



US 20180142991A1

(19) **United States**

(12) **Patent Application Publication**
Rogers et al.

(10) **Pub. No.: US 2018/0142991 A1**

(43) **Pub. Date: May 24, 2018**

(54) **FIREARM SIGHT AND UNIVERSAL MOUNT**

Publication Classification

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(51) **Int. Cl.**
F41G 11/00 (2006.01)

F41G 1/34 (2006.01)

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(52) **U.S. Cl.**
CPC **F41G 11/004** (2013.01); **F41G 1/345** (2013.01)

(21) Appl. No.: **14/948,245**

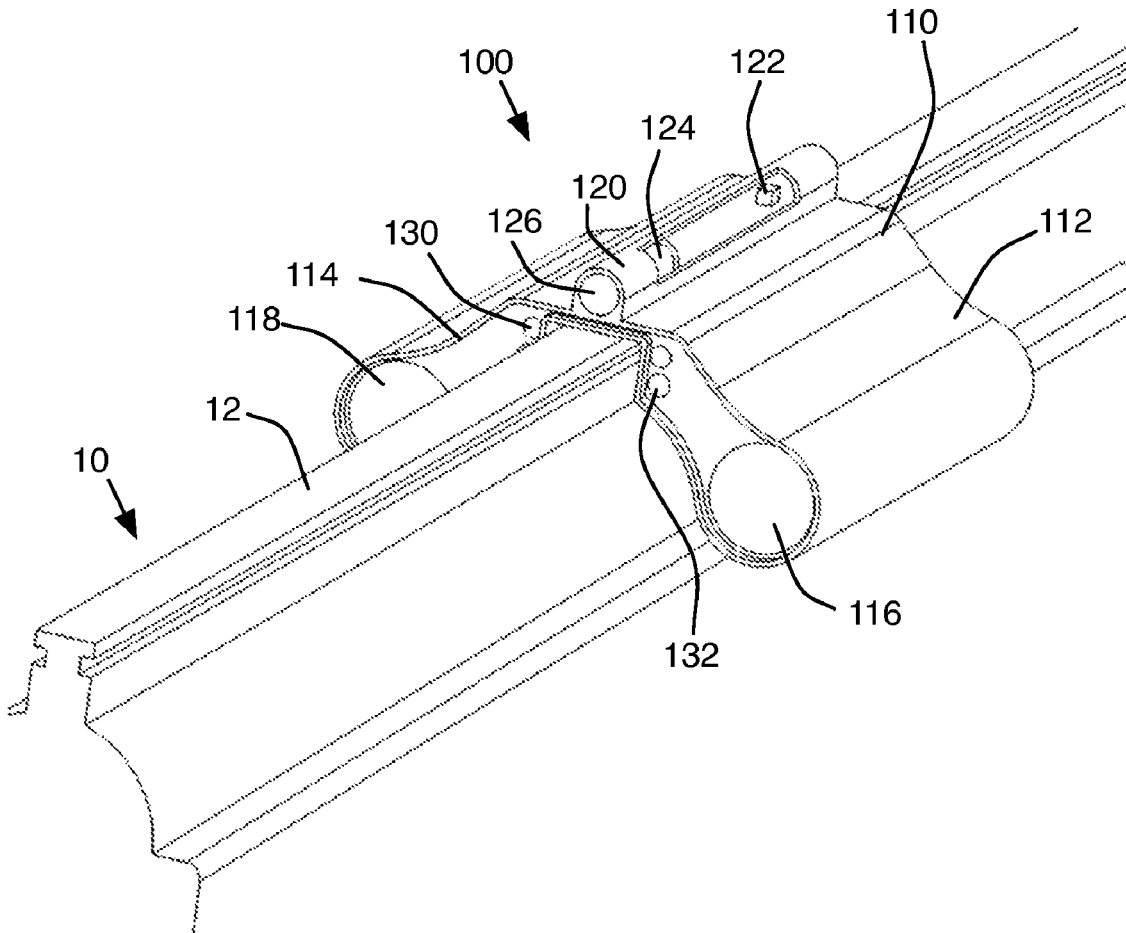
(57) **ABSTRACT**

(22) Filed: **Nov. 20, 2015**

A sight assembly may include a body or chassis having a channel configured and dimensioned to fit on and secure to the rib or rail of the barrel of a firearm. A pair of opposing pivotable cams are configured to secured against opposite sites of the rail using screws or other members to provide a biasing force against each cam. A light source directs light through an optical housing supported on the chassis and through a lens toward the user, such that the light may be visible only when the firearm is properly aimed.

Related U.S. Application Data

(60) Provisional application No. 62/082,270, filed on Nov. 20, 2014.



