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G. T. BRADLEY

2,534,946

BOW SIGHT

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2 Sheets-Sheet 1

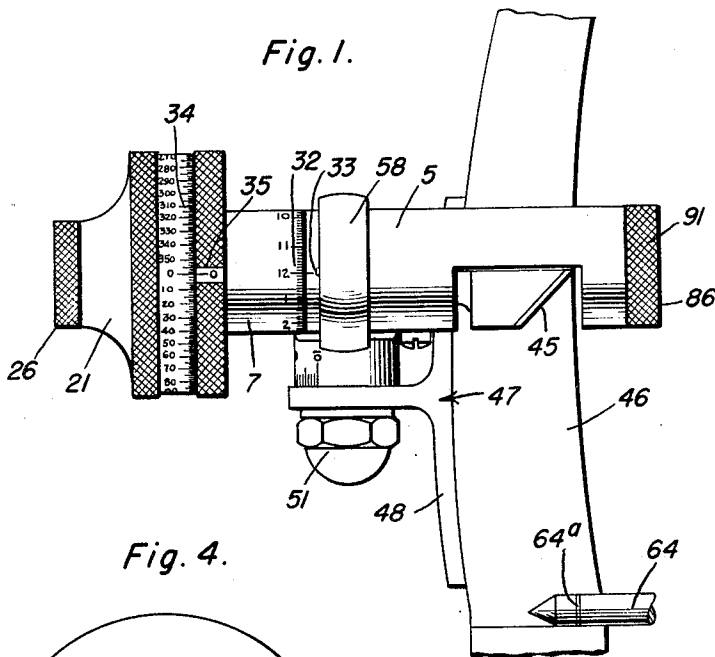


Fig. 1.

Fig. 4.

Fig. 5.

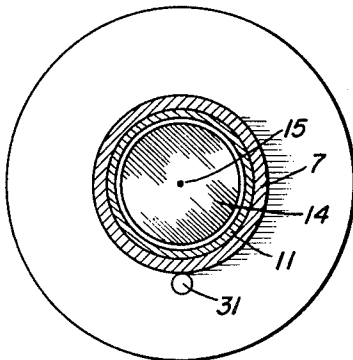
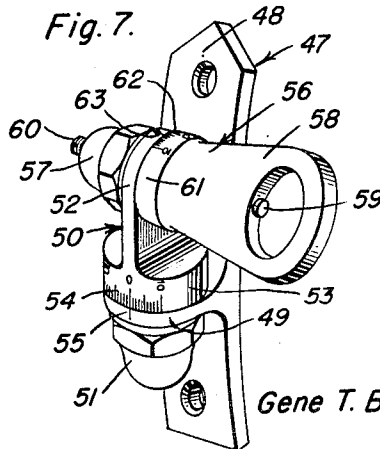
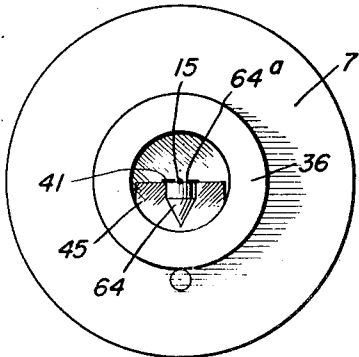
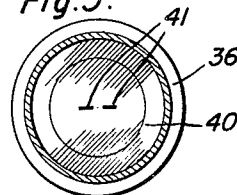


Fig. 6.



