United States Patent [19]

Oreck

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[45] **Dec. 11, 1973**

[54] **GUNSIGHT ALIGNMENT APPARATUS**

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[52] **U.S. Cl.** **33/245**

[51] **Int. Cl.** **F41g 1/38,** F41g 1/42, F41a 1/54

[58] **Field of Search** 33/277, 245-248

[56] **References Cited**

UNITED STATES PATENTS

476,874	6/1892	Cummins	33/246
1,949,100	2/1934	Fahrenwald	33/246
2,763,930	9/1956	Ivy	33/245

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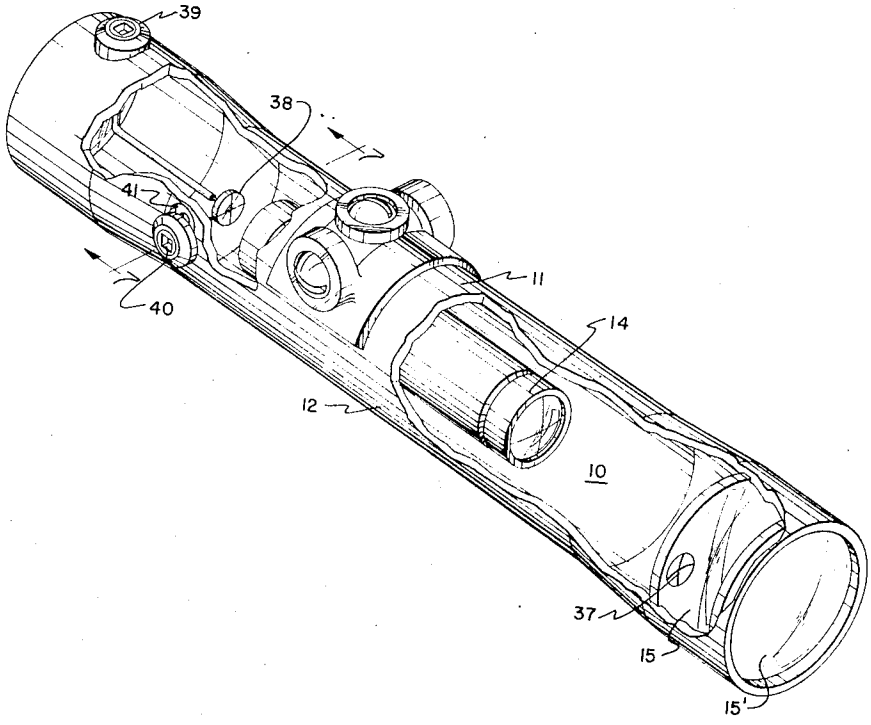
[57] **ABSTRACT**

The collimator of the present invention is intended to be carried within a telescopic gunsight. The collimator of this invention comprises an eyepiece reticle suitably disposed from the eyepiece of the gunsight, a forward reticle disposed distally forwardly of the reticle erector of the gunsight and means for horizontally and vertically adjusting the relationship of the eyepiece reticle and the forward reticle. The horizontal and vertical adjusting means include a horizontal set-screw-type adjusting means carrying the eyepiece reticle, and a vertical adjusting means carrying the forward reticle. A further embodiment of this invention includes an eyepiece reticle etched onto the eyepiece of a gunsight and a forward reticle having both horizontal and vertical adjusting means.

3 Claims, 7 Drawing Figures



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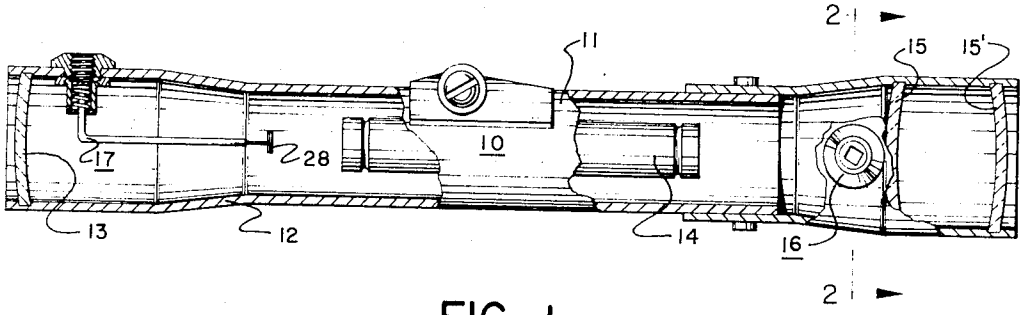

