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(54) **MULTI-DOT REFLEX SIGHT**

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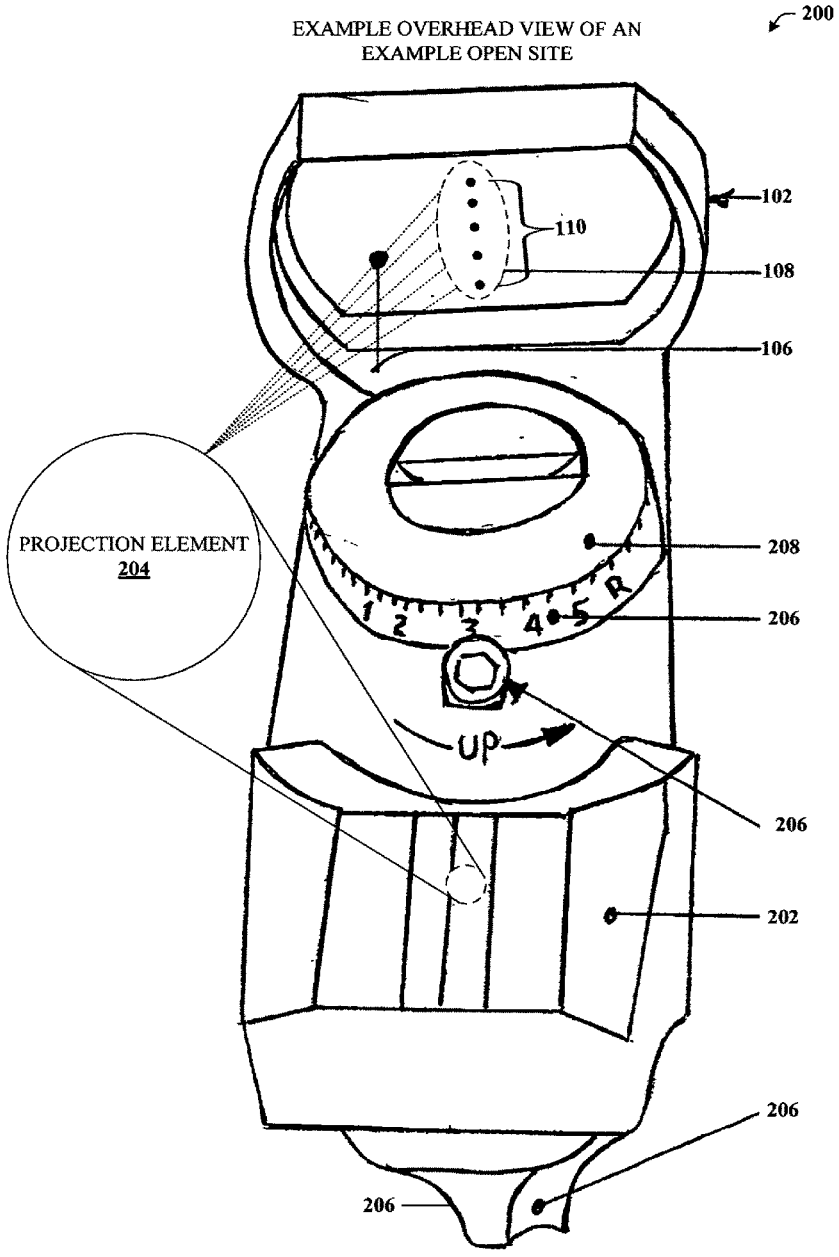
(57) **ABSTRACT**

The disclosed subject matter relates to a reflex sight or another suitable dot sight having a viewing element upon which an illuminated reticle is projected, causing the illuminated reticle to be superimposed over the field of view at infinity. The illuminated reticle can comprise multiple aiming elements (e.g., dots) that are vertically aligned. A spacing between the vertically aligned aiming elements can be a function of a projectile trajectory, a function of a configuration of different projectile devices, or some other suitable function.



