Dec. 19, 1967 S. R. FREEBAIRN 3,358,504

SIGHTING APPARATUS

Filed Oct. 1, 1965 2 Sheets-Sheet 1

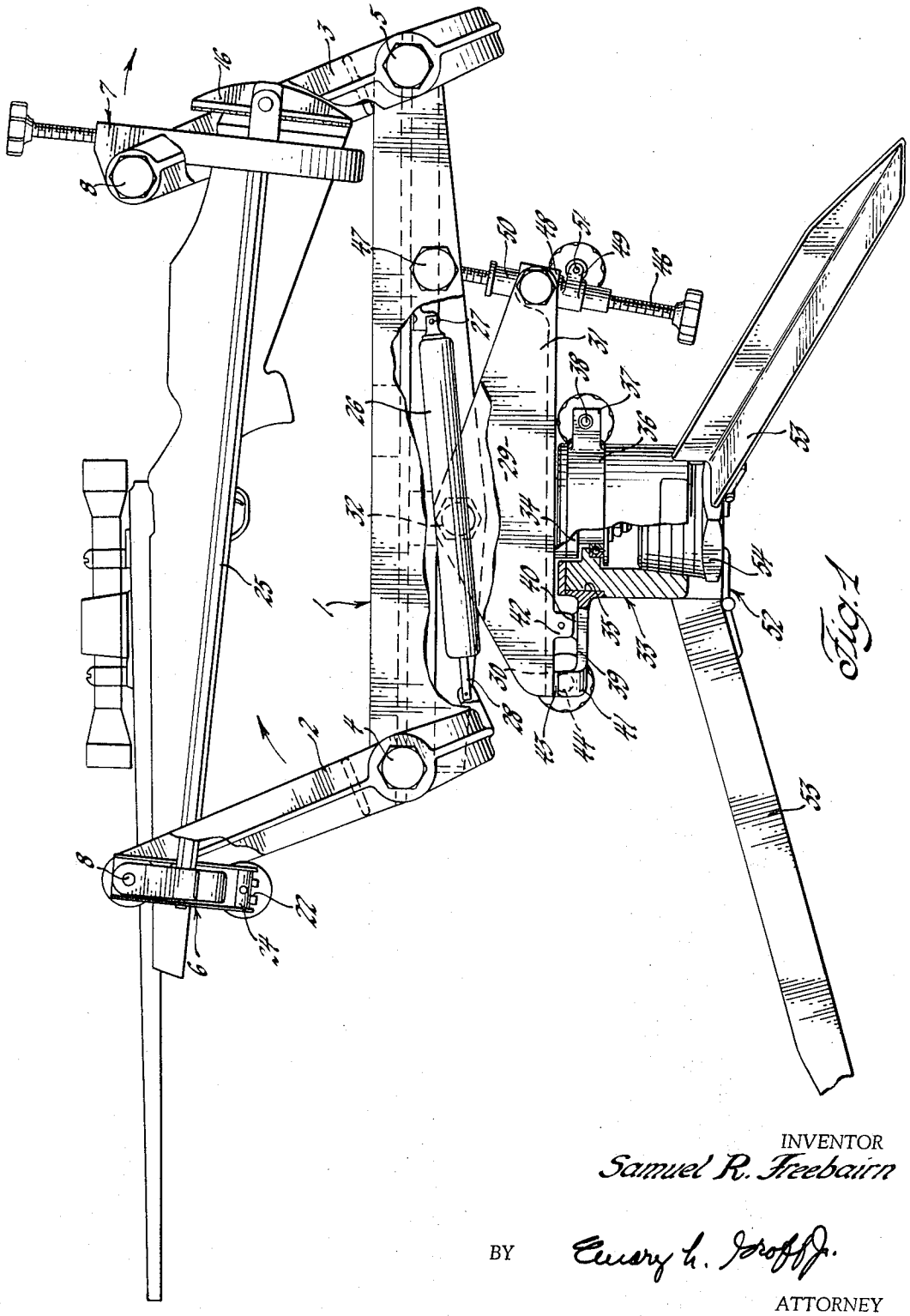


Fig. 1

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SIGHTING APPARATUS

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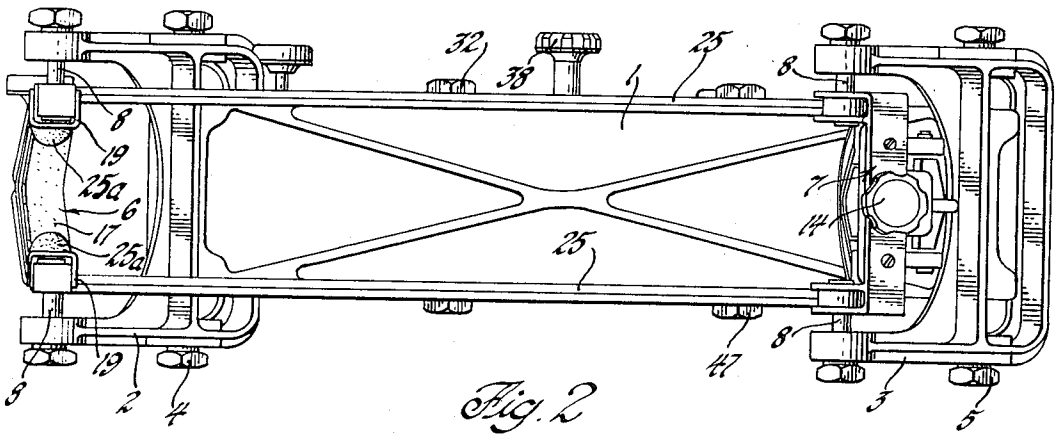


Fig. 2

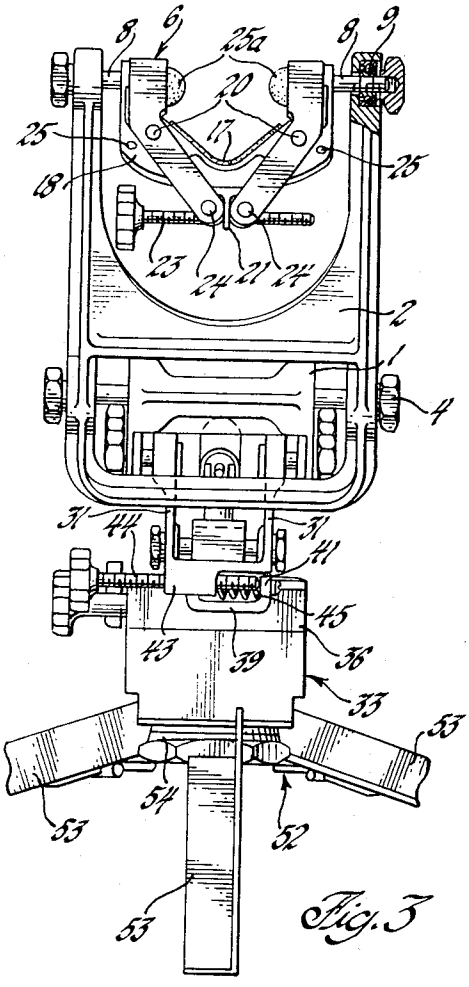


Fig. 3

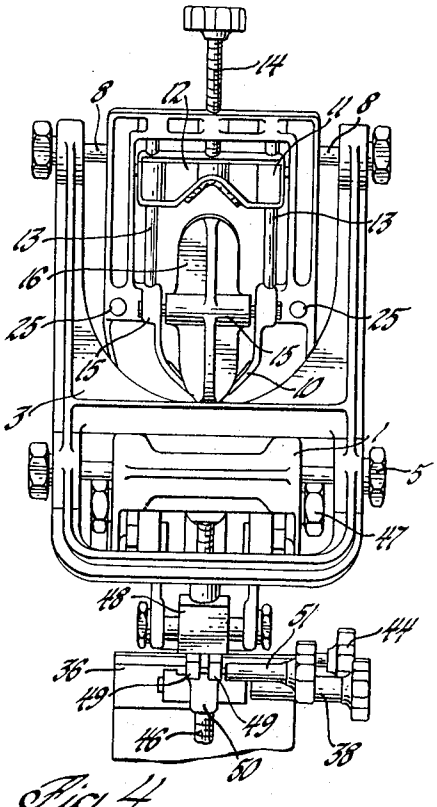


Fig. 4

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United States Patent Office 3,358,504
Patented Dec. 19, 1967

3,358,504

SIGHTING APPARATUS

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Filed Oct. 1, 1965, Ser. No. 492,132
10 Claims. (Cl. 73—167)

This invention relates generally to a sighting apparatus and more particularly to a device for zeroing in rifles and other types of firearms.