FIG. 1

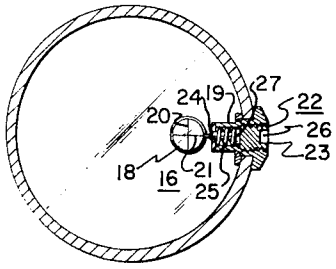

FIG. 2

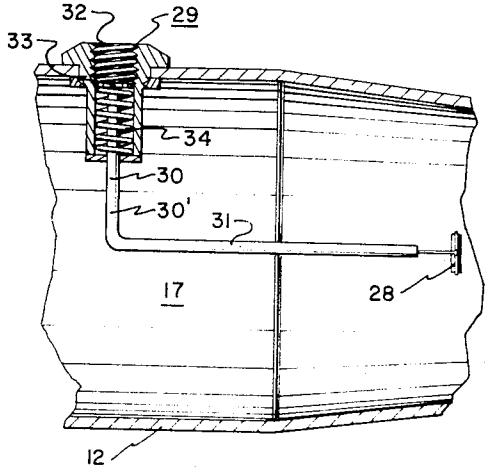

FIG. 3

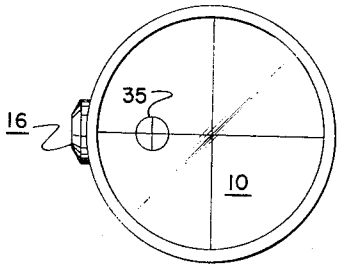

FIG. 4

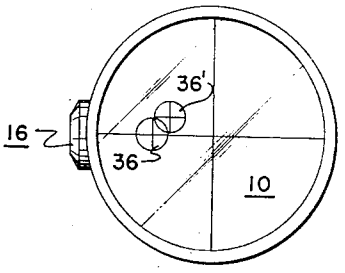

FIG. 5

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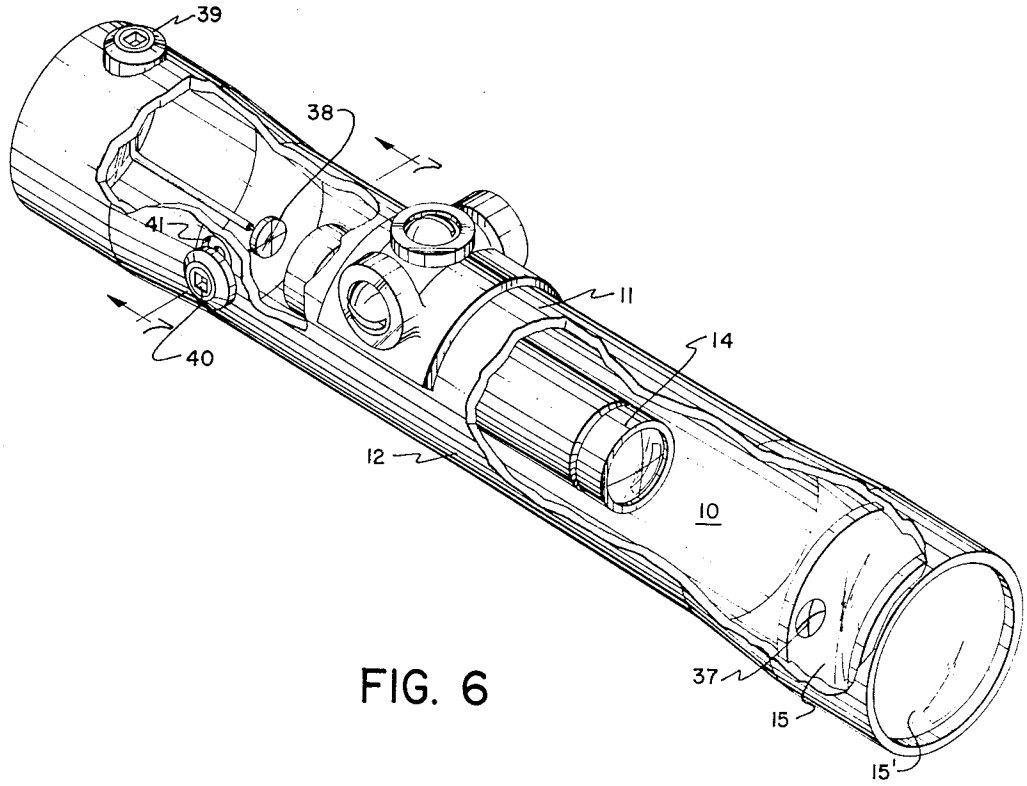