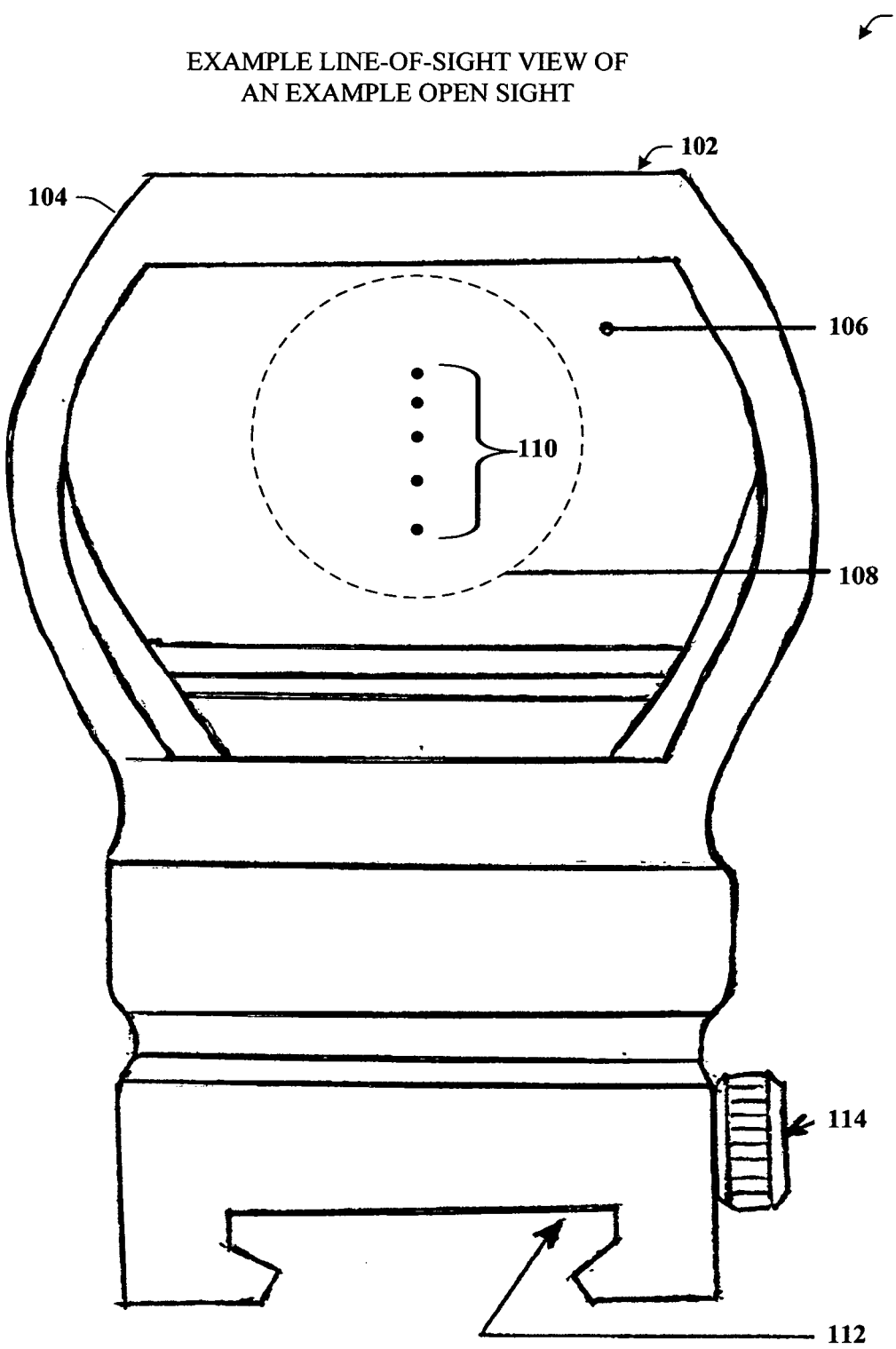

100
EXAMPLE LINE-OF-SIGHT VIEW OF
AN EXAMPLE OPEN SIGHT
102
104
106
110
108
114
112

FIG. 1

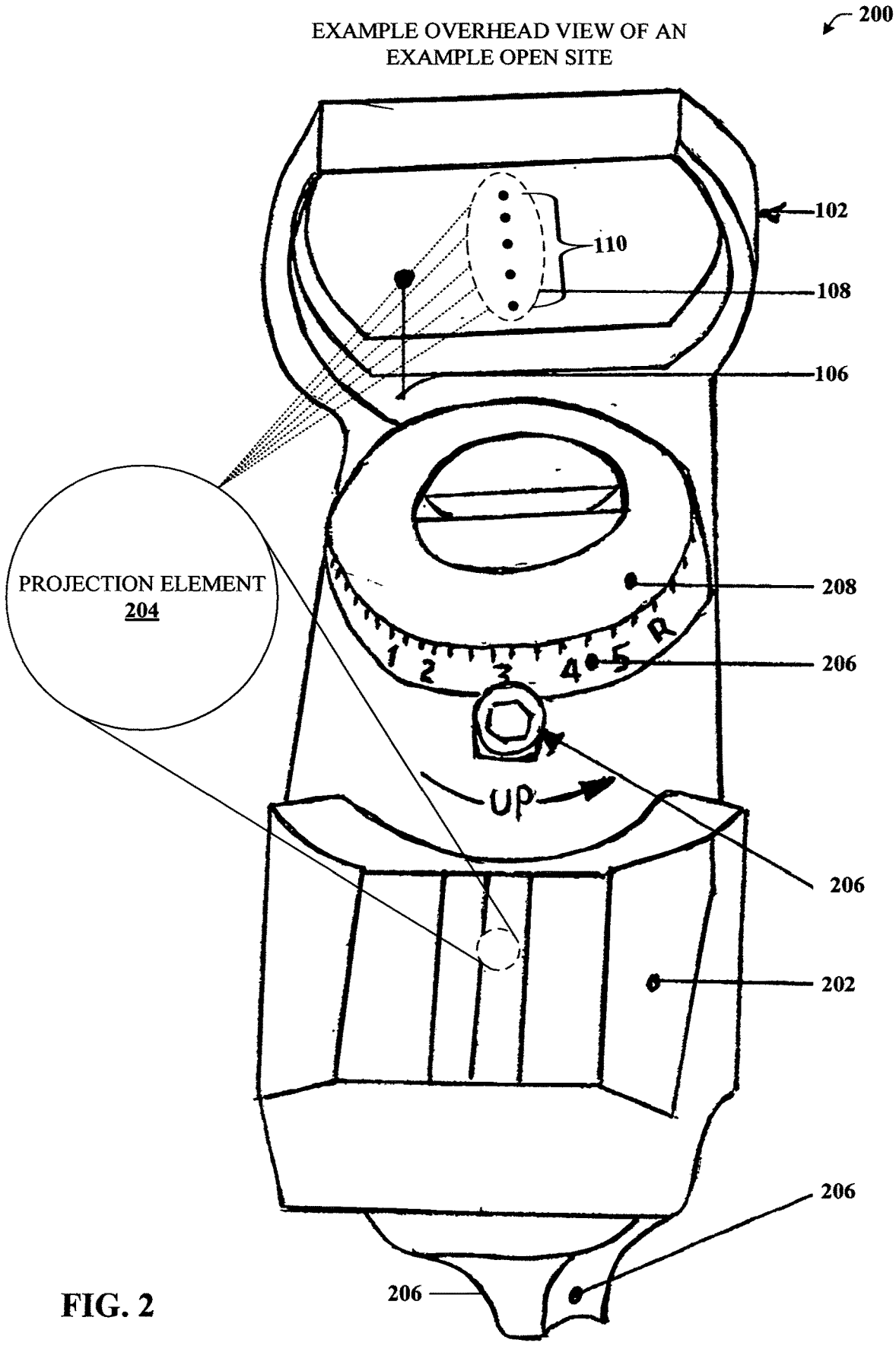

200
EXAMPLE OVERHEAD VIEW OF AN EXAMPLE OPEN SITE
102
110
108
106
PROJECTION ELEMENT
204
208
1
2
3
4
5
R
206
UP
206
202
206
206