Many devices are known for checking or testing the accuracy of gun sights. Many of the prior known devices rely upon the maintenance of the utmost stability of the firearm throughout the testing procedure whereby provision is made for preventing even the slightest displacement of the weapon during the firing of a plurality of cartridges therefrom. In order to achieve this effect, it has heretofore been a practice to construct the gun mount of extremely heavy components tending to resist any displacement as a result of the firing of the weapon and to incorporate any of various means for tightly clamping the weapon within the gun mount which in turn is usually permanently mounted upon a heavy bench.

Accordingly, one of the primary objects of the present invention is to provide a sighting apparatus comprising a lightweight easily transported device which may be readily adapted for use in the field by, say, a hunter, as well as adaptable for use on a firing range by attaching the base of the mount to a rigid pipe or other supporting member fixedly disposed within the ground.

Another object of the present invention is to provide a sighting apparatus which may be set up to test any type of firearm in a matter of seconds, and which provides means for rigidly clamping only the butt stock of the firearm while merely providing a cradle type support for the forearm stock of the weapon. With the present invention, the actual time consumed in conducting the actual zeroing in of the weapon amounts to only a few seconds in view of the novel construction therein provided. This feature, coupled with the ease or portability of the present device, makes readily available an improved sighting apparatus not previously known in the art. Heretofore, it has usually only been the most expert of riflemen who could afford the time and expense necessary to have their firearms zeroed in in view of the non-availability of a simple inexpensive apparatus for accomplishing this procedure. All shooting enthusiasts realize, however, that the line of sight of each of their weapons will vary considerably, not only as a result of time and use, but also between manufacturer's lots of a single prescribed size and weight of ammunition. Thus, it becomes evident that it would behoove each shooter to have his weapon zeroed in, not only a single initial time, but also whenever he changes from one bullet size or powder weight of ammunition to another, or even changed lots in a single rating of ammunition. With the present invention, a sighting apparatus is provided of inexpensive construction which may be easily transported, even into the field, by a hunting party so that each and every member may readily zero in his firearm in a mere matter of seconds, usually requiring only the firing of two rounds of ammunition per weapon.

A further object of the present invention is to provide a sighting apparatus including a pair of V-way suspended supporting clamps into which the weapon is deposited, said suspended clamps being in turn pivotally mounted to a pair of parallel frame members, in turn pivotally mounted upon a body member.

Still another object of the present invention is to provide a sighting apparatus including a pair of pivoted firearm supporting frame members which are equally

displaced in an arcuate manner by the force of the recoil of the weapon when it is fired, and which are returned by arrestor means to the exact original position without any displacement of the bore sighting of the weapon from its original position.

With these and other objects in view which will more readily appear when the nature of the invention is better understood, the same consists in the novel construction, combination, and arrangement of parts hereinafter more fully described, illustrated, and claimed.

A preferred and practical embodiment of the invention is shown in the accompanying drawings, in which:

FIGURE 1 is a side elevation, with portions broken away, of a sighting apparatus according to the present invention.

FIGURE 2 is a top plan view of the present invention.

FIGURE 3 is a front elevation view of the present invention.

FIGURE 4 is a rear elevation view of the present invention.

Similar reference characters designate corresponding parts throughout the several views of the drawings.