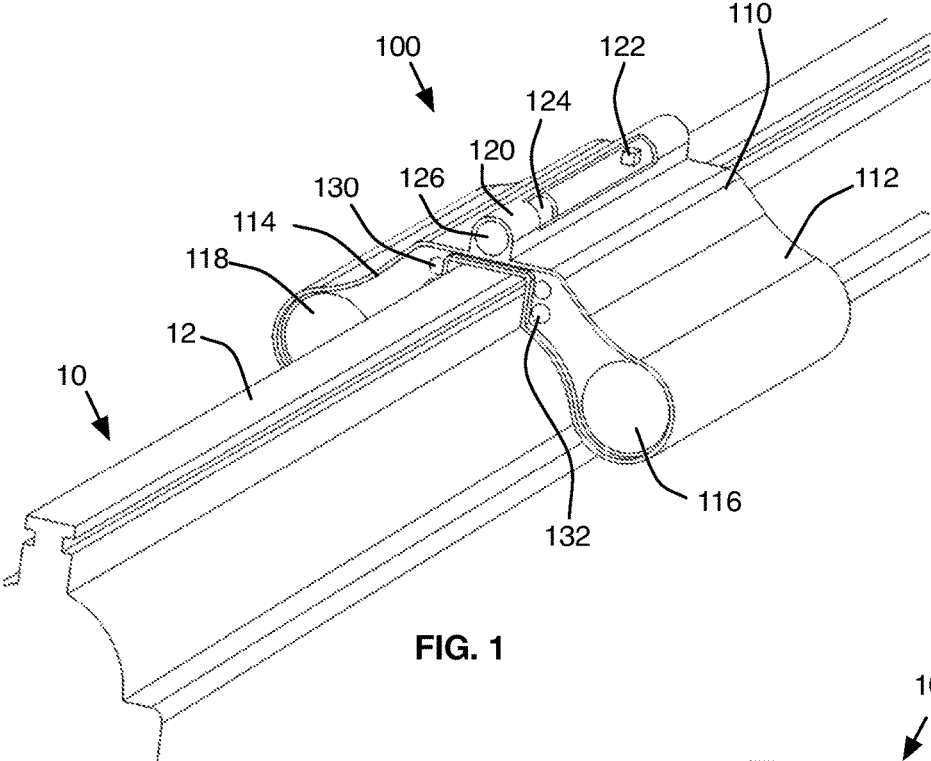


FIG. 1

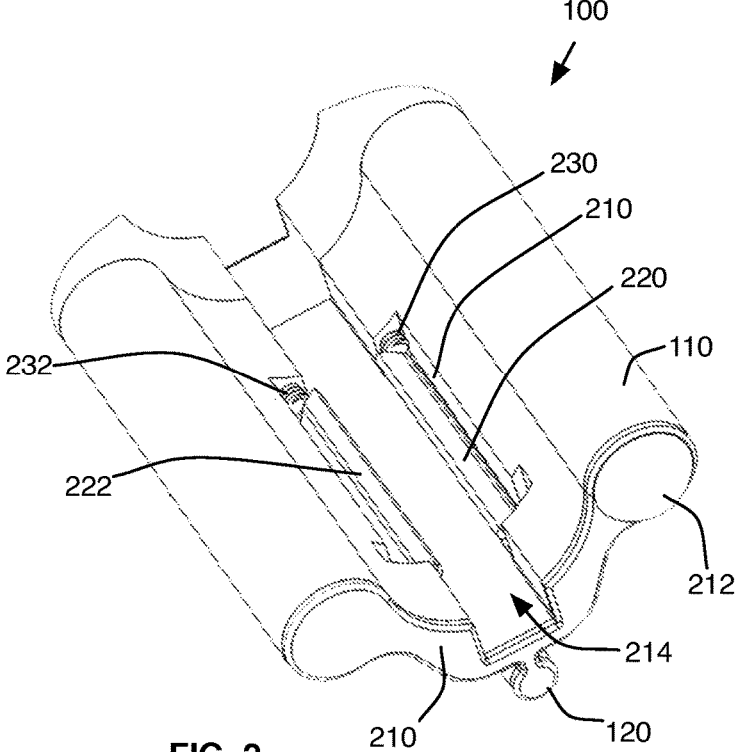


FIG. 2

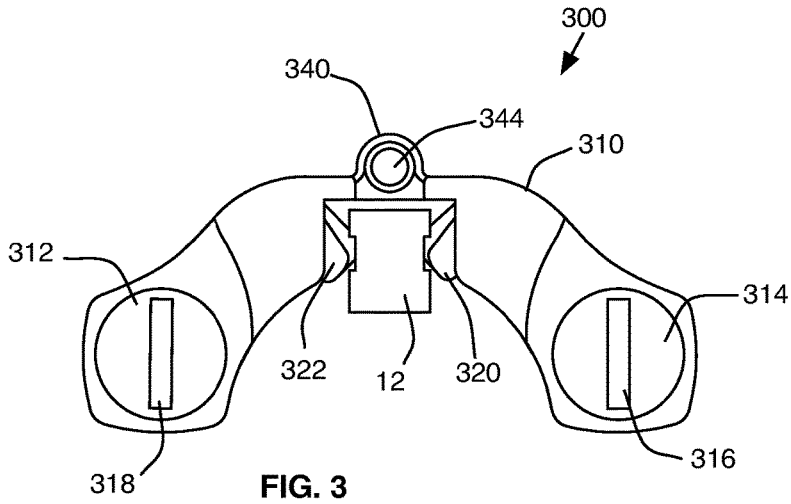


FIG. 3

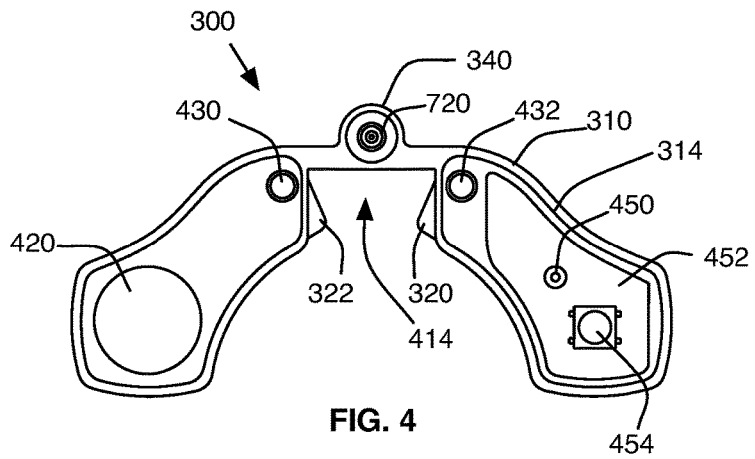


FIG. 4

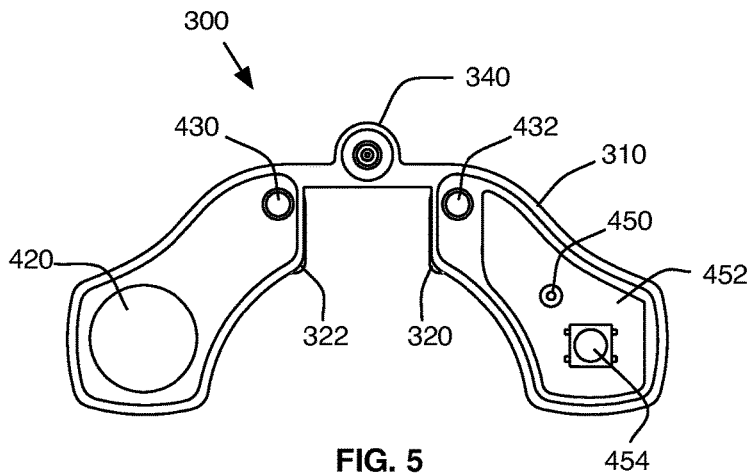


FIG. 5

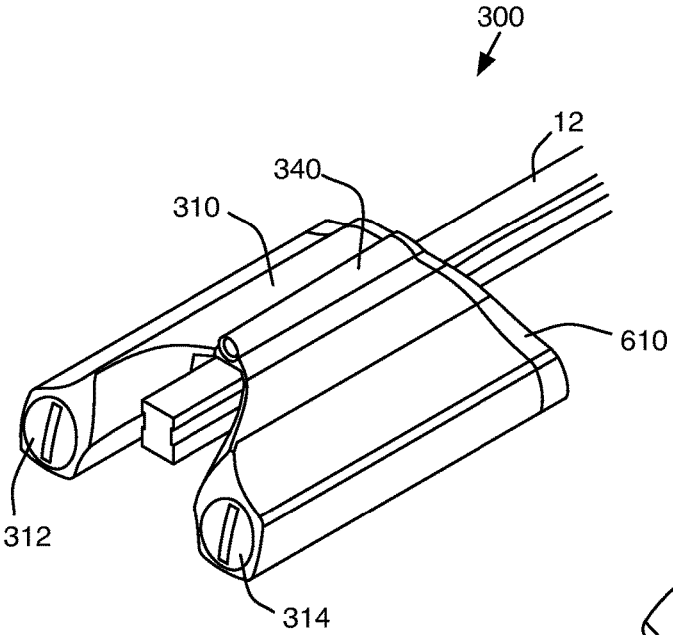


FIG. 6A