FIG. 6

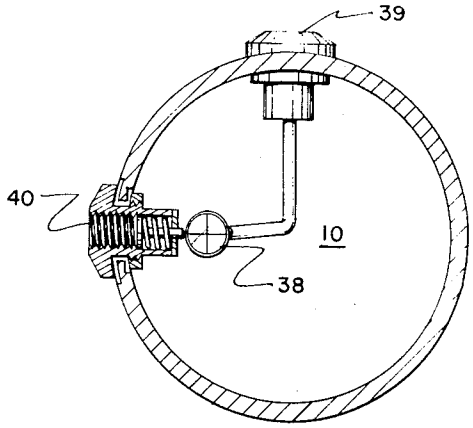

FIG. 7

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GUNSIGHT ALIGNMENT APPARATUS

FIELD OF THE INVENTION

The present invention relates to gunsight alignment apparatus and more particularly to gunsight alignment apparatus carried within a telescopic gunsight.

DESCRIPTION OF THE PRIOR ART

Apparatus for collimating telescopic gunsights with the weapon on which they are mounted generally involve successive experimental firings of a weapon, or have involved laboratory-based collimator frames. Experimental firing of the weapon and adjusting of the rifle mounted scope, known as sighting-in, employs firing a suitable number of shots and experimentally adjusting the scope in relation to the weapon. Laboratory-based collimators employ a specially designed frame provided with reticle lense in combination with a parallel light source. Collimators tend to be delicate, complex, and expensive in use. Commonly, experimental firing only provides an approximation of the true relationship of the telescopic gunsight with respect to the weapon. The collimator, because of the delicacy of the apparatus, generally cannot be taken in the field. Neither of the above-mentioned methods are operable to indicate to one using the gun-mounted sight if the relationship of the telescopic gunsight to the weapon is correct at the time of shooting.

Accordingly, it is an object of the present invention to provide gunsight alignment means which are disposed in a telescopic gunsight and which are operable in the field.

It is a further object of this invention to provide collimator adjusting means operable to be adjusted in the field.

These and other objects shall become apparent from the description following, it being understood that modifications may be made without affecting the teachings of the invention here set out.

SUMMARY OF THE INVENTION

Generally, the collimator of the present invention is intended to be carried within a telescopic gunsight. The collimator of this invention comprises an eyepiece reticle suitably disposed from the eyepiece of the gunsight, a forward reticle disposed distally forwardly of the reticle erector of the gunsight and means for horizontally and vertically adjusting the relationship of the eyepiece reticle and the forward reticle. The horizontal and vertical adjusting means include a horizontal set-screw-type adjusting means carrying the eyepiece reticle, and a vertical adjusting means carrying the forward reticle. A further embodiment of this invention includes an eyepiece reticle etched onto the eyepiece of a gunsight and a forward reticle having both horizontal and vertical adjusting means.

A more thorough and comprehensive understanding may be had from the detailed description of the preferred embodiment when read in connection with the drawings forming a part of this specification.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side elevational view of a gunsight collimator apparatus of this invention, in combination with a telescopic gunsight with the end portions of the cylindrical wall cut away for illustrative purposes.

FIG. 2 is a cross-sectional view taken substantially along the lines 2—2 of the FIG. 1, and drawn to a larger scale showing the horizontal alignment reticle of this invention.

FIG. 3 is a fragmentary side elevational view of the forward reticle assembly of this invention, drawn to a larger scale.

FIG. 4 is an end elevational view showing the reticles as they would appear with the scope in proper alignment.

FIG. 5 is an end elevational view showing the scope as it would appear with the scope not in proper alignment, for illustrative purposes.

FIG. 6 is a right perspective view with the end portions of the cylindrical wall removed for illustrative purposes showing a further embodiment of this invention.