Referring now to the drawings, particularly FIGURE 1, it will be seen that the present invention comprises a device which is relatively compact and lightweight and which thus may be readily transported, even into the field, by a hunter for the purpose of zeroing in his rifle in order to ensure accuracy of bullet impact, even at ranges in excess of 1000 yards. Basically, the sighting apparatus comprises a longitudinal body member **1** having pivotally journalled at opposite ends thereof a substantially U-shaped front frame member **2** and rear frame member **3**. The bearings (not shown) disposed within the ends of the body member **1** and containing the pivotal axles **4** and **5** are of the adjustable type so that maximum precision may be maintained to eliminate any possible free play in the attachment of the front and rear frames to the body member. Pivotally suspended from the upper ends of the forks of the front frame **2** and rear frame **3** are, respectively, a front V-way clamp assembly generally designated **6** and a rear butt stock clamp assembly generally designated **7**. From a review of FIGURES 3 and 4 it will be seen that the two clamp assemblies are each pivotally suspended from the upper ends of the front and rear frames by means of stub axles **8** which are journalled within suitable bearings **9**, contained in the upper forks or arms of the frame members.

The front and rear frame members may be of substantially identical construction. However, the front clamp assembly **6** and rear clamp assembly **7** are necessarily entirely different in construction from one another in view of their use during operation of the sighting apparatus. As will be most clearly seen in FIGURE 1, the rear butt stock clamp assembly **7** is disposed with its vertical axis offset and to the rear of the pivotal axis of the stub axles **8** journalled within the rear frame member **3**. As will be seen in FIGURE 4, the bottom of the rear clamp assembly **7** is provided with a V-way **10**, the upper exposed surface of which is preferably covered with a protective cushion layer such as neoprene. Disposed above the bottom of V-way **10** is a butt stock clamp bar **11** having an inverted V-way surface **12** facing the V-way **10**. The clamp bar **11** is mounted within the confines of the rear clamp assembly **7** by means of a pair of vertically disposed clamp guide bars **13—13** and includes an adjustment screw **14** threaded through the top of the clamp assembly **7** and having its lower end freely journalled within the medial portion of the butt stock clamp bar **11**. Pivotally mounted between a pair of rearwardly projecting offset brackets **15—15** is a rifle butt support plate **16** which is provided with a protective cushion layer on its forwardly facing

surface as will be seen in FIGURE 1. From the foregoing, it will now be understood that when placing a firearm in the sighting apparatus, the butt of the weapon is disposed in juxtaposed relationship to the rifle butt support plate **16** with the bottom of the rifle butt resting upon the bottom V-way **10** of the clamp assembly **7**. With the weapon thus positioned, the clamp screw **14** is turned to force the butt stock clamp bar **11** downwardly until the upper V-way **12** firmly grips the top of the rifle butt to hold the weapon in a rigid position in the sighting device.

With the butt stock portion of the rifle firmly anchored within the clamp assembly **7**, the forearm stock portion of the weapon is adapted to be disposed upon the V-way portion **17** of the front clamp assembly **6**. This front clamp assembly **6** includes a main body portion **18** of generally U-shaped configuration and which is pivotally supported within the front frame **2** by means of the aforedescribed stub axles **8**. Straddling the front and rear of the main body portion **18** are a pair of scissor arms **19—19**, each of which is pivotally mounted to the main body portion as at **20**. Depending from the lowermost medial portion of the main body portion **18** is a guide **21** having a slot **22** provided therein (FIGURE 1). Loosely disposed within the slot **22** is a scissor adjustment screw **23** about which are threaded a pair of sleeves **24—24**. The ends of each of the threaded sleeves **24** are pivotally mounted within the front and rear portions of each of the scissor arms **19**, whereupon it will be obvious that as the adjustment screw **23** is turned, the left and right hand threads provided thereon will move the two sleeves **24** concurrently either towards the ends of the screw **23** or towards the depending guide **21**, dependent upon the direction the screw **23** is rotated. In view of the pivotal mounting of the two scissor arms **19** upon the pivots **20**, it will follow that as the screw **23** is turned, the upper ends of the scissor arms **19** will be moved either towards one another or away from one another in an arcuate manner. As shown in FIGURE 3, the upper portions of the scissor arms **19—19** are each provided upon their oppositely facing surfaces with a rubber bumper **25***a* for reasons which will become obvious immediately hereinafter.