FIG. 2

EXAMPLE ILLUMINATED RETICLE **108** COMPRISING MULTIPLE DOTS **110** THAT ARE VERTICALLY ALIGNED

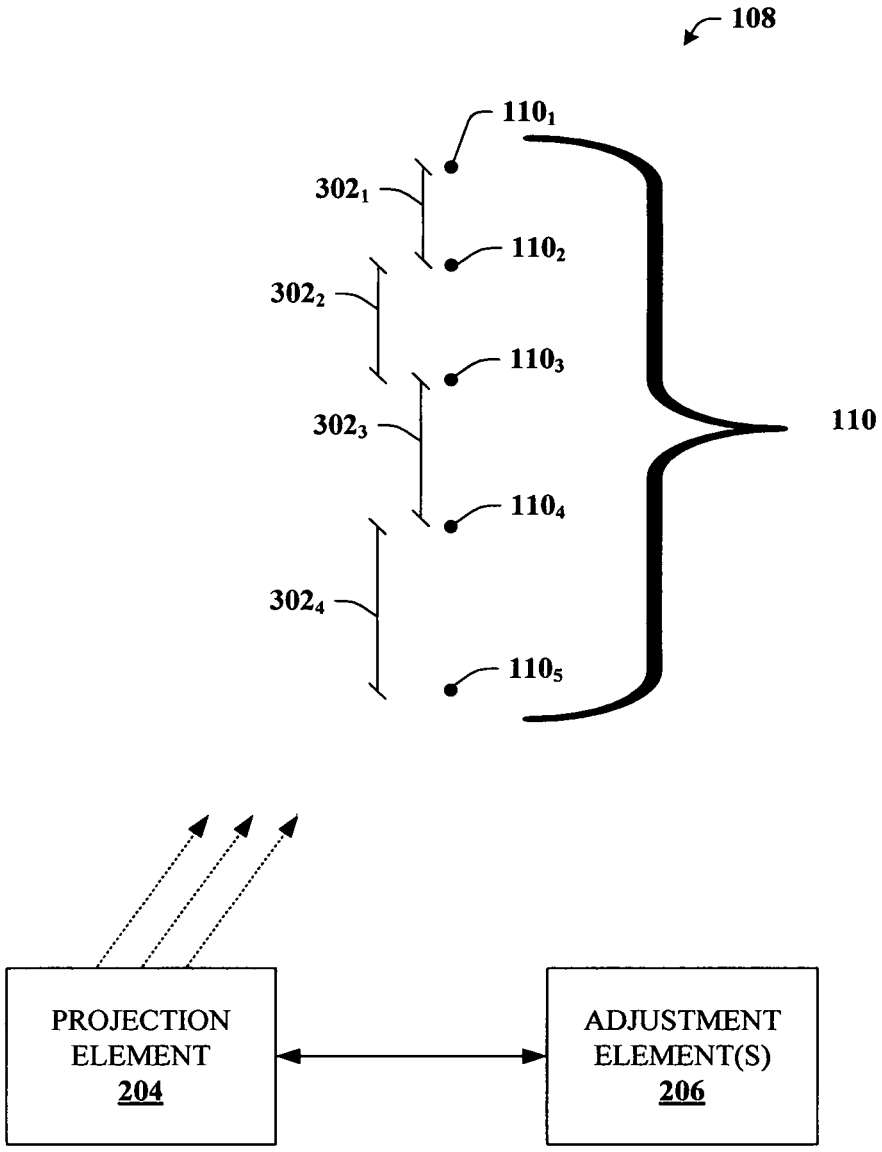


FIG. 3

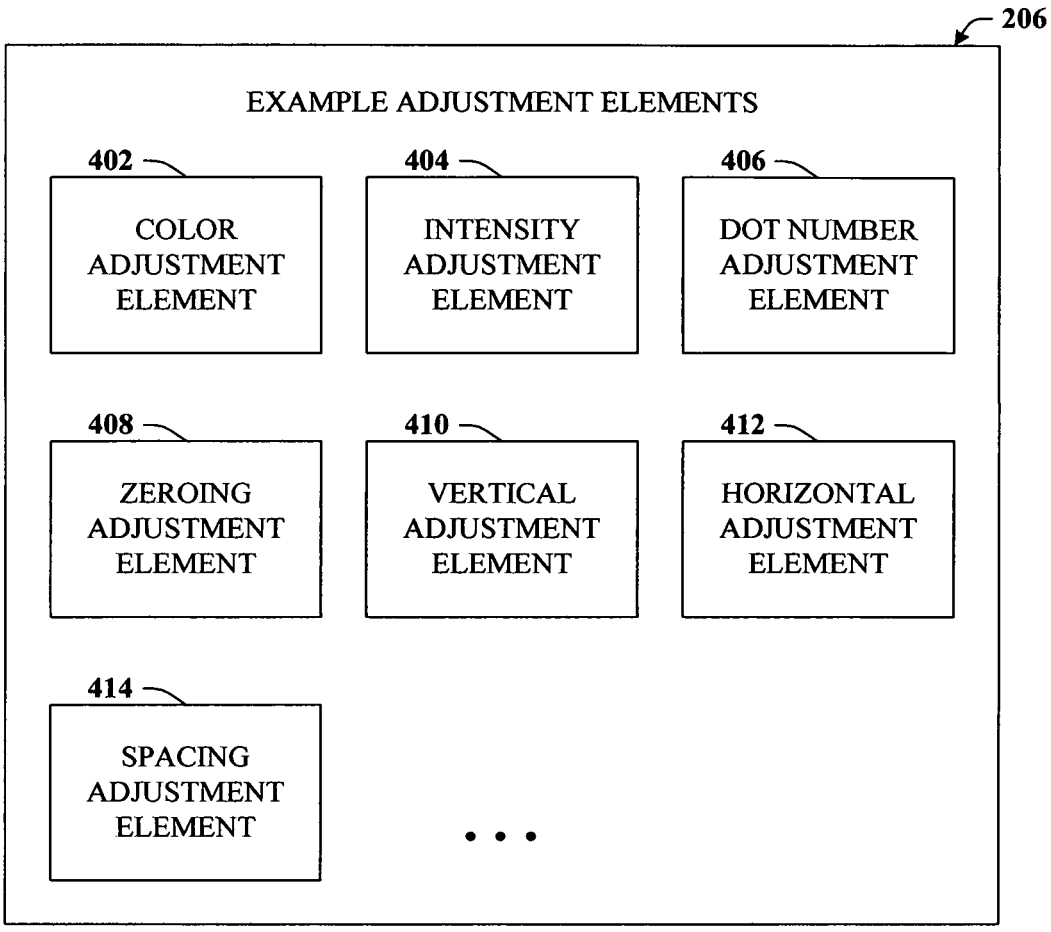

206
EXAMPLE ADJUSTMENT ELEMENTS
402
COLOR ADJUSTMENT ELEMENT
404
INTENSITY ADJUSTMENT ELEMENT
406
DOT NUMBER ADJUSTMENT ELEMENT
408
ZEROING ADJUSTMENT ELEMENT
410
VERTICAL ADJUSTMENT ELEMENT
412
HORIZONTAL ADJUSTMENT ELEMENT
414
SPACING ADJUSTMENT ELEMENT
• • •