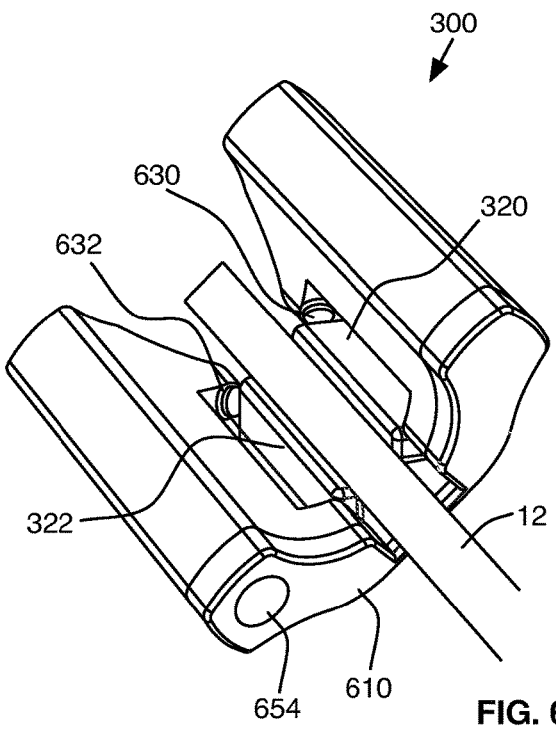


FIG. 6B

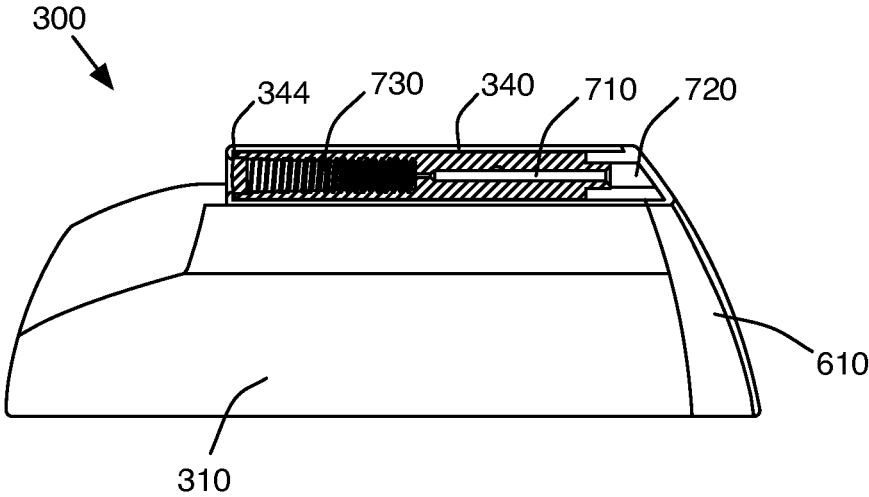


FIG. 7

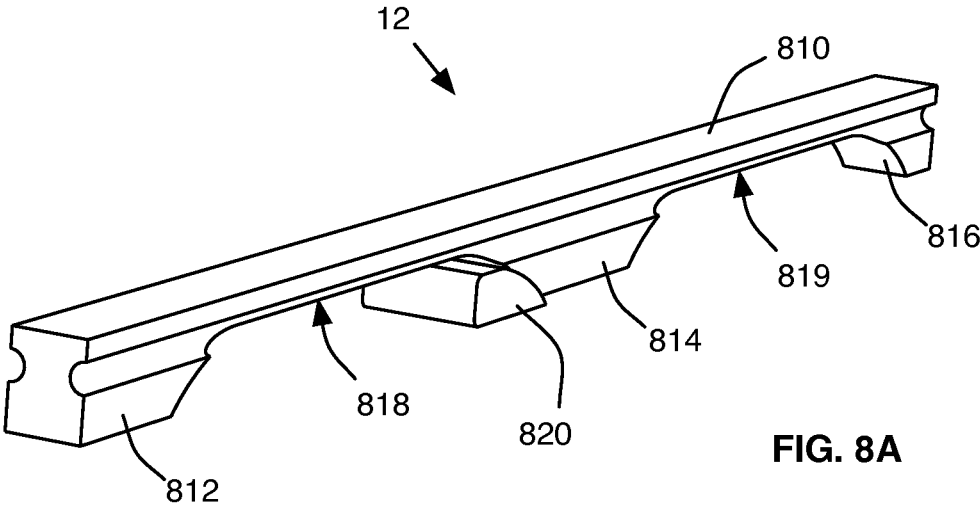


FIG. 8A

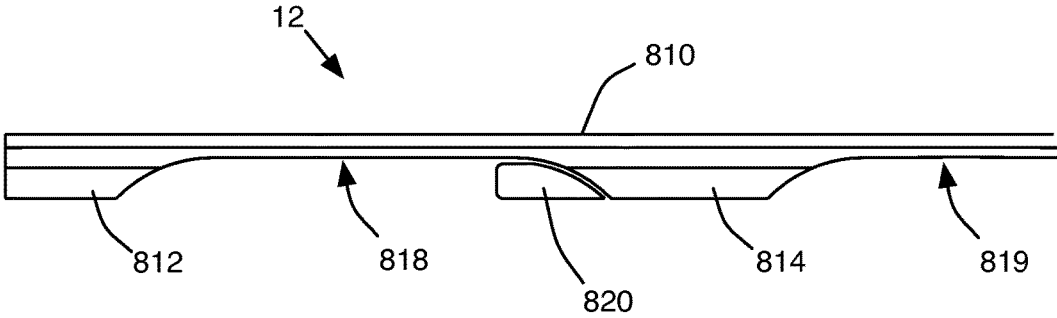


FIG. 8B

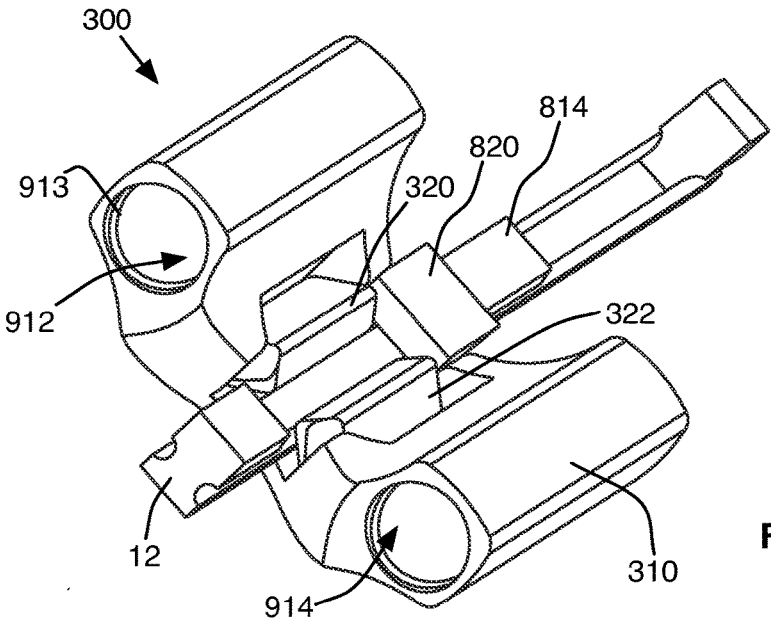


FIG. 9

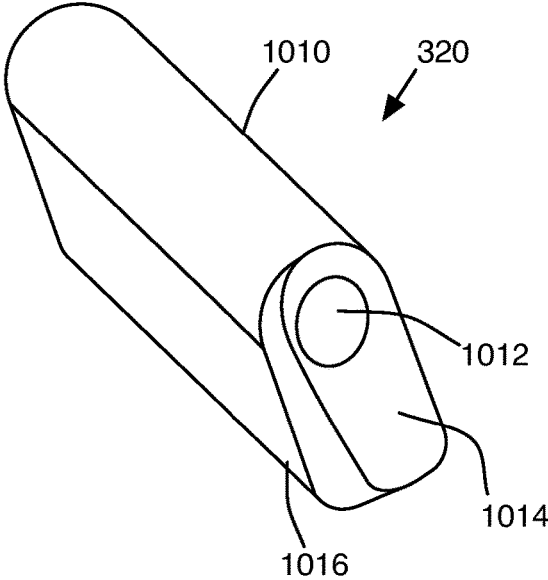


FIG. 10A