When the firearm has been anchored within the rear clamp assembly **7** and the forearm stock is resting upon the V-way **17** of the front clamp assembly **6**, the screw **23** is rotated to move the two sleeves **24**, **24** outwardly away from the guide **21** to pivot the scissor arms **19** and move the bumpers **25***a* towards one another until the forward portion of the rifle is urged downwardly thereby to suitably retain the front of the weapon within the V-way **17**. It will be understood as this description progresses that the front clamp assembly **2** does not have to serve the purpose of rigidly locking the forearm portion of the weapon in the sighting apparatus against the usual recoil reaction encountered, and is primarily to prevent lateral displacement of the weapon during the subsequent firing thereof. An important feature of the present invention which precludes any raising or climbing of the bore of the weapon during the recoil thereof is that the line of thrust which passes through the center of the firearm's bore, if extended rearwardly, would pass through the center of the pivoting stub axles **8**, **8** in the rear frame **3**. The front and rear frame, as well as the front and rear clamp assemblies, are maintained in their respective parallel relationship by means of a tie-rod **25**, having its opposite ends rigidly attached to the front and rear clamp assemblies. In order to balance the forces reacting on the front and rear clamp assemblies, it is proposed to provide a separate tie rod **25** to interconnect both the left and right hand sides of the two clamp assemblies.

The front and rear frames which will always be disposed in parallel relationship in view of the tie rods **25**, **25** interconnecting the front and rear clamp assemblies, assume a normal or at-rest position with the upper portions thereof inclined forwardly as shown in FIGURE 1. The frame members are biased to this at-rest position by

means of an arrestor cylinder **26**, preferably comprising a pneumatic cylinder operating on the similar principle, as a door closer and having one end of the cylinder pivotally anchored as at **27** to the undersurface of the body member **1** while the slidable piston rod **28** has its outer free end pivotally connected to the lower rear edge of the front frame member **2** below the pivotal axis of the axle **4**. It will be understood that the arrestor **26** will include any suitable conventional valve means (not shown) as commonly found in many cylinders of this type, whereby the resistance, and therefore the speed with which the piston rod **28** is extended and retracted, may be altered in order to accommodate firearms having widely different recoil forces.

The present invention provides means whereby practically any firearm may be zeroed in by firing usually no more than two shots, regardless of how far from the bullseye the first shot strikes the target. In order to accomplish this, fast, accurate, and smooth means must be provided for making elevation and wind adjustment to the line of sight of the weapon. Means are included to enable the operator to make both rapid or coarse elevation and windage adjustments as well as fine precision windage and elevation adjustments to the body member **1**, it being apparent that any vertical and lateral movements directed to the body member **1** will be transmitted as a corresponding movement of the line of sight of the weapon mounted within the front and rear clamp assemblies of the sighting apparatus.

The body member **1** is mounted for pivotal movement upon a carrier **29** comprising a channel member having a horizontal base **30** and a pair of vertically disposed side walls **31**, **31**. The side walls **31**, **31** are generally of triangular configuration in side elevation and are attached to the body member **1**, adjacent the upper vertex thereof by means of a suitable shaft **32** which is equipped with bearings to provide a smooth, effortless, pivotal movement of the body member **1** upon the carrier **29**. The carrier **29** is in turn supported upon a base **33** by means of a circular hub **34** depending from the bottom **30** of the carrier and journalled within said base **33** for rotary movement with respect to the base. From the above description, it will be seen that suitable means are provided to permit both lateral or windage movement of the line of sight of the firearm as the carrier **29** is pivoted about the vertical axis passing through the base **33**, and also vertical or elevation movement by means of the horizontal pivot axis formed by the bearing-equipped shaft **32** joining the body member **1** to the side walls of the carrier **29**.