FIG. 4

EXAMPLE LINE-OF-SIGHT VIEW OF
AN EXAMPLE TUBULAR SIGHT

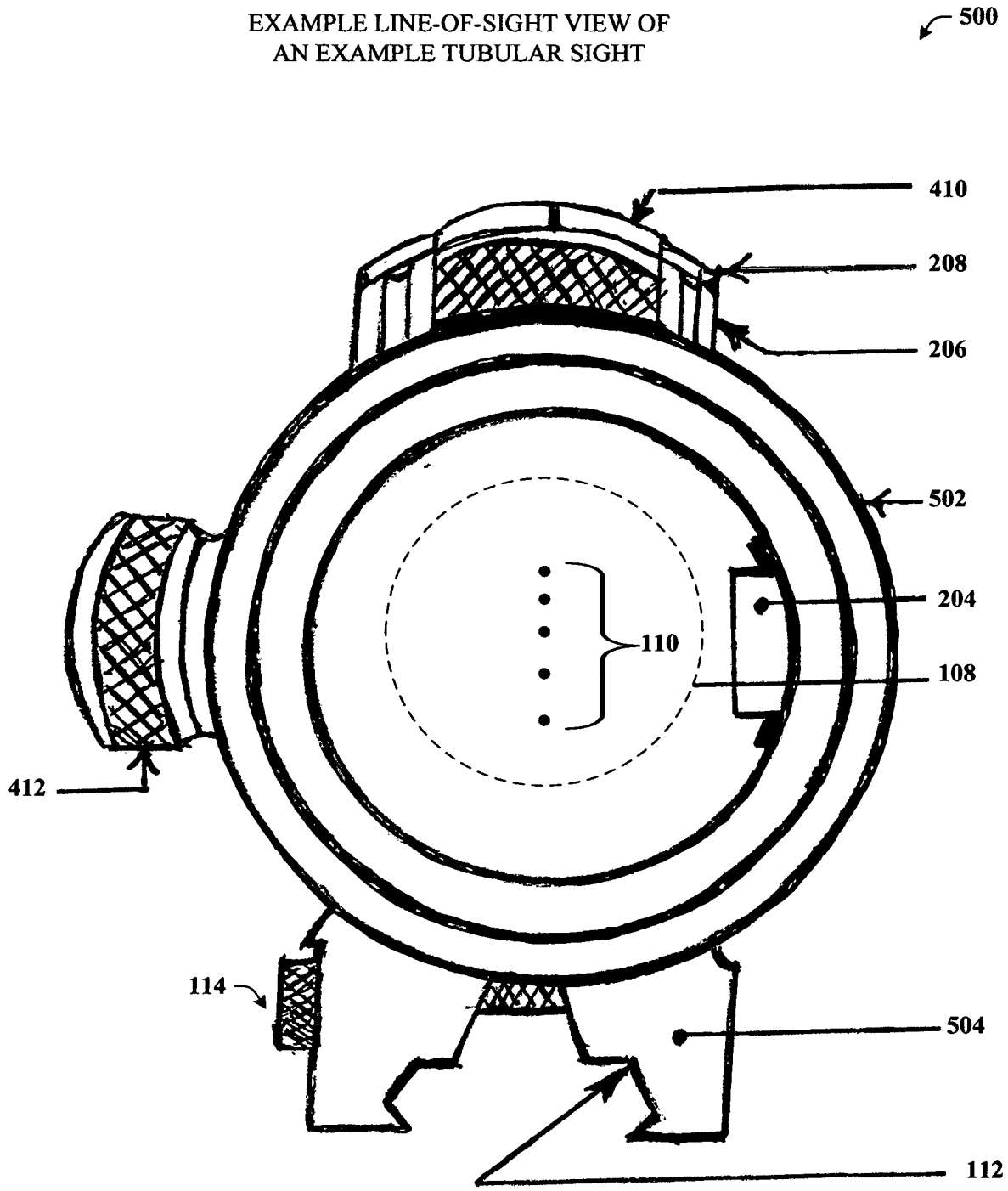


FIG. 5

EXAMPLE OVERHEAD VIEW OF AN
EXAMPLE TUBULAR SIGHT

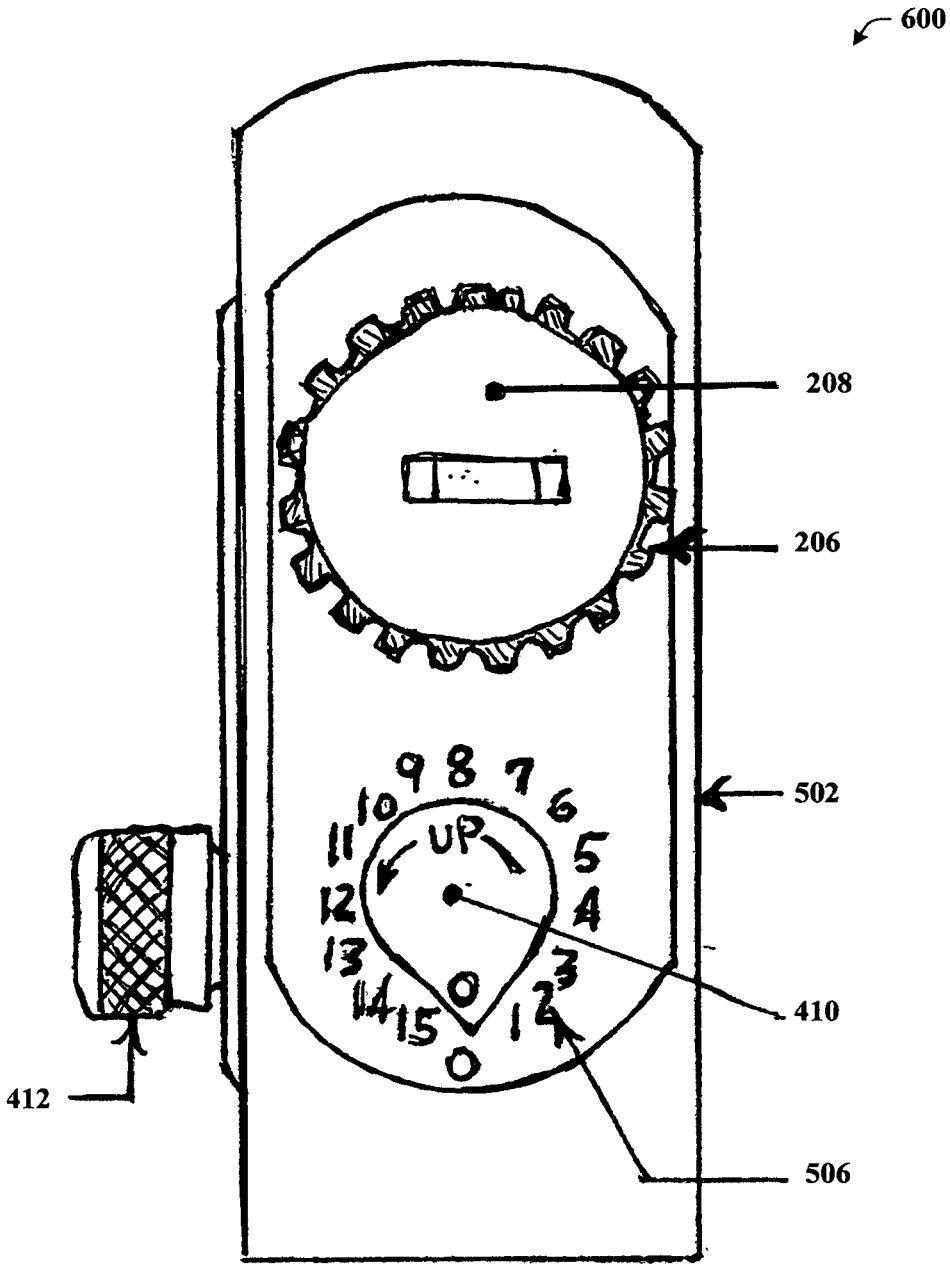


FIG. 6

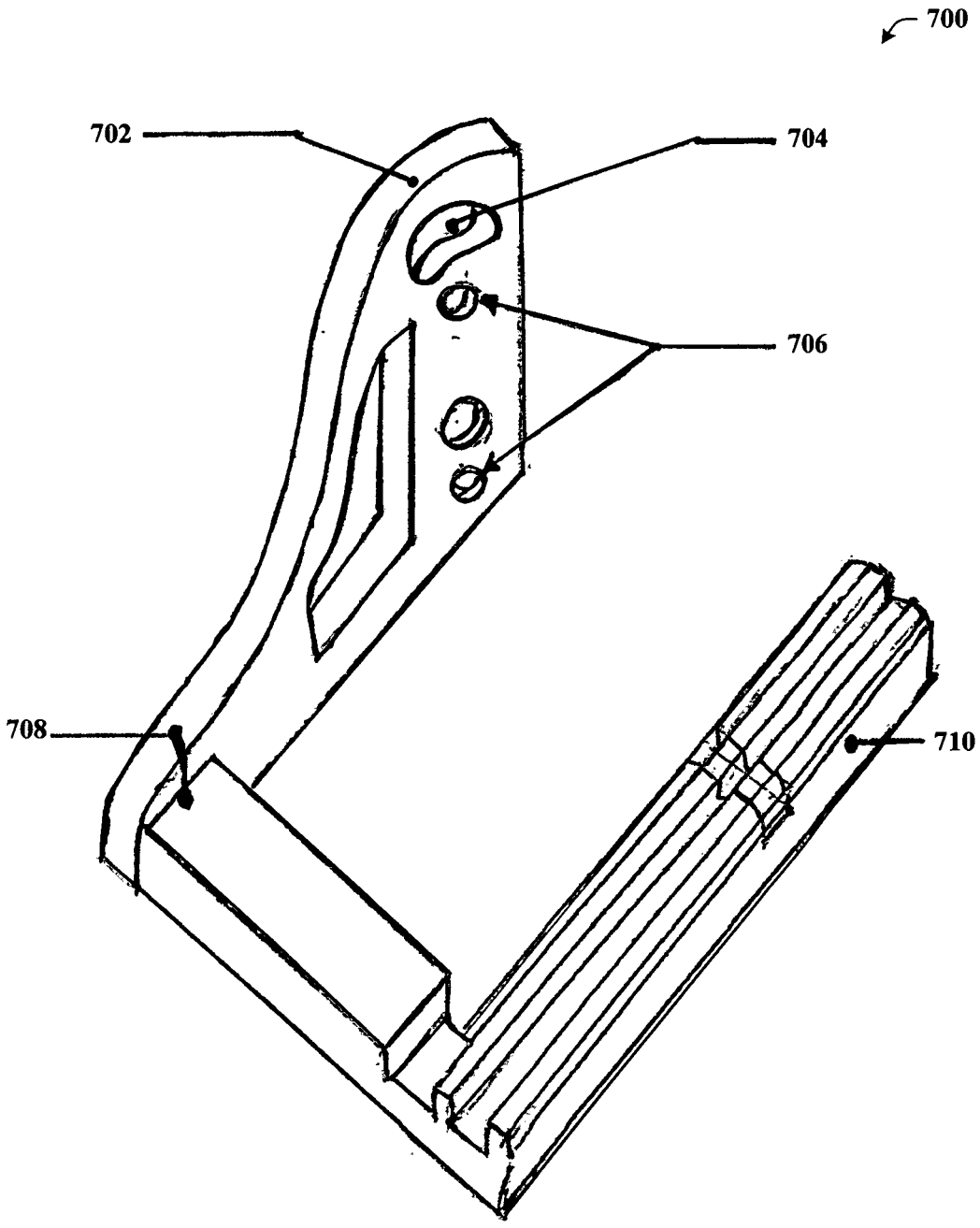


FIG. 7

MULTI-DOT REFLEX SIGHT

TECHNICAL FIELD

[0001] The present application relates generally to a sight mechanism having multiple aiming elements (e.g., dots) superimposed over a field of view.

BACKGROUND

[0002] A dot sight, commonly referred to as a red dot sight, is a general classification for sights that provide aiming elements in the form of an illuminated red dot. A typical design uses a laser or light-emitting diode (LED) at the focus of collimating optics, which generates an illuminated reticle that stays in alignment with an attached projectile device regardless of eye position.

BRIEF DESCRIPTION OF THE DRAWINGS

[0003] Numerous aspects, embodiments, objects and advantages of the present invention will be apparent upon consideration of the following detailed description, taken in conjunction with the accompanying drawings, in which like reference characters refer to like parts throughout, and in which:

[0004] FIG. **1** is a diagram of an example open reflex sight illustrated according to a line-of-sight perspective in accordance with certain embodiments of this disclosure;

[0005] FIG. **2** is a diagram of an example open reflex sight illustrated according to an overhead perspective in accordance with certain embodiments of this disclosure;

[0006] FIG. **3** illustrates in more detail an example illuminated reticle comprising multiple dots that are vertically aligned in accordance with certain embodiments of this disclosure;

[0007] FIG. **4** illustrates an example block diagram conceptually depicting various example adjustment elements in accordance with certain embodiments of this disclosure;

[0008] FIG. **5** is a diagram of an example closed or tubular reflex sight illustrated according to a line-of-sight perspective in accordance with certain embodiments of this disclosure;

[0009] FIG. **6** is a diagram of an example closed or tubular reflex sight illustrated according to an overhead perspective in accordance with certain embodiments of this disclosure;

[0010] FIG. **7** illustrates an example adapter bracket that can facilitate mounting the sight devices to a wide array of different types of projectile devices in accordance with certain embodiments of this disclosure; and

