

Nov. 27, 1934.

U. WILCOX

1,982,489

SIGHT FOR BOWS

Filed Aug. 24, 1932

2 Sheets-Sheet 1

Fig. 1.

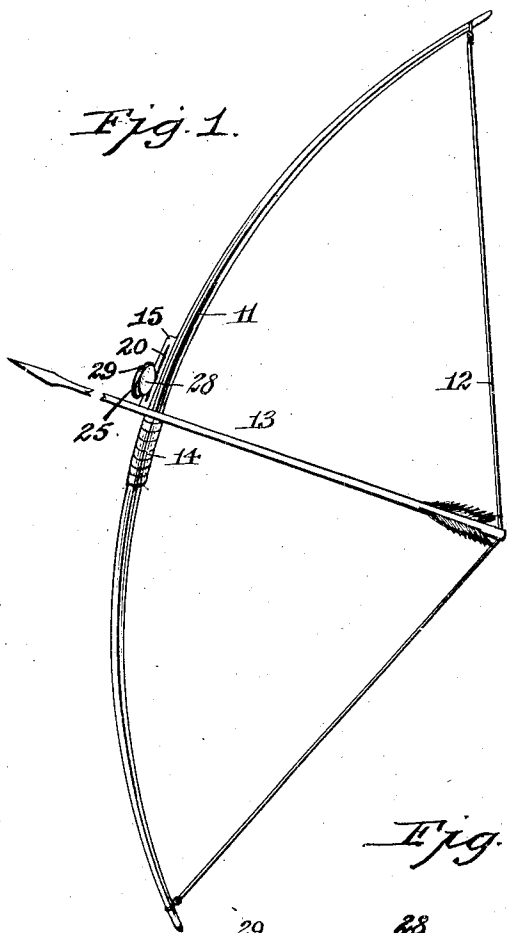


Fig. 2.

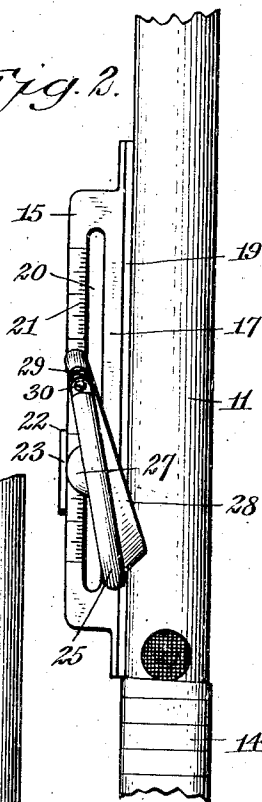
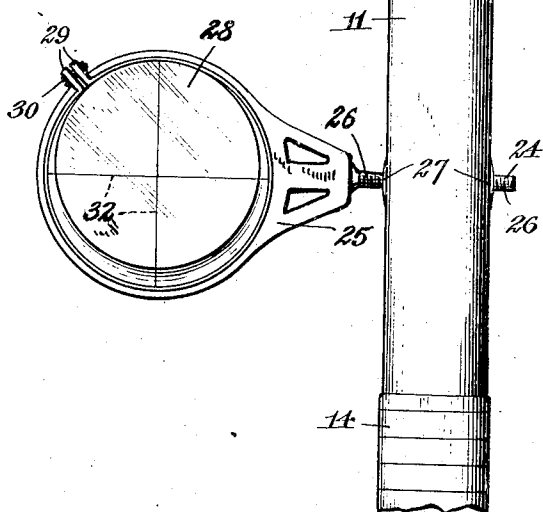


Fig. 3.



Urquhart Wilcox, Inventor.
By *Conrad H. Hark*
Attorney.

Nov. 27, 1934.