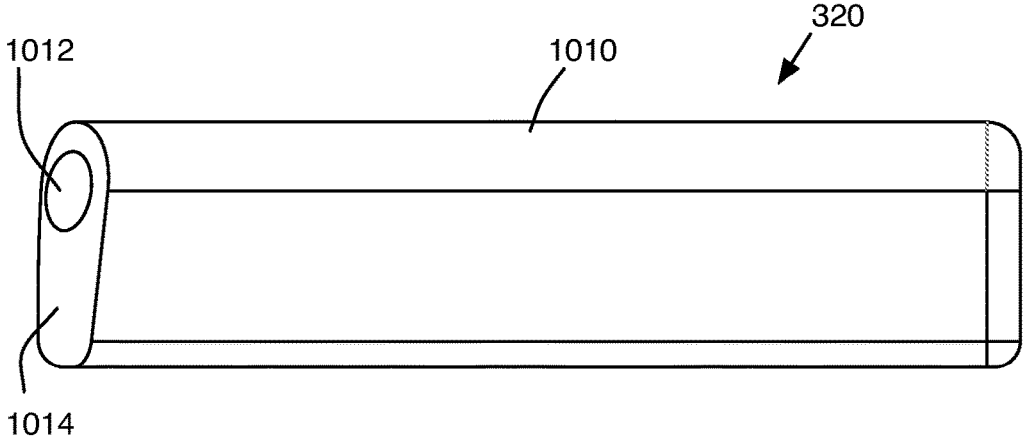


FIG. 10B

FIREARM SIGHT AND UNIVERSAL MOUNT

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This application claims benefit of U.S. Provisional Application No. 62/082,270, filed on Nov. 20, 2014, which is incorporated by reference herein in its entirety.