DETAILED DESCRIPTION

Overview

[0011] A common type of dot sight is a reflector sight or reflex sight. In some embodiments, a reflex sight is an optical device that allows the user to look through a partially reflecting glass element and see an illuminated projection of a reticle or aiming point. The illuminated reticle can be superimposed on the field of view. Reflex sights operate on the optical principle that anything at the focus of a lens or curved mirror (e.g., where the illuminated reticle is projected) will appear to be superimposed over a target within the field of view at infinity. Reflex sights typically rely on some type of reflector (e.g., a beam splitter or half silvered curved mirror) to allow the viewer to see the illuminated reticle and the field of view simultaneously. Typically, the illuminated reticle (e.g., a red dot) is only visible when looking through the sight and therefore not projected toward the target as with laser sights.

[0012] Reflex sights and other dot sights are known in the art and have many potential advantages for example reflex sights can provide rapid acquisition of targets, reduce aiming errors due to parallax, and typically do not project visible indicators to the target. However, previous dot sights can also have disadvantages. For example, other dot sights typically provide only a single aiming element (e.g., dot). Therefore, a given configuration might result in inaccuracy when a distance to the target changes. Such is especially problematic for lower velocity projectile devices such as bows, crossbows, shotguns, or some handguns.

[0013] To remedy these and other shortcomings, the inventor proposes a multi-dot sight having multiple dots or aiming elements rather than a single dot or aiming element. The multiple aiming elements can be aligned vertically and vertical spacing between the dots can be configured as a function of a projectile trajectory. Such can effectively retain the benefits of conventional dot sights while at the same time expanding the capabilities of conventional dot sights, namely, by providing to a user the ability to select and use one of the multiple dots based on target range without potential time-consuming reconfiguration. As another potential benefit, the disclosed dot sight can be easily mounted on a wide variety of different projectile devices. In some embodiments, vertical spacing between the dots can be a function of projectile device