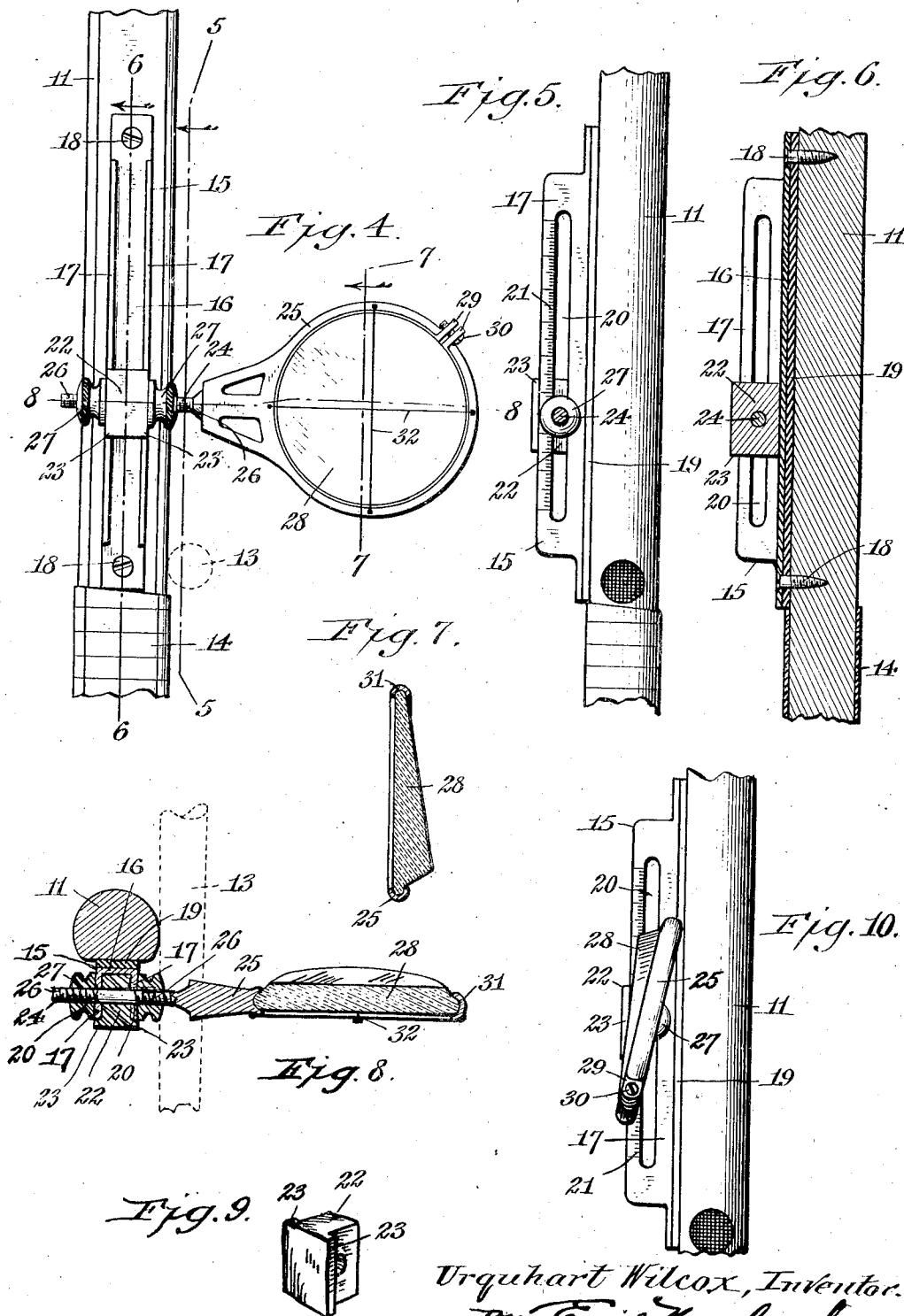
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2 Sheets-Sheet 2



Urquhart Wilcox, Inventor.
By Emil Hunkeler
Attorney.

UNITED STATES PATENT OFFICE

1,982,489

SIGHT FOR BOWS

Urquhart Wilcox, Buffalo, N. Y.

Application August 24, 1932, Serial No. 630,263

20 Claims. (Cl. 88—2.2)

My invention relates to an improved sight for bows.