TECHNICAL FIELD

[0002] This invention relates to firearm accessories, and in particular to aiming devices for use with firearms.

BACKGROUND

[0003] Unless otherwise indicated herein, the elements described in this section are not prior art to the claims and are not admitted to be prior art by inclusion in this section.

[0004] A firearm sight, sometimes referred to as a fore-sight, is a device or instrument that may be incorporated within or attached to the barrel of a firearm, e.g., near the distal, or firing, end of the barrel, to help with the shooter's alignment or aim of the weapon by eye. For example, sights can be a simple set or system of markers that must to be aligned together as well as aligned with the target, e.g., bead and iron sights on firearms. Other sights may utilize optical devices that allow the user to see the image of an aligned aiming point in the same focus as the target.

[0005] Existing sights are difficult to maintain accuracy due to firearm torque, inconsistent shouldering, and poor firing technique, and therefore often aim the line of sight away from the desired target resulting in missed or inaccurate shots.

[0006] Other problems with existing sights include difficulty in securing the sight to the barrel of a firearm and consistently maintaining proper alignment. For example, alignment of existing sights is not fixed such that the axis of the sight is always parallel in all dimensions relative to the axis of the firearm barrel. This results in firearm inaccuracy.

[0007] Existing sights also do not help the shooter identify and correct for eye dominance, resulting in missed or inaccurate shots. Most known designs also rely solely on ambient light for sight and/or illumination, resulting in poor visibility especially when paired against extremely bright backgrounds in daylight conditions. Other existing sights have sight points that can still be seen when off axis, and do not give the shooter the binary feedback that the desired line of sight and shooting angle have been achieved.

[0008] Some known sights employ fiber optics to direct light, however existing fiber optic sight color options are limited primarily to red and green and lack the ability to change color quickly in the field.

[0009] Some known firearm sights are adapted to secure to a rib or rail on the barrel of a rifle, shotgun, or other firearm. Rib width between models and manufacturers can vary, for example by as much as 2-3 millimeters. Existing sights address this variability by providing a gap between the mounting channel of the after-market sight and the rib of the firearm. In some designs the manufacturers have attempted to eliminate this gap by providing multiple sized channels to better accommodate multiple models and manufacturers. However, even with the use of multiple sized channels the chance of sight cocking (misalignment along the axis of the firearm) and misaligned centers is high and relies heavily on the skill level of the user to calibrate the system during setup.

Non-permanent options, such as magnets and set-screws for example, do a poor job staying attached to the firearm. Permanent options, such as adhesives for example, are difficult if not impossible to adjust and/or remove once attached.

[0010] Thus, there remains a need for an improved firearm sight that easily and securely attaches to a firearm to improve firing accuracy and reliability.

SUMMARY

[0011] Described herein are innovative optic sights that improve upon existing sights, primarily dominated by bead and iron and fiber optic designs, used for aiming by connecting the shooters eyes, body, and their firearm.

[0012] In some embodiments, a firearm sight assembly may include a body or chassis configured and dimensioned to fit on and secure to the rib or rail of the barrel of a firearm. A channel in the chassis is adapted to fit over the firearm rib, and a locking cam system, also referred to herein as a cam assembly, secures the sight assembly to the rib. In some embodiments, the locking cam system comprises a pair of opposing pivotable cams configured to secured against opposite sites of the rail. Each cam may be suspended or pivotably connected to the chassis, e.g., by a pin disposed through an elongated channel in the body of the cam. To achieve force with this locking mechanism, a pair of set screws, each with pointed or angled leading tips, may engage and press against a corresponding angled face on each cam. In other embodiments, set screws may be replaced by or used in conjunction with pins, bolts, levers, or other locking members to provide an inward biasing force against the cams.

[0013] In some embodiments, the locking cams may be suspended within the chassis, and are free to rotate about an axis substantially parallel axis to the firearm barrel via elongated pins. When the set screws are advanced within the threaded holes of the chassis the cams are forced in toward the rib or rail of the firearm.

[0014] In some embodiments, the shape and motion of the cams pull the chassis down onto the top face of the rib while at the same time compressing and/or pinching the vertical walls of the rib of the firearm. This actuation may be achieved via the mating of the 45-degree point of the set screws and the corresponding 45 degree faces of the cams. In some embodiments, adjusting each set screw independently allows for adjustment of the sight assembly to center it on the rib of the firearm upon which it is mounted.

[0015] In some embodiments, set screws are disposed within and accessible through openings or compartments within each wing of the assembly chassis. For example, a user unscrew or otherwise remove access caps covering battery compartments in the chassis, and a user may access the set screws using a tool inserted into the compartment opening.

[0016] In some embodiments, an LED or other light source is housed within a wing of the chassis of a sight assembly, and fiber optic elements may be used to direct light from the LED up and into a linear optical housing on the assembly. The housing may include a light source or port for emitting light from the LED and a lens disposed on or near an end of the optical housing toward the user. In some embodiments, a fiber optic port is used to direct light toward the lens. The lens may be positioned a desired distance from the light source, port and/or LED to provide optimal recep-

tion and/or focusing of the light such that a user only sees the light (or a specific color, intensity, or shape associated with the light) when the assembly and firearm is properly aimed.

[0017] In one aspect, a sight according to an example embodiment includes a bright aiming bead for the shooter to pick up against extremely bright and dark backgrounds.

[0018] In another aspect, an example sight embodiment is configured and adapted to provide nearly infinite color and intensity options through the use of RGB light emitting diodes (LEDs), with the primary offering being (red, green, and blue). This feature allows the shooter to select the best color and intensity for their environment.

