:

- a) providing a light assembly as described above;
- b) depressing the latches to the inoperative position so as to allow the lateral members to slide to the extended position and the latch lock
15 engaged;
- c) engaging the longitudinal rail grooves of the lateral members into the flanges of the guide;
- d) moving and maintaining the latches in their inoperative position, while sliding the light assembly on the guide; and
- 20 e) moving the latches in their operative position so as to lock the light assembly in place on the guide.

Preferably, the method for removably attaching the light assembly further comprises the step of detaching the light assembly from the mating guide.
25 This step comprising the following sub-steps of:

- f) moving and maintaining the latches in their inoperative position, while sliding the light assembly longitudinally off the flanges off the guide; and
- g) depressing the latch lock so that the latches slide back into the light assembly so that the light assembly resumes its pre-defined shape.

Although preferred embodiments of the present invention have been described in detail herein and illustrated in the accompanying drawings, it is to be understood that the invention is not limited to these precise embodiments and that various changes and modifications may be effected
5 therein without departing from the scope or spirit of the present invention. It is clear from the present description that the proposed light assembly is particularly useful for mounting on a weapon. It should however be understood that the light assembly of the present invention is not limited to be used on a weapon and that any convenient applications such as
10 mounting on a bicycle, or on a protecting helmet, for example, are also envisaged and are encompassed by the present invention.

CLAIMS

1. A light assembly having a pre-defined shape, for removable
5 attachment to a mating guide, said light assembly comprising a housing provided with suitable optics having a light source at one end thereof and batteries for powering said light source through a switch, said housing having:
- 10 a) a pair of lateral members being movable between a retracted position and an extended position, wherein:
- when said members are in the retracted position, the light assembly has said pre-defined shape; and
 - when said members are in the extended position, said members are adapted to engage said mating
15 guide; and
- b) means for preventing longitudinal movement of the light assembly on the mating guide.
- 20 2. The light assembly according to claim 1, wherein the housing has two sides, each one of said two sides being provided with a channel for receiving a respective one of said lateral members, where each one of said lateral members comprises an inner substantially planar face bounded by a stop screw, and wherein the mating guide is
25 planar, parallel to the housing and perpendicular to the inner planar face of the lateral members, said mating guide comprising rail grooves parallel to each other projecting outwardly, planar to the mating guide; said inner face of the lateral members being adjacent to the housing and provided with a longitudinal groove proximate
30 and parallel to the lower edge, said longitudinal groove being shaped and sized to slidably engage the flange.

3. The light assembly according to claim 2, wherein when the lateral members are further provided with locking means for locking said lateral members in the retracted position and in the extended position.
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4. The light assembly according to claim 2, wherein each channel is shaped and sized to receive a corresponding lateral member, said channel comprising a back face for maintaining the lateral member within said channel.
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5. The light assembly according to claim 2, wherein each channel is substantially U-shaped and sized to receive a corresponding lateral member, said U-shaped channel being provided with guiding members protruding outwardly and perpendicularly from said channel, for slidably engaging corresponding grooves extending from the upper edge to the lower edge of the lateral members.
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6. The light assembly according to claim 2, wherein the mating guide is provided with a plurality of cross-slots and wherein each one of said lateral members further includes a latch having:
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- an upper portion and a lower portion, said upper portion and said lower portion each having an inner face adjacent to the side of the housing and an outer face; and
 - 25 - a latch projection projecting inwardly from the inner face of said lower portion of the latch, for engaging any one of said cross-slots,
 - said latch being inwardly biased;
- wherein the latch is pivotable between an operative position and an inoperative position so that:
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- 5 a- when the latch is in the operative position, with the latch projection protruding into the side of the housing, thereby providing the means for preventing longitudinal movement of the light assembly on the mating guide; and
- b- when the latch is in the inoperative position, the upper portion is pivoted inwardly toward the housing while the lower portion is pivoted outwardly away from the housing, thereby preventing the latch projection from engaging any one of said cross-slots.
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7. The light assembly according to claim 6, wherein each channel comprises a back face and sidewalls, said back face comprising a depression shaped and sized to receive a respective one of said latch projections so that, when the lateral members are in the retracted position, each one of said respective latch projections engages said respective depression.
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8. The light assembly according to claim 1, wherein the switch is a push button.
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9. The light assembly according to claim 1, wherein the pre-defined shape is a substantially cylindrical shape.
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10. The light assembly according to claim 1, wherein the light source is a LED assembly.
11. The light assembly according to claim 1, wherein the light source is a laser.
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12. The light assembly according to claim 1, wherein the light source is a combination of a LED and a laser.

13. The light assembly according to claim 1, wherein the light source is a combination of an incandescent light source and a laser.
14. The light assembly according to claim 1, wherein said mating guide
5 is provided on a weapon.
15. The light assembly according to claim 1, wherein said mating guide is provided on a device on which the light assembly is to be mounted.
10
16. A method for removably attaching a light assembly, said light assembly having a pre-defined shape, for removable attachment to a mating guide, said light assembly comprising a housing provided with suitable optics having a light source at one end thereof and
15 batteries for powering said light source through a switch, said housing having a pair of lateral members being movable between a retracted position and an extended position and means for preventing longitudinal movement of the light assembly on the mating guide, said method comprising the steps of:
- 20 a) providing said light assembly;
b) depressing the latches to the inoperative position so as to allow the lateral members to slide until they are in the extended position and the latch lock engaged;
c) engaging longitudinal rail grooves of the lateral members into
25 flanges of the guide;
d) moving and maintaining latches of the lateral members in an inoperative position, while sliding the light assembly on the mating guide; and
e) moving the latches in an operative position so as to lock the light
30 assembly in place on the mating guide.

17. The method of claim 16 further comprising of the step of detaching the light assembly from the mating guide, said step of detaching comprising the sub-steps of:
- 5 f) moving and maintaining the latches in the inoperative position, while sliding the light assembly longitudinally of the flanges of the mating guide; and
- g) depressing the latch lock so that the latches slide back into the light assembly, so that the light assembly resumes the pre-defined shape.
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18. The method of claim 16, further comprising the initial step of mounting said mating guide on a weapon.
19. The method of claim 16, further comprising the initial step of
- 15 mounting said mating guide on a device on which the light assembly is to be mounted.