FIG. 7 is a cross-sectional view taken substantially along the lines 7—7 of the FIG. 6 showing the interior configuration of the adjustable reticles of the further embodiment.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawings, and more particularly to the FIG. 1, the collimator of this invention is shown to advantage and identified by the numeral 10. The collimator 10 is operable to indicate changes in the relationship of a telescopic gunsight to a weapon on which the gunsight is disposed. The collimator 10 is carried within the scope 10 which provides the environment for the collimator 10. Generally, a telescopic gunsight comprises a substantially cylindrical tube 12 operable to provide a housing means for the scope 11 and a mounting means operable to rectilinearly mount the scope 11 on a gun (not shown). The magnifying means of the scope 11 usually includes an objective lens 13 disposed distally from the forwardmost terminal end of the tube 12 with respect to the weapon-mounted scope 11, a reticle-erector 14 disposed centrally in the tube 12, and a pair of eyepiece lenses 15 and 15'. Generally, the image enters the objective lens 13 inverted as a magnified image, is focused and inverted by the retile-erector 14, and is transmitted to the observer's eye by the eyepiece lenses 15 and 15'. The recticle-erector 14 includes perpendicularly disposed cross-hairs (not shown) which provide datum reference lines for sighting the weapon. The collimator 10 is operable to employ the lenses of the recticle-erector 14 and the eyepiece lenses 15 and 15' as magnifying means for parallax indications of misalignment of the scope 11, hereinafter later described.

The collimator 10 comprises an eyepiece reticle assembly 16, and a forward reticle assembly 17. The eyepiece reticle assembly 16 is disposed distally forwardly of the forward eyepiece lens 15 in the tube 12. As shown by the FIG. 2, the reticle assembly 16 comprises a reticle 18, and a reticle holding means 19 operable to hold the reticle 18 distally within the interior terminal wall of the tube 12. The reticle 18 is a transparent ring provided with a pair of cross hairs 20 and 21 disposed perpendicularly to each other, through which the observer may look. The eyepiece reticle assembly 16 may be provided with means operable to adjust the reticle 18 distally parallelly along the horizontal cross hair axis 21 of the scope 11. The adjusting means comprises a socket subassembly 22 disposed through the terminal

wall of the tube 12, an adjusting screw 23, a reticle stem 24, and an urging spring 25. The socket 22 includes a boring 26 disposed transversely with respect to the tube 12. The boring 26 is provided on its outer portion with suitable threads operable to engage the adjusting screw 23, and is provided with smooth polygonal walls on the portion closer to the center axis of the tube 12. The stem 24 is a rod-like wire fastened at one of its terminal ends to the reticle 18, and is provided at its opposite terminal end with a polygonal cap 27 having a larger diagonal dimension than the diameter of the stem 24. The cap 27 closely conforms to the polygonal walls of the polygonal portion of the boring 26. It has been found to advantage to use a square boring wall and a square cap, although other shapes may be used. An urging spring 25 is provided under the cap 27 on the stem 24. As shown by the FIG. 2, the stem 24 and spring 25 disposed on the stem 24 are disposed within the polygonal portion of the boring 26. The spring 25 is retained in the boring 26 by a retaining means 26' disposed at the centermost terminal end of the socket 22. In operation, the reticle 18 may be moved centrally along the horizontal cross hair axis 21 by further engaging the adjusting screw 23 which is operable to force the cap 27 of the stem 24 into the boring 26. Conversely, the reticle 18 may be moved outwardly along the horizontal axis 21 by withdrawing the adjusting screw 23 which will permit the urging spring 25 to react against the cap 27 to force the stem 24 outwardly in the boring 26.