type. For example, a first aiming element (or group of aiming elements) can be associated with a pistol, a second aiming element (or group) that is some distance below the first aiming element(s) can be associated with a bow and so forth. Techniques detailed herein are described in connection with a reflex sight as a representative example, but can be applicable to other types of dot sights such as e.g., holographic sights or prism sights.

Example Multi-Dot Sight

[0014] Various aspects or features of this disclosure are described with reference to the drawings, wherein like reference numerals are used to refer to like elements throughout. In this specification, numerous specific details are set forth in order to provide a thorough understanding of this disclosure. It should be understood, however, that certain aspects of disclosure may be practiced without these specific details, or with other methods, components, materials, etc. In other instances, well-known structures and devices are shown in block diagram form to facilitate describing the subject disclosure.

[0015] Referring now to the drawing, with reference initially to FIG. **1**, an example line-of-sight view of open sight device **100** is depicted. Device **100** can be an archery-based sighting device such as for a bow or crossbow as well as for pistols or rifles of various types. Some benefits of the disclosed sight can be more pronounced with respect to lower velocity projectile devices. Sight device **100** can include viewing element **102**, through which a user can look to see a field of view, generally including the target. Viewing element **102** can include housing **104**, in this case an open style configuration. Viewing element **102** can further include a reflecting material **106**, which can be comprised of glass or some other material that can be configured to at least partially reflects light back toward a user's eye, while also

being at least partially transparent to allow the user to observe the field of view. Viewing element **102** can thus be configured to present illuminated reticle **108**. Illuminated reticle **108** can be any suitable shape or size, and can include multiple dots **110**. As used herein, the terms 'dot' or 'dots' are intended to refer to an aiming element of illuminated reticle **108**. Such can be small dots as shown and common in the industry, but can also include crosshairs, lines or hashes, or any suitable aiming element.