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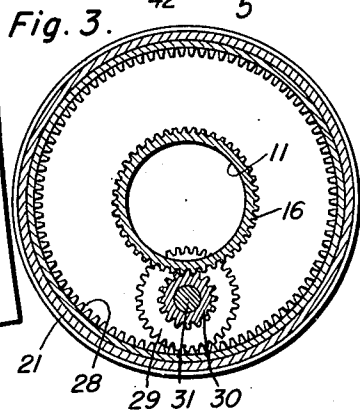
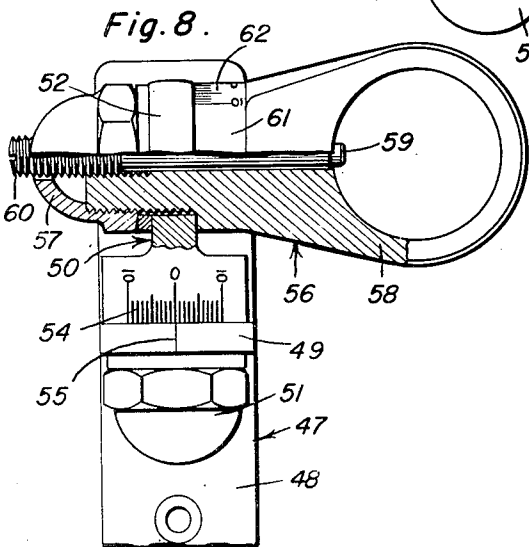
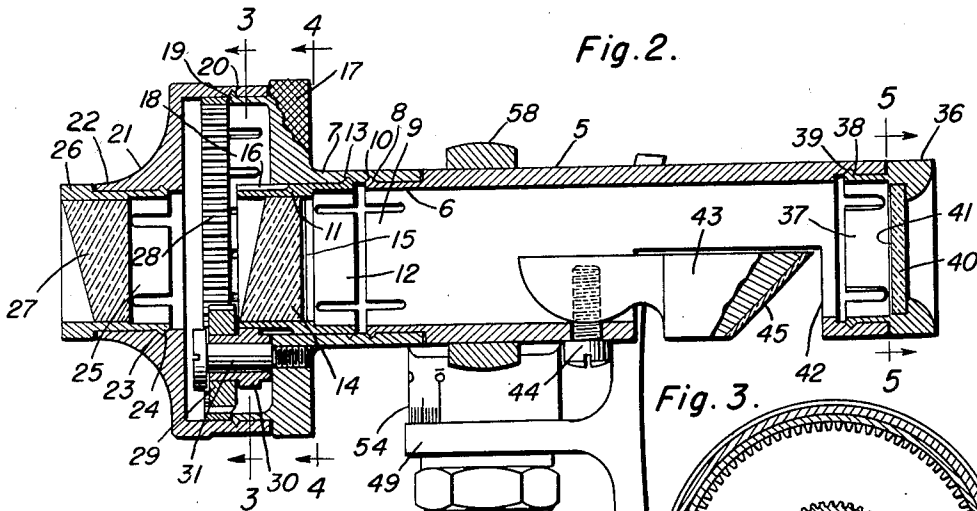
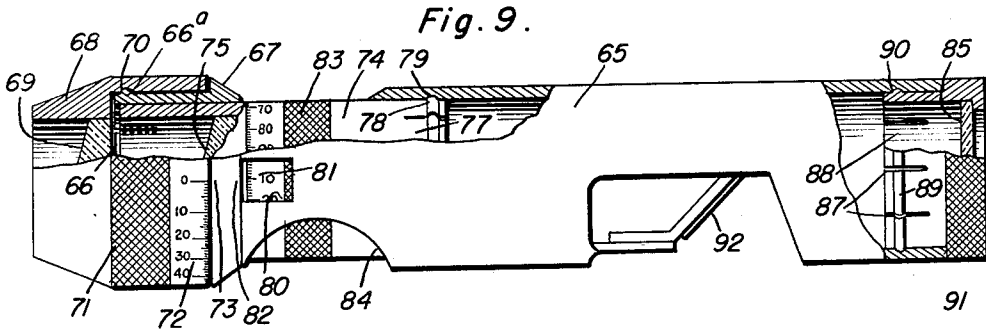
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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

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BOW SIGHT

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1 Claim. (Cl. 88—2.4)

1

The present invention relates to new and useful improvements in sights for archery bows and more particularly to a device of this character including front and rear sighting elements together with means for detachably mounting the same in position at one side of a bow.