Referring again to the FIG. 1, the forward reticle assembly 17 is provided with a reticle 28 disposed distally from the forwardmost terminal end of the reticle-erector 14. The reticle 28 is provided with cross hairs (not shown), substantially similar to the reticle 18. It has been found to advantage to provide a recticle 28 of sufficient size to project an image at the eyepiece 15' identical to the image of the reticle 18. The forward reticle assembly 17 includes a vertical adjustment means operable to move the reticle image vertically with respect to the vertical cross hair axis 20 of the scope 11. As shown more clearly by the FIG. 4, the forward reticle assembly 17 is provided with a socket subassembly 29 similar to the socket subassembly 22 of the eyepiece reticle assembly 16 and a stem 30 provided with a substantially vertically disposed arm 30' and a substantially horizontal arm 31. The horizontal arm 31 of the stem 30 is operable to suitably project the reticle 28 to the objective end of the recticle-erector 14. The vertical arm 30' projects the reticle 28 into the interior of the tube 12. As shown more clearly by the FIG. 3, the socket subassembly 29 is provided, in identical manner to the socket subassembly 22 of the eyepiece reticle 16, with an adjustment screw 32, stem cap 33 and urging spring 34 in a manner set out above. The image of the reticle 28 may be moved vertically parallelly to the vertical cross hair (not shown) of the scope 11 by engaging or disengaging the adjustment screw 32 as set out above. It has been found to advantage to project the images of the collimator 10 to one of the side areas of the scope 11, thus leaving the central area open for viewing the magnified image for which the scope 11 is intended. It is to be understood that while the adjusting means has been described with the eyepiece reticle 16 having a horizontal travel and the forward reticle 17 having a verticle travel, the adjusting travels may be reversed with satisfactory results.

Referring now to the FIGS. 4 and 5, in a scope properly aligned with respect to the weapon and images collimated with respect to each other a single reticle image 35 will appear. Should the weapon become misaligned, as shown by the FIG. 5, there will appear two images 36 and 36'. The distance by which the centers of the image 36 and 36' are separated corresponds to the distance by which the scope may be out of alignment with the weapon (not shown).

Referring now to the FIG. 6, a further embodiment of this invention includes an eyepiece reticle 37 etched onto the eyepiece reticle 16 and a forward reticle 38 provided with both vertical and horizontal adjusting means. Referring now to the FIG. 7, the forward reticle 38 is provided with a pair of sockets 39 and 40 disposed substantially perpendicularly in the tube 12. The verticle adjusting socket 39 is identical to the socket 32 as set out above with respect to the eyepiece reticle 16. The horizontal adjusting means comprises a socket 40 disposed within a slot-like track 41 dipsosed in the terminal side of the tube 12. In operation, the reticle 38 may be vertically adjusted causing a corresponding change in the position of the horizontal adjusting socket 40. The horizontal adjusting means may be actuated by engaging an adjusting screw, (not shown) in a manner similar to that set out above. The indication of alignment is the same as that set out above with respect to the embodiment employing two separately acting reticles.

Having thus described in detail a preferred apparatus which embodies the concepts and principles of the invention and which accomplishes the various objects, purposes and aims thereof, it is to be appreciated and will be apparent to those skilled in the art that many physical changes could be made in the apparatus without altering the inventive concepts and principles embodied therein. Hence, it is intended that the scope of the invention be limited only to the extent indicated in the appended claims.

I claim:

1. In combination with a telescopic gunsight including an objective lens, a reticle-erector, eyepiece lens, and a collimator, as alignment device comprising an eyepiece reticle assembly disposed from said eyepiece of said gunsight, a forward reticle assembly disposed distally from the forwardmost terminal end of said reticle-erector of said gunsight, and means horizontally and vertically adjusting the relationship of said eyepiece reticle and said forward reticle.

2. The apparatus of claim 1 wherein said means horizontally and vertically adjusting said eyepiece reticle and said forward reticle include a horizontal adjusting means carrying said eyepiece reticle, said eyepiece reticle comprising a socket disposed in the tube of said gunsight and being juxtapositioned to a horizontal cross hair of said gunsight, said socket having a boring including threads on its outer portion and smooth polygonal walls on its portion closest to the central axis of said tube, said boring being disposed rectilinearly in said socket, an adjusting screw operable to threadably engage said boring threads, a stem having said reticle fastened at one of its terminal ends and having means at its end opposite operable to engage said polygonal boring, and urging means carried on said stem operable to outwardly urge said eyepiece reticle with respect to said central axis of said tube; and a vertical adjusting means carrying said forward reticle including a socket,

stem, and urging means similar to said eyepiece reticle socket, said stem and said urging means being disposed parallelly to a vertical cross hair of said gunsight.

3. The apparatus of claim 1 wherein said means for horizontally and vertically adjusting said eyepiece reticle and said forward reticle include an eyepiece reticle etched onto said eyepiece of said gunsight and a forward reticle having both horizontal and vertical adjusting means.

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