[0019] In another aspect, a sight may include sensors to automatically and continuously select the appropriate color and intensity for its environment.

[0020] In another aspect, a sight assembly limits the shooter to only see the aiming bead when the shooters dominant eye is looking parallel and in close proximity to the axis of the firearm. In such embodiments, if the aiming bead is not seen by the shooter, it is a signal that a correction in body or eye alignment is necessary prior to shooting. When the illuminated aiming bead is seen by the shooter, it is confirmation that the desired line of sight is achieved and signals the shooter to fire the weapon.

[0021] By providing immediate binary feedback, the shooter is trained in the art of proper shooting position and over time develops the muscle memory to correct their body position. This muscle memory can be carried through to future firearm use, even on firearms not equipped with the sights disclosed herein.

[0022] In another aspect, an example sight assembly may include a locking cam system to ensure the sight remains attached as intended. The cam system may also ensure that regardless of the rib width on top of the firearm barrel, the sight will always be parallel to the axis of the barrel. Such cam system absolves the issues associated with sight cocking (misalignment along the axis of the firearm) and improves the setup process to ensure centerlines are parallel.

[0023] In another aspect, alternative sights are provided for shotguns, handguns, and rifles in the small arms category for close range shots (e.g., less than 100 meters) where a scope cannot be focused. Sights disclosed herein are also beneficial when a quick reflex shot must be taken and there is no time to look through a scope.

[0024] These as well as other aspects and advantages will become apparent to those of ordinary skill in the art by reading the following detailed description, with reference where appropriate to the accompanying drawings. Further, it should be understood that the embodiments described in this overview and elsewhere are intended to be examples only and do not necessarily limit the scope of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0025] Example embodiments are described herein with reference to the drawings.

[0026] FIG. 1 is a perspective view illustration of a sight assembly in accordance with one or more example embodiments.

[0027] FIG. 2 is a perspective bottom view illustration of the sight assembly of FIG. 1 in accordance with one or more example embodiments.

[0028] FIG. 3 is a front view illustration of a sight assembly shown secured to the rib or rail of a firearm in accordance with one or more example embodiments.

[0029] FIG. 4 is a rear view illustration of the sight assembly of FIG. 3 shown with rear cap removed and locking cams deployed in accordance with one or more example embodiments.

[0030] FIG. 5 is a rear view illustration of the sight assembly of FIG. 3 shown with rear cap removed and cams stowed in accordance with one or more example embodiments.

[0031] FIG. 6A is a top perspective view illustration of a sight assembly in accordance with one or more example embodiments.

[0032] FIG. 6B is a bottom perspective view illustration of a sight assembly in accordance with one or more example embodiments.

[0033] FIG. 7 is a side cross-sectional view of a light pipe of a sight assembly in accordance with one or more example embodiments.

[0034] FIG. 8A is a perspective view illustration of a firearm rail and rail adapter in accordance with one or more example embodiments.

[0035] FIG. 8B is a side view illustration of a firearm rail and rail adapter in accordance with one or more example embodiments.

[0036] FIG. 9 is a rear perspective view illustration of the underside of a sight assembly including a rail adapter secured to a firearm rail in accordance with one or more example embodiments.

[0037] FIG. 10A is an end perspective view illustration of a cam of a sight assembly in accordance with one or more example embodiments.

[0038] FIG. 10B is a side view illustration of the cam of FIG. 10A in accordance with one or more example embodiments.

[0039] Like reference numerals refer to the same or similar components throughout the several views of the drawings.

DETAILED DESCRIPTION

[0040] Described herein are sight assemblies for aiding in the aiming of a firearm or other device to be aimed by a user. In the following description, for purposes of explanation, numerous examples and specific details are set forth in order to provide a thorough understanding of the invention. It will be evident, however, to one skilled in the art that the present invention may include some or all of the features in these examples alone or in combination with other features described below, and may further include modifications and equivalents of the features and concepts described herein.

[0041] Referring to FIGS. 1 and 2, an example firearm sight assembly 100 includes a chassis 110, also referred to herein as a body 110 having pair of wings 312, 314 configured and dimensioned to extend over and partially around the barrel of a firearm. A channel 214 in chassis 310 is adapted to fit over the firearm rib 12, and a locking cam system secures the assembly 300 to the rib 12. In this example, sight assembly 100 is shown secured to a rail or rib 12 of a firearm through the locking cam system, or cam assembly, comprising cam 220 and cam 222 secured against opposite sites of rail 12. To provide biasing force against each cam 220, 222 this locking mechanism, the face of the chassis 110 may include two threaded holes 130, each including threads equipped to accommodate a set screw, e.g., screws 230, 232 of FIG. 2. The set screws 230, 232 may have pointed or angled leading tips created by putting an

angle, e.g. a 45 degree angle in some embodiments, on the end of each set screw. Each cam **220**, **222** may have a corresponding angled face, e.g., a 45-degree face that is adapted to be engaged by the corresponding set screw **230**, **232**. In some embodiments, other locking members, such as screws, bolts, buttons, pins or levers, may be employed to provide a biasing force against each cam.

[0042] The cams **230**, **232** may be suspended within the chassis **110**, e.g., each within a corresponding compartment or space **210**, and are free to rotate about the axis of the firearm barrel **10** via pins **130**. When the set screws **230**, **232** are advanced within the threaded holes **130** of the chassis **110** the cams **220**, **222** are forced in toward the rib or rail **12** of the firearm **10**. The shape and motion of the cams **220**, **222** pull the chassis **110** down onto the top face of the rib **201** while at the same time compressing and/or pinching the vertical walls of the rib **12** of the firearm **10**. This actuation is achieved via the mating of the 45-degree point of the set screws **230**, **232** and the corresponding 45 degree faces of the cams **220**, **222**. Because each cam **220**, **222** is fixed along the length of the rib **12** of the firearm barrel **10** via a pin **130**, there is minimal chance of the sight assembly **100** cocking (misalignment along the axis of the firearm). In some embodiments, adjusting each set screw **230**, **232** independently allows for adjustment of the sight assembly **100** to center it on the rib **12** of the firearm **10** upon which it is mounted.