[0016] Sight device **100** can further include picatinny rail groove **112** and mounting bolt **114**. Such can facilitate easy mounting and unmounting of sight device on a wide variety of different projectile devices. Sight device **100** can further include a projection element, which is not shown here, but is further detailed in connection with FIG. **2**.

[0017] Turning now to FIG. **2**, sight device **200** is depicted. Sight device **200** can be the same or similar to sight device **100**, here, illustrated via an overhead view, showing additional elements. For example, sight device **200** can include projection housing **202**, which can house projection element **204**. Projection element **204** is occluded by projection housing **202**, but shown by cutaway example. Projection element **204** can be configured to project illuminated reticle **108** onto viewing element **102**. As shown here and in FIG. **1**, illuminated reticle **108** can comprise multiple dots **110** that are vertically aligned.

[0018] Sight device **200** can further include various adjustment elements **206** that are further detailed in connection with FIGS. **3** and **4**. Sight device **200** can also include one or more component housings **208** to contain various components such as batteries or the like.

[0019] With reference now to FIG. **3**, an example illuminated reticle **108** is shown in more detail. As with other examples herein, illuminated reticle **108** comprises multiple dots **110**. FIG. **3** illustrates five dots labeled $\mathbf{110}_1$-$\mathbf{110}_5$, but it is appreciated that illuminated reticle **108** can include substantially any number of dots **110**. A representative example range can include any number of dots between two and ten vertically aligned dots **110**.

[0020] In some embodiments, a first dot $\mathbf{110}_1$ can be determined to represent an aiming point of a target at a first distance from sight device **100**, **200**. A second dot $\mathbf{110}_2$ can be determined to represent an aiming point of a target at a second distance from sight device **100**, **200** that differs from the first distance. In some embodiments, first dot $\mathbf{110}_1$ can be representative of an aiming point for one projectile device whereas second dot $\mathbf{110}_2$ can be representative of an aiming point for a different projectile device. For example, when the two projectile devices have different projectile velocity configurations.

[0021] Spacing $\mathbf{302}_1$-$\mathbf{302}_4$ represent various vertical spacing distances between adjacent pairs of the multiple dots **110**. In some embodiments, spacing **302** can be a function of a trajectory determined for a projectile. In other words, dot $\mathbf{110}_1$ can represent an aiming point when the target is at 10 yards, $\mathbf{110}_2$ can represent an aiming point when the target is at 20 yards, $\mathbf{110}_3$ can represent an aiming point when the target is at 30 yards, and so on. As can be seen, spacing **302** increases in that case due to the parabolic trajectory of a projectile such that spacing $\mathbf{302}_4$ is greater than spacing $\mathbf{302}_1$.

[0022] In other embodiments, spacing **302** might instead reflect different projectile devices, which might potentially be color coded as detailed below. In still other embodiments, a combination of the two can exist. For example, dots $\mathbf{110}_1$-$\mathbf{110}_2$ can represent targets at various distances for a first projectile device, while other dots **110** might represent targets at various distances for a second projectile device.

[0023] As illustrated, projection element **204** can project illuminated reticle **108** onto viewing element **102**. One or more adjustment element(s) **206** can be employed to modify or update the way projection element **204** projects illuminated reticle **108**. Various examples and further detail are provided with reference to FIG. **4**.

[0024] Turning now to FIG. **4**, examples of adjustment element **206** are now described. For instance, adjustment element **206** can represent a color adjustment element **402** that can be configured to change a color of all or a portion of multiple dots **110**. Intensity adjustment element **404** can be configured to change an intensity or brightness of illuminated reticle **108** and/or multiple dots **110**. In some embodiments, respective colors of multiple dots **110** or respective intensities of multiple dots **110** can be individually configurable.

[0025] Dot number adjustment element **406** can be configured to increase or decrease a number of the multiple dots **110** projected onto the viewing element. Zeroing adjustment element **408** can be employed to configure the aiming elements such as during a first-time use for a particular projectile device or in response to a change to the projectile device.

[0026] Vertical adjustment element **410** and horizontal adjustment element **412** can be configured to change a location at which the illuminated reticle is projected onto the viewing element. Vertical adjustments elements **410** can be substantially similar to zeroing adjustment element **408** that can be used or adjusted based on projectile velocity, elevation or the like. Horizontal adjustment element **412** can updated, for example, in response to wind or the like.

[0027] Sight device **100**, **200** can further include spacing adjustment element **414**. Spacing adjustment element **414** can be configured to increase or decrease the respective spacing distance(s) **302**. For example, consider a first projectile device having a first set of defined characteristics (e.g., muzzle velocity, etc.) and a second projectile device having a second set of defined characteristics (e.g., draw weight, etc.). Spacing distance **302** is likely to be different for the first projectile device relative to the second projectile device. Thus, respective spacing distances **302** can increased or decreased in accordance with the different defined characteristics between the two projectile devices.

[0028] Referring now to FIGS. **5** and **6**, sight devices **500** and **600** are depicted. Sight devices **500**, **600** can be similar to sight devices **100**, **200**, but instead of an open sight design, are configured according to a tubular design. FIG. **5** illustrates a line-of-sight view, whereas FIG. **6** illustrates an overhead view. As depicted, sight devices **500**, **600** can include all or a portion of elements detailed previously.

[0029] For example, sight devices **500**, **600** can include projection element **204** that can project illuminated reticle **108** onto a viewing element. In this case, projection element **204** is situated on the side. Illuminated reticle **108** can comprise multiple dots **110** that are aligned vertically, as shown. Sight devices **500**, **600** can further comprise tubular housing **502** as well as battery housing **208**. Sight devices **500**, **600** can further include various adjustment elements **206**, which can be inclusive of vertical adjustment element

410 and horizontal adjustment element 412. Mounting base 504 can include picatinny rail groove 112.