An important object of the present invention is to provide a front sight in the form of a pair of rotatably adjusted prisms arranged upon a rotation of one relative to the other to adjust the sight accurately to any required elevation and windage.

Another object of the invention is to provide a bow sight including front and rear sighting elements together with a mirror mounted in the sighting path and arranged to reflect the position of an arrow held to the bow.

A still further object is to provide a mirror for use in conjunction with front and rear sighting elements for a bow whereby the check draw or releasing position of the arrow is indicated without necessitating the archer shifting his eyes from the sight to the arrow and thus enable the archer to constantly focus his eyes on the target.

Another object of the invention is to provide a bow sight including front and rear sighting elements adjustable for setting the sights in accordance with variations in the anchorage of different archers, that is, the position of the hand pulling the bow string when he has reached his natural draw to thus enable setting of the sight to the archer's natural anchor point.

An additional object is to provide a device of this character of simple and practical construction, which is efficient and reliable in operation, relatively inexpensive to manufacture and otherwise well adapted for the purposes for which the same is intended.

Other objects and advantages reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming part hereof, wherein like numerals refer to like parts throughout, and in which:

Figure 1 is a side elevational view of the sight shown attached to a bow.

Figure 2 is an enlarged longitudinal sectional view of the barrel of the sight.

Figures 3, 4 and 5 are transverse sectional views taken respectively on the lines 3—3, 4—4 and 5—5 of Figure 2.

Figure 6 is a rear elevational view of the sight, showing the arrow reflected by the mirror.

Figure 7 is a perspective view of the mounting for the sight.

2

Figure 8 is a front elevational view of the mounting with parts shown in section, and

Figure 9 is a side elevational view of a modified barrel construction with parts shown in section.

Referring now to the drawings in detail, and first with respect to the form of invention illustrated in Figures 1 to 8 inclusive, the numeral 5 designates a barrel having a front end 6 of reduced diameter and on which a head 7 is rotatable. The rear end of the head is provided with a pair of internal annular grooves 8 and the reduced end 6 is formed with resilient circumferentially arranged fingers 9 having an external annular rib 10 seated in the rearmost groove 8 to lock the head on the barrel.

A rear prism holding sleeve 11 is rotatably mounted in the head and is formed at its rear end with resilient circumferentially arranged fingers 12 having an external annular rib 13 seated in the forward groove 8. A rear prism 14 is suitably secured in the holder 11 and is provided on its rear flat face with a front sighting element in the form of a dot 15. The front end of the holder 11 is formed with external gear teeth 16 for a purpose more fully hereinafter described.

The head 7 includes an annular knurled flange 17 having circumferentially arranged resilient fingers 18 projecting forwardly and formed with an external annular rib 19 seated in an internal annular groove 20 in a knurled cap 21 for rotation of the cap on the flange of the head.

The cap is formed with a forwardly projecting neck 22 having an internal annular groove 23 in which an external annular rib 24 is seated and formed on circumferentially arranged resilient fingers 25 at the rear end of a front prism holding sleeve 26 having a front prism 27 suitably secured therein.

An internal ring gear 28 is suitably secured in cap 21 and pinions 29 and 30 mesh respectively with the gear 28 and gear 16, the pinions having a pressed fit with each other or otherwise suitably secured together for uniform rotation. The pinions are journaled on a pin 31 carried by the head 7 and the pinions are of different ratio to correspond with the difference in ratio of gears 16 and 28 to rotate the front and rear prism holders and prisms uniformly in opposite annular movement.

The rear end of head 7 is provided with graduations 32 coacting with a zero setting 33 on the barrel and the rear end of cap 21 is likewise provided with graduations 34 coacting with a zero setting 35 on the flange 17 of the head.