Means for regulating the vertical and horizontal disposition of the line of sight of the firearm is provided by a plurality of screw threaded elements for adjusting and holding the relative position between the fixed base **33**, the carrier **29**, and the body member **1**, as will now be described. Disposed within a peripheral groove **35** formed in the upper portion of the base **33** is a windage clamp **36** comprising a split ring having a pair of spaced apart clamping ears **37**, **37** formed at the free ends thereof. A clamp screw **38** freely passing through one of said ears **37** engages a tapped opening in the other ear **36** whereby the windage clamp **36** will be tightened about the peripheral groove **35** in base **33** as the clamping screw **38** is moved in one direction and will be loosened as it is moved in the opposite direction for purposes which will become obvious immediately hereinafter. Attached to the split ring of the windage clamp **36** at a point diametrically opposed to the clamping screw **38** is a horizontally disposed offset arm **39** extending outwardly to a point underlying the forward portion of the carrier **29**. As will be seen in FIGURE 1, a pair of upstanding stops **40** and **41** are provided along opposite side edges of the offset arm **39**, the stop **40** being disposed adjacent the split ring portion of the windage clamp **36**, while the stop **41** is adjacent the free outer edge of the offset arm **39**. Depend-

ing from the bottom portion **30** of the carrier **29** and laterally opposed to the stops **40** and **41** is an ear **42** and threaded sleeve **43**, respectively. As will be seen most clearly in FIGURE 3, a windage screw is threaded through the sleeve **43** and has its free end positioned in abutment with the vertically disposed stop **41** on the offset arm **39**. The constant biasing of the end of the screw **44** against the stop **41** is ensured by means of a compression spring **45**, having its opposite ends bearing upon the inner surfaces of the opposed stop **40** and ear **42**. In this manner, it will be understood that relative positioning of the carrier **29** with respect to the windage clamp **36** is achieved by rotation of the windage screw **44**. Prior to utilizing the screw **44**, it will often be advantageous to initially obtain a rough windage adjustment of the line of sight by means of the clamping screw **38**. When the firearm has been secured within the front and rear clamp assemblies, the screw **38** is loosened to release the clamping pressure of the split ring **36** upon the base **33** whereby the carrier **29** and body member **1** may be manually moved about the vertical axis of the base **33** to achieve a rough setting of the windage adjustment, whereafter the clamping screw **38** is tightened. Then when it is desired to exactly pinpoint the windage portion of the line of sight adjustment, the windage fine adjustment screw **44** is manipulated to move the carrier **29** laterally with respect to the now fixedly disposed windage clamp **36**.

Elevation adjustment of the body member **1** about the horizontally disposed pivot **32** is accomplished by means of a threaded elevation screw **46** having its free end freely journalled within a suitable pivot member **47** carried by the body member **1**. Pivotally mounted between the side walls **31**, **31** at the rear of the carrier **29** is an elevation slide housing **48** which includes a smooth cylindrical passageway and a pair of spaced apart locking ears **49**, **49** adjacent a split portion in the housing. Disposed within the bore of the slide housing **8** is an elevation adjustment slide **50** having a threaded bore therein. A locking screw **51** passes freely through one of the locking ears **49** and engages a tapped opening in the other locking ear **49**, whereby clamping pressure may be applied by tightening the screw **51** to lock the otherwise freely slidable member **50** within the housing **48**. The elevation adjustment will now be apparent from the foregoing description where it will be seen that by loosening the locking screw **51**, the body member **1** may be tilted about the horizontal pivot **32** to achieve a rapid coarse adjustment of the elevation of the line of sight. During this manual adjustment of the body member **1**, the slide **50** will be free to move within the loosened passageway of the housing **48** until a crude or coarse elevation adjustment is achieved whereafter the locking screw **51** will then be tightened. Following this coarse adjustment, a precision elevation adjustment is accomplished by the subsequent rotating of the elevation fine adjustment screw **46** which will turn within the threaded bore of the slide **50** to raise or lower the journalled free end of the screw which is attached to the body member **1** at the pivot member **47**.