[0030] With specific reference to FIG. 6, sight device 600 is illustrated with example adjustment indicators 506. For example, the numbers 1-15 can respectively indicate different vertical adjustment settings, spacing 302 settings, or another setting such as those detailed in connection with FIG. 4.

Example Universal Mounting Adapter

[0031] FIG. 7 depicts an example adapter bracket 700. Adapter bracket 700 can be configured to mount any of the aforementioned sight devices 100, 200, 500, 600 to substantially any type of projectile device, including, e.g., bows, crossbows, pistols, rifles, and so forth. As shown, structure 702 can comprise elongated mounting hole 704 and holes 706, any or all of which can be employed to secure adapter bracket to a projectile device of choice. Structure 708 can be coupled to picatinny rail bracket 710 that can be inserted into and/or secured to picatinny rail groove 112 of the sight devices detailed herein.

[0032] While a particular feature of the subject innovation may have been disclosed with respect to only one of several implementations, such feature may be combined with one or more other features of the other implementations as may be desired and advantageous for any given or particular application. Furthermore, to the extent that the terms "includes," "including," "has," "contains," variants thereof, and other similar words are used in either the detailed description or the claims, these terms are intended to be inclusive in a manner similar to the term "comprising" as an open transition word without precluding any additional or other elements.

[0033] Moreover, the words "example" or "exemplary" are used herein to mean serving as an example, instance, or illustration. Any aspect or design described herein as "exemplary" is not necessarily to be construed as preferred or advantageous over other aspects or designs. Rather, use of the words "example" or "exemplary" is intended to present concepts in a concrete fashion. As used in this application, the term "or" is intended to mean an inclusive "or" rather than an exclusive "or". That is, unless specified otherwise, or clear from context, "X employs A or B" is intended to mean any of the natural inclusive permutations. That is, if X employs A; X employs B; or X employs both A and B, then "X employs A or B" is satisfied under any of the foregoing instances. In addition, the articles "a" and "an" as used in this application and the appended claims should generally be construed to mean "one or more" unless specified otherwise or clear from context to be directed to a singular form.

1. A sight apparatus, comprising:

a viewing element comprising a reflecting material configured to present an illuminated reticle superimposed over a field of view observed by looking through the viewing element;

a projection element that projects the illuminated reticle onto the viewing element, wherein the illuminated reticle comprises multiple dots that are vertically aligned and separated from one another by respective spacing distances, wherein a spacing distance, of one of the respective spacing distances, is representative of a physical distance between two of the multiple dots;

a spacing adjustment element that is configured to change the spacing distance in response to input to the sight apparatus.

2. The sight apparatus of claim 1, wherein the multiple dots comprise:

a first dot determined to represent an aiming point of a target at a first distance; and

a second dot determined to represent the aiming point of the target at a second distance that differs from the first distance.

3. The sight apparatus of claim 2, further comprising a color element configured to change a color of the first dot in response to an adjustment to the color element.

4. The sight apparatus of claim 3, wherein respective colors of the multiple dots are individually configurable.

5. The sight apparatus of claim 1, further comprising a number element configured to increase or decrease a number of the multiple dots projected onto the viewing element in response to an adjustment to the number element.

6. The sight apparatus of claim 5, wherein the number is between two and ten.

7. The sight apparatus of claim 1, further comprising a zeroing element that, in response to an adjustment to the zeroing element, is configured to change a location at which the illuminated reticle is projected onto the viewing element.

8. The sight apparatus of claim 7, wherein the zeroing element comprises a vertical adjustment element that, in response to adjustment, moves the illuminated reticle vertically with respect to the viewing element.

9. The sight apparatus of claim 7, wherein the zeroing element comprises a horizontal adjustment element that, in response to adjustment, moves the illuminated reticle horizontally with respect to the viewing element.

10. The sight apparatus of claim 1, wherein the input is representative a defined projectile velocity and the spacing adjustment element changes the spacing distance as a function of a trajectory determined for a projectile.

11. The sight apparatus of claim 1, wherein the input is representative of a projectile device model identification and the spacing adjustment element changes the spacing distance accordingly.

12. The sight apparatus of claim 11, wherein the projectile has a first set of defined characteristics and is for a projectile device having a second set of defined characteristics, and wherein the respective spacing distance is increased or decreased in accordance with different ones of the first set of defined characteristics or the second set of defined characteristics.

13. The sight apparatus of claim 1, wherein the reflecting material is at least partially transparent.

14. The sight apparatus of claim 1, wherein the reflecting material is at least partially reflecting.

15. The sight apparatus of claim 1, wherein the reflecting material comprises glass.

16. The sight apparatus of claim 1, further comprising an adapter bracket configured to couple the sight apparatus to a projectile device.

17. The sight apparatus of claim 1, wherein the adapter bracket comprises a picatinny rail element configured to couple to a picatinny groove element of the sight apparatus.

18. The sight apparatus of claim 1, wherein the adapter bracket comprises a picatinny rail element configured to couple to a picatinny groove element of the sight apparatus.

19. A sight apparatus, comprising:

a viewing element comprising a reflecting material configured to present an illuminated reticle superimposed over a field of view visible when looking through the viewing element;

a projection element that projects the illuminated reticle onto the viewing element, wherein the illuminated reticle comprises multiple dots that are vertically aligned, and wherein a spacing distance between two of the multiple dots is a function of a trajectory determined for a first defined projectile; and

a spacing adjustment element that is configured to change the spacing distance in response to input indicating a second defined projectile that has different characteristics than the first defined projectile.

20. A sight apparatus, comprising:

a viewing element comprising a reflecting material configured to present an illuminated reticle superimposed over a field of view visible when looking through the viewing element;

a projection element that projects the illuminated reticle onto the viewing element, wherein the illuminated reticle comprises multiple dots that are vertically aligned, and wherein a spacing distance between two of the multiple dots is a function of a trajectory determined for a first defined projectile device; and

an adjustment element configured to change the spacing distance in response to input indicating a second defined projectile device that has different characteristics then the first defined projectile device.

* * * * *