A rear lens cap 36 is rotatably inserted in the rear end of the barrel 5 and is formed with circumferentially arranged resilient fingers 37 having an external annular rib 38 seated in an internal annular groove 39 in the barrel. A lens 40 is suitably held in cap 36 and is provided on its inner face with a pair of rear sighting elements 41 in the form of radially disposed marks aligned with each other and with their inner ends spaced from each other for aligning the front sighting element 15 therebetween as shown in Figure 6.

The lower portion of barrel 5 is formed with an opening 42 at a point immediately forwardly of lens holder 36 and in which a mirror bracket 43 is secured by a screw 44. The rear end of the mirror bracket is inclined forwardly toward its bottom and against which is suitably secured a mirror 45 with its upper edge in the horizontal plane of the sighting elements 15 and 41, the mirror being exposed in the lower half of the barrel when sighting therethrough to reflect the image of an object below the opening in the barrel.

The barrel is secured in position at one side of a bow 46 by means of a mounting designated generally at 47 and which comprises an attaching plate 48 secured to the front edge of the bow. An apertured ear 49 projects horizontally forwardly of plate 48 and in which vertical horizontally rotatable bracket 50 is secured by a nut 51. The bracket 50 includes an upstanding apertured plate 52 at the lower portion of which is an annular flange 53 having graduations 54 thereon coating with a zero setting 55 on the front edge of ear 49.

A horizontal bracket 56 is vertically rotatable in plate 52 and secured in adjusted position by a nut 57. The bracket 56 also includes an apertured plate 58 extending outwardly at one side of the bow 46 and in which the barrel 5 is secured by a locking pin 59 carried by the plate 58 and a screw 60 engaging the rear end of the pin and forcing the pin against the barrel.

The bracket 56 further includes an annular flange 61 having graduations 62 coating with a zero mark 63 on the upper edge of plate 52.

The barrel 5 is secured to the bow by the mounting in a position above an arrow 64 held against the bow so that the tip of the arrow is reflected in the mirror 45.

By rotating the cap 21 the prisms are rotated oppositely and an object or target sighted through the barrel appears to travel on a straight line. Therefore, by the use of the gearing mechanism as described, a single movement will rotate both prisms and with the graduations 34 of the front prism holder calibrated to represent degrees, the device may be used for measuring angles.

Also, by turning the head 7 the entire head section, including the front and rear prisms, may be bodily rotated about a horizontal axis any desired number of degrees as indicated by the graduations 32.

In the operation of the device, the attaching plate 48 and brackets 50 and 56 carried thereby are secured in vertical position at the front edge of the bow 46 and the barrel 5 is clamped in the plate 58. The plate 58 may be secured in outwardly adjusted position at either side of the bow by reversing the bracket 58 on the bracket 50 to position the sight for either right or left hand archers.

The arrow 64 may be properly aimed by align-

ing between the front sighting element 15 and the rear sighting element 41 as shown in Figure 6 and the tip of the arrow 64 is reflected in the mirror 45 to indicate the proper draw length of the archer without taking his eyes from the sight by aligning one of the marks 64a at the tip of the arrow with the upper edge of the mirror in the manner as indicated in Figure 6 of the drawings.

In summarizing, the problems of an archer are:

1. In long range shooting, the bow must be elevated and the arrow arched through the air in order to obtain the necessary trajectory to carry to the target. In doing so, the bow hand, wrist or arm hides the target from view.

Solution

A single prism will rotate an image of the target only on an established radius governed by the angle of the prism. However, two prisms of the same angle, arranged as indicated, double the radius of deflection and by turning one prism clockwise and the other counter-clockwise, any point within the circle may be used.

2. On existing types of sights, such as the peep sight or the single fixed prism with cross-work thereon, he finds this comparable to a rifle with the rear sight removed. He can draw a perfect bead on the target and yet his anchorage can vary sufficiently to make him miss the target completely.

Solution

If the dot 15 on prism 14 aligns in the space between the rear sights 41, as shown in Figures 5 and 6, his anchorage must be the same on every shot.