The manner of utilizing the present invention to achieve an accurate zeroing in of the firearm by firing only two shots will now be described. After the firearm is properly seated within the front and rear clamp assemblies **6** and **7**, the firearm is bore-sighted upon a suitable target by manipulating the aforedescribed windage and elevation adjustment means to center upon the bullseye of the target. The firearm sights are thereafter adjusted to the same center of the target. A first round is then fired from the firearm, preferably by means of any suitable electrical or remote mechanism for depressing the weapon trigger without causing undesirable displacement of the weapon within the sighting apparatus. The strike of the bullet is then noted. During the firing of the round, the force of the recoil will be transmitted through the rifle butt support plate **16** to the rear clamp assembly **7** and also to the front clamp assembly **6** by means of the tie

rods **25** so that both the front **2** and rear **3** frame members will be displaced rearwardly against the force of the arrestor cylinder **26** and thereafter returned to the exact same forward, or at-rest position, by retraction of the piston rod **28** within the cylinder **26**.

The strike of the fired round is marked or otherwise clearly identified so that the sights of the weapon may then be adjusted to align with the marked bullet strike. By the subsequent manipulation of the fine elevating screw **46** and windage screw **44**, the sight alignment is then fixed to the center of the target, and a second round is fired which will strike the target center and verify the proper zeroing in of the weapon for the particular range and ammunition involved.

The embodiment of the invention as illustrated in the drawings discloses a truly portable arrangement, whereby the base **33** is supported upon a detachable folding tripod assembly **52** comprising a plurality of legs **53** pivotally attached to a threaded plug **54** adapted to engage a threaded opening within the base **33**. Alternatively, the sighting apparatus may be more rigidly mounted by applying the internally threaded base **33** to an exteriorly threaded pipe, suitably anchored within the ground.

It is to be understood that the invention is not limited to the specific features shown, but that the means of construction herein disclosed comprise the preferred form of several modes of putting the invention into effect, and the invention will therefore be understood in any of its forms or modifications within the legitimate and valid scope of the appended claims.

I claim:

1. A sighting apparatus for firearms, comprising, front and rear clamp assemblies for supporting the forestock and buttstock of a firearm respectively, front and rear frame members including means pivotally suspending said front and rear clamp assemblies therein, body means having means pivotally mounting said front and rear frame members thereon in spaced apart relationship, means interconnecting said front and rear clamp assemblies and maintaining same in parallel relationship as said frame members pivot about said body means during recoil of said firearm following firing thereof, and arrestor means between one of said frame members and said body means partially absorbing the force of the recoil and returning the pivotally mounted frame member to an at-rest position.

2. In a sighting apparatus according to claim **1**, a carrier disposed below and pivotally attached to said body means to permit angular displacement therebetween in a vertical plane, and base means supporting said carrier and pivotally attached thereto to permit angular displacement therebetween in a horizontal plane.

3. In a sighting apparatus according to claim **2**, adjustable elevation means rigidly interconnecting said body means and carrier to alter the angular relationship therebetween.

4. In a sighting apparatus according to claim **2**, adjustable windage means rigidly interconnecting said base means and carrier to alter the angular relationship therebetween.

5. A sighting apparatus according to claim **3**, wherein, said elevation means comprises, an internally threaded member normally anchored to said carrier, and a screw freely journalled in said body means and passing through said member in said carrier.

6. A sighting apparatus according to claim **5**, including a housing attached to said carrier, said internally threaded member normally secured against movement in said housing, and locking means on said housing operable to release said threaded member to permit rapid concurrent displacement of said screw and threaded member.

7. A sighting apparatus according to claim **4**, wherein, said windage means comprises, a clamp releasably engaging said base means and including an arm provided

with stop means, a screw mounted in said carrier and having its free end in abutment with said stop means, and means constantly urging said screw end against said stop means.

8. A sighting apparatus according to claim 7, including a lock screw on said clamp operable to release said clamp from engagement with said base means to permit rapid concurrent angular displacement of said clamp, carrier and body means.

9. In a sighting apparatus according to claim 1, V-way support surfaces in the bottom of said front and rear clamp assemblies, a vertically adjustable clamp bar mounted in said rear assembly, a pair of adjustable scissor arms pivotally mounted on said front assembly, and

a support plate attached to said rear assembly and adapted to engage the butt of the firearm when secured by said clamp assemblies.

10. A sighting apparatus according to claim 9, wherein, said support plate is pivotally mounted to provide full contact engagement with the firearm butt.

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