[0043] In addition to being used for the sight assembly **100**, this locking cam system may be used as a new standard for fixing accessories to firearms. Currently there is no standard for firearms with a rib mounting system. This invention provides that standard, similar to the standard that was created by the Picatinny Rail System for tactical firearms. Accessories that may be developed to work with this locking cam system include but are not limited to sights (powered and non-powered), scopes, flashlights, lasers, ammunition storage, animal call storage, video and still cameras mounting, and smartphone mounting.

[0044] In some embodiments, a sight assembly **100** may also be adapted to enable mounting to existing rail systems, which may include but are not limited to Weaver, Picatinny, and Dovetail, for example.

[0045] In some embodiments, a site assembly **100** may also include a button, switch, or other device to activate or turn on/off the assembly, e.g., shown in this example as button **212**. Such button may control power, for example, to the light source **122** (e.g. one or more light emitting diodes (LEDs) **122** from a power source. In some embodiments, the power source may include one or more batteries housed in compartments **116**, **118**, e.g., in the wings **112**, **114** of chassis **110**. Functions of the power/activation button **212** may include any of the following, for example:

[0046] Power On/Off:

[0047] A single click of the button.

[0048] Brightness Level Adjustment:

[0049] Holding down the button in the powered On mode. When actuated the LED **122** immediately jumps to maximum brightness and then begins to dim. Releasing the button selects the desired brightness level. When a maximum or minimum brightness level is reached, the LED **122** flashes, and then reverses.

[0050] LED Color Selection:

[0051] Double clicking the button within one second changes the color of the LED **122**.

[0052] In other embodiments, a button or other input device may be used to activate or control other features of the assembly. In some embodiments, light source **122** may be located in another portion of chassis **110**, and light from the source may be directed into the housing **120**.

[0053] When given power, the light from the light source, e.g., LED **122**, is routed either directly or via a light transferring mechanism (fiber optic, light pipe, or other) to a lens **124** within housing **120**. In some embodiments, optical parameters are optimized to only allow the viewing of the light when viewed as close to coaxial with the lens **124** as possible. These optical parameters may include, but are not limited to, lens **124** design (shape, size, material, and finish) and/or position of the **124**, diameter and clarity of the light source, and the distance and angle of the light source relative to the lens.

[0054] In some embodiments, lens **124** and light transferring mechanism are both held in place via the chassis **110** of the sight assembly **100**, e.g., within optical housing **120**. A front end of housing **120** may include an opening **126** to the lens **124**. In some embodiments, chassis **110** may also include a visor to shroud the lens **124** and optimize visibility of the light source **122**. In some embodiments, lens **124** may be disposed at a desired position within housing **120**, e.g., at or near opening **126** or deeper within housing **120** as shown in FIG. 1.

[0055] Turning now to FIG. 3, another embodiment of a sight assembly **300** is shown secured to the rib or rail **12** of a firearm. In this front view example, chassis **310** of assembly **300** includes wings **312**, **314**, and an optical sight housing **340** disposed on a top portion of the chassis **310**, and may include a lens **344** for focusing light to a user for aiming or alignment of the firearm. Each wing **312**, **314** may include caps **316**, **318** for accessing battery compartments within the chassis **310**. In some embodiments, each cap may include a slot **317**, **319** or other feature to facilitate securing and removing of the caps **316**, **318**, e.g., by screwing or unscrewing. A cam assembly comprising a pair of locking cams **320**, **322** suspended within the chassis **310** may be used to secure the assembly **300** in a desired position on the firearm rail **12**, e.g., along a longitudinal axis of the rail.

[0056] FIG. 4 is a rear view illustration of the sight assembly **300** of FIG. 3 shown with a rear cap (e.g., cap **610** of FIGS. 6A and 6B) removed, and locking cams **320**, **322** deployed in accordance with one or more example embodiments; and FIG. 5 is a rear view illustration of the sight assembly **300** of FIG. 3 shown with rear cap **610** removed and cams **320**, **322** stowed in accordance with one or more example embodiments.

[0057] Each cam **320**, **322** is pivotably suspended within chassis **310** by a cam pin **430**, **432**. An LED **450** or other light source may be disposed within chassis **310**, e.g., within a wing **314** of chassis **310** as shown in FIG. 4. LED **450** may provide light that is directed, e.g., via an optical fiber or other device, up to housing **340**, e.g., through a light source port **720** that may receive and direct the light through housing **340**.

[0058] A button **454** or other switch or feature may also be integrated within chassis **454**, e.g., to turn the LED on/off, to adjust intensity, to change or select a desired color, or to change, control or configure other features of the assembly **300**. In some embodiments, LED **450** and/or button **454** may be disposed on a PCB **452** or other substrate. Each wing **312**,

314 of chassis **312** may include a compartment **420**, e.g., for holding one or more batteries or other power supplies.

[0059] As shown in FIGS. 4 and 5, a channel **414** below housing **340** and between wing portions **312**, **314** is configured and dimensioned to fit over a rail of a firearm. Cams **320**, **322** may be selectively deployed into the channel **414** to engage with the rail (e.g., rail **12** as shown in FIG. 3) and secure the assembly **300** to the firearm.

[0060] Turning now to FIGS. 6A and 6B, an example assembly **300** from is shown secured to a rail of a firearm (for illustration purposes, without the barrel of the firearm). In this example, cap **610** is secured over the front end (e.g., facing the user) of the chassis **310**, to cover the PCB **452**, LED **450** and other elements within chassis **310**. Button cover **654** may be pressed by the user to activate features button **454** of FIG. 4, as described above. As shown in FIG. 6B, cams **320**, **322** may pivot within chassis **310** to press against rail **12** and secure the assembly **300**. Set screws **630**, **632** may be used to apply force against a canted surface of cams **320**, **322** (as shown and described below with respect to FIGS. 10A and 10B) to secure cams against rail **12**.