3. Even though his alignment may be perfect, if his draw-length is not the same every time, or if his arrow does not rest against the side of the bow each time, his shot will still go wild. He can't look through his sight and down at the arrow at the same time.

Solution

As shown in Figure 6, the top edge of mirror 45 is directly on the line of vision and reflects a view from directly above the arrow tip and therefore is a more accurate check than looking directly along the arrow at the tip because he is looking almost on a flat plane along the top surface of the arrow shaft whereby it is difficult to judge with a high degree of accuracy whether his draw-length varies a fraction of an inch. Also, if his arrow should not be touching the side of the bow, it will be readily discernible in the mirror.

As shown in Figures 1 and 6, the circumferential marks 64a on the tip of the arrow can be used as the draw-check for aligning with the upper edge of the mirror. In case neither of these points appear at the upper edge of the mirror when the archer has pulled the arrow to his proper draw-length, the barrel 5 should be adjusted longitudinally in the bracket 56 until a suitable point on the arrow appears at the top of the mirror.

In Figure 9, I have illustrated a modified sight construction which comprises a barrel 65 having resilient fingers 66 provided with an annular rib 66a at its front end and an annular shoulder 67 spaced rearwardly therefrom and providing a stop for the rear edge of a front prism holder or sleeve 68 rotatably mounted on the front end of the barrel and having the front prism 69

5

positioned therein. The prism holder 68 is provided with an internal annular groove 70 receiving the rib 66 to hold the prism holder 68 on the barrel.

The outer surface of the prism holder 68 is knurled as at 71 and rearwardly of which is marked a scale 72 coacting with zero setting 73 on the shoulder 67.

A tubular rear prism holder 74 is rotatably mounted in the barrel rearwardly of the prism 69 in which is secured the rear prism 75. The rear edge of the prism holder 74 is provided with a plurality of longitudinally extending slots 76 to form resilient fingers 77 having an external annular rib 78 seated in an internal annular groove 79 in the barrel to hold the prism holder against longitudinal movement.

The barrel is formed with a window opening 80 behind which the prism holder 74 carries a scale 81 also coacting with a zero setting 82 and rearwardly of the scale 81 the prism holder 74 is knurled as at 83 exposed in openings 84 in the barrel to enable finger gripping engagement with said knurled portion.

The lens 85 at the rear of the sight is secured in a sleeve 86 having its forward portion rotatably mounted in the barrel and likewise split longitudinally as at 87 to form a plurality of resilient fingers 88 having an external annular rib 89 seated in an internal groove 90 in the barrel. The rear end of the sleeve 86 projects outwardly of the barrel and is knurled as at 91 to provide a finger grip.

The barrel is also provided with the mirror 92 to reflect the position of the arrow and the barrel is secured to the bow by an attaching bracket as heretofore described.

Having described the invention what is claimed as new is:

In a bow sight, a barrel having front and rear ends and a bottom opening, a rear end sighting element carried by said barrel, a pair of front and rear prisms, the rear prism having a sighting element thereon, a mounting for holding said

6

prisms to the front end of the barrel with said prisms superposed in the line of sight transversely thereof comprising a head on said barrel, a holder for the rear prism rotatable in said head, a cap rotatable on the head with the front prism fixed therein, means enclosed by said head and cap operative by rotation of said cap to rotate said prisms equally and in opposite directions, whereby to deflect an image of a target through an angle equal to the combined angles of the prisms with the image appearing to travel in a straight line when viewed through the rear sighting element, said mounting being rotatable as a unit relative to said barrel to cause the image to travel in vertical and horizontal lines, selectively, under rotation of the front prism relative to the rear prism, a mirror mounted in said barrel with an edge in alinement with said sights to provide an added sighting element and being exposed through said opening to reflect the position of an arrow held to said bow, means for adjusting the mirror angularly with respect to the longitudinal axis of the sights, and means for attaching the barrel to a bow.

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