[0061] In some embodiments a cam assembly including cams **320**, **322** pivotably disposed within a chassis may be adapted for various types of firearms, survey equipment, or other devices. In some embodiments, a chassis **310** having a cam assembly with features described herein may be configured as a universal mount, e.g., for clamping accessories to a bar, rail, edge, or other part of any desired piece of equipment.

[0062] FIG. 7 is a side cross-sectional view of a light pipe housing **340** of a sight assembly **300** in accordance with one or more example embodiments, including a lens **344** disposed within housing **340**. A light source **720** may receive and provide light from LED **450** (e.g., see LED **450** of FIG. 4), and the light may be directed through a fiber optic port **710**, or other pipe, channel, fiber, lens, or elongated member toward lens **344**. One or more threads **720** inside of housing **340** may be used to reduce glare of the light directed to and/or from lens **344**. Lens **344** may be positioned at a proximal end of housing **340** as shown, or in other embodiments, lens **344** may be disposed at another desired position within housing **340**.

[0063] Turning now to FIG. 8A to FIG. 9, a rail adapter **820** for use with a sight assembly is shown and described. FIG. 8A is a perspective view illustration of a firearm rail **12** and rail adapter **820** in accordance with one or more example embodiments. In some firearms, the rail **12** may include one or more legs **812**, **814**, **816** attached to the barrel of the firearm. A rail adapter **820** may be configured and dimensioned to fit within a space or gap **818** or **819**, between adjacent legs of the rail **12**. Rail adapter **820** may also be configured and dimensioned to fit within channel **414** of a sight assembly **300** and engage cams **320**, **322** as a stop to keep the assembly from forward travel along the length of rail surface **810** when the firearm is fired. In some embodiments adapter **820** may be configured in different sizes and/or shapes to fit different types of firearms and/or firearm barrels, ribs, or rails.

[0064] In some embodiments, set screws (e.g., **630**, **632** as shown in FIG. 6B) may be accessed through openings **912**, **914** in chassis **310** to drive the set screws against a corresponding angled surface of each cam (e.g., angled surface **1014** as shown in FIGS. 10A and 10B) to force each cam to pivot inward against the sides of a firearm rail or barrel. In

some embodiments, one or both set screws **630**, **632** may be adjusted (e.g., tightened or loosened) as desired to adjust the axial alignment of the sight assembly and optical housing **340** with respect to the firearm rib **12**. As shown in FIG. 9, each opening **912**, **914** may be dimensioned to receive batteries (e.g., one or more AAAA batteries, AAA batteries, lithium ion batteries, or other types or sizes of batteries or power supplies), and may include threads **913** to receive compartment access caps, e.g., caps **316**, **318** of FIG. 3.

[0065] FIG. 10A is an end perspective view illustration of a cam **320** of a sight assembly **300** in accordance with one or more example embodiments. In this example, cam includes a body **1010** having a channel **1012** through which a pin or other device may be disposed to pivotably secure cam **320** to chassis **310**. An end of cam body **1010** has an angled face **1014**, e.g., beveled at an angle of 45 degrees, or optionally another desired angle, to engage with an angled or pointed tip of set screw or other device to bias an inner edge **1016** of cam **320** toward a rib, rail, barrel, or other object to which assembly **300** is to be secured.

[0066] The foregoing description illustrates various embodiments of the present invention along with examples of how aspects of the present invention may be implemented. The above examples and embodiments should not be deemed to be the only embodiments, and are presented to illustrate the flexibility and advantages of the present invention. Based on the above disclosure and the following claims, other arrangements, embodiments, implementations and equivalents will be evident to those skilled in the art and may be employed without departing from the spirit and scope of the invention.

What is claimed is:

1. A sight assembly, comprising:

a chassis;

an elongated optical housing supported by said chassis, said optical housing including a light source for directing light through the housing and a lens for receiving the directed light;

a cam assembly including at least one cam pivotably secured to the chassis for securing the chassis to a firearm.

2. The sight assembly of claim 1, wherein the chassis includes an elongated channel axially aligned with the optical housing, and the cam is configured to pivot to a position within the channel.

3. The sight assembly of claim 2, further comprising a locking member for providing a biasing force against the cam toward the channel.

4. The sight assembly of claim 3, wherein the locking member is a set screw, and said chassis includes a threaded hole for engaging threads of the set screw.

5. The sight assembly of claim 2, wherein the cam assembly further comprises a pair of cams pivotably secured to the chassis on opposite sides of the channel.

6. The sight assembly of claim 5, wherein the cam assembly further comprises a pair of set screws, each set screw configured to threadably engage with a corresponding hole in the chassis and impart a biasing force against one of the pair of cams.

7. The sight assembly of claim 6, wherein each cam of the pair of cams has an end with an angled surface, and each set screw has an angled tip for engaging the angled surface and forcing the cam toward the channel.

8. The sight assembly of claim **7**, wherein the channel is configured to fit on a rail of a firearm barrel, and the pair of cams force against the rail to secure the assembly when the pair of set screws are tightened.

9. The sight assembly of claim **8**, further comprising a rail adapter configured and dimensioned to fit within the channel and a gap of the rail to prevent movement of the sight in at least one direction along the rail of the firearm.

10. The sight assembly of claim **1**, wherein the light source is an LED.

11. The sight assembly of claim **1**, further comprising an LED disposed within the chassis, and wherein the light source of the optical housing receives light from the LED.

12. The sight assembly of claim **11**, further comprising an optical fiber for directing light from the LED to the lens.

13. The sight assembly of claim **12**, wherein the optical housing further comprises threads for minimizing glare from the light source.

14. The sight assembly of claim **13**, further comprising a button in the chassis for controlling power to the sight assembly.

15. The sight assembly of claim **14**, wherein the button further controls intensity and color of light emitted from the LED.

* * * * *