In archery, the archer often finds it necessary to seek a spot beyond or much higher than the target as a point of aim, especially when distant targets are shot at. For example, in order to assure the arrow landing anywhere within reach of the target located at a distance upward of eighty yards, this method is invariably employed in order to compensate for the curved trajectory of the arrow in its flight through the air, consequently, the first arrow is more or less propelled under a random shot, after which some object is located which is usable as a point of aim and which will assure the landing of the next arrow, when propelled under proper force within, or within a limited region around the spot to be struck. In open space, a distant tree or some other fixed object, or some part thereof, may serve as a point of aim. The experienced archer having located a point of aim beyond the target may land his arrow within proximity of the center or bull's eye of the target under the first shot made, but an inexperienced archer may discover that his arrow has landed far too high or too low, or considerably to one or the other side of the target. In either case, the point of aim must be changed and at best this is only guess work, resulting in closer approach to the center or bull's eye of the target with experienced archers than with those inexperienced. However, in all cases, the first shot, or number of shots, invariably result in delivery of the arrow at a point distant from the center of the target, and close approximation thereto, or striking of the center or bull's eye with the first, or first few arrows propelled, are merely what may be termed "lucky shots". If the first arrow propelled happened to have passed the target at a distance above and to the right of the target under a certain point of aim, in which, for example, the top of a distant tree was used, the archer will know that he must lower his point of aim and also seek a spot to the left of his first point of aim in order to cause the arrow to be delivered closer to, or strike the center or bull's-eye of the target. This may necessitate quite a number of shots before some fixed distant spot is found to be usable as a true point of aim; and in the event that the location of the target is changed, the entire proceedings must be repeated before assurance is had of landing the arrow in, or in close proximity to the center of the target.

In some instances, however, not even a tree or shrub is in view for use as a point of aim, and

in a clear sky no portion thereof could be used as such; whereas, when the sky is clouded, the moving clouds make it impossible to select a point of aim. I have therefore provided a sight for bows which will, at the very outset, assure a close approach of the arrow propelled to the center or bull's-eye of a target, and with this end in view the primary object of my invention is the utilization of a lens in the form of a prism or any other transparent medium having surfaces arranged at an angle to each other so that variations between the point of aim and the point to be shot at will be compensated for, and under proper adjustment of the device, assurance had of accurate shots being made, or shots closely approaching complete accuracy.

Another object of my invention is the provision of a sight for bows, which is universally adjustable so that any inaccuracy taking place under the first shot will enable the archer to adjust his sight to assure a closer approach to or an accurate aim at the point against which it is sought to propel the arrow, regardless of the direction of deviation away from the point to be pierced or penetrated by the arrow made under the previous shot.

Another object of my invention is the provision of a lens which will reflect the image of the target in a selected region thereof, regardless of whether the point of aim is above or below the center of the target or to either side of a vertical plane passing through the center of the target; the lens being adjustable and preferably provided with surfaces arranged at an angle to each other so that one surface is arranged in a plane more closely approaching a plane at right angles to the line of flight of the bow than the other surface.

A still further object of my invention is the provision of a sight, including a transparent medium so arranged that one surface thereof is at an angle to the other, with a view of reflecting the target or other point or object against which the arrow is to be propelled, centrally in the lens, although the point of aim is somewhat higher than the target or other object to be shot at; this being found necessary to compensate for the curved trajectory through which the arrow passes in its forced flight.

A still further object of my invention is the provision of a lens sight, which is universally adjustable so that the lens may be moved bodily in the direction of the length of the bow and/or in a direction towards or away from the bow, and in which the lens may be tilted bodily or rotated on its own axis.

A still further object of my invention is to provide a lens in the form of a prism, and in dividing said lens into sectors, preferably quadrants, the center of the lens being a point common to the apices of all sectors or quadrants and being adapted to have the target or other object to be shot at reflected in equal parts in all sectors or quadrants, thus enabling the archer, after having a central reflection within the lens and finding his aim imperfect, to cause the image of the target or object shot at to be reflected in the lens more within the region of certain of said sectors or quadrants than in others.

With the above and other objects in view, my invention consists in the use of a sight having refractory means to reflect the image of the object shot at.

The invention also consists in the use of a lens in the form of a prism, arranged on the bow adjacent the plane in which the arrow is held thereagainst to propel the same, and in which the image reflected in the lens is positioned so that assurance is had of the arrow striking the center or close to the center of the target.

It also consists in the use of means for adjusting the lens so that any deviation from an accurate shot may be easily compensated for, and the image of the object shot at centrally displayed within the lens.

It further consists in providing a lens, which is universally adjustable so that, regardless of the distance of the object shot at, the lens may be adjusted to assure accurate shots; the adjusting of the lens being once ascertained for a target or other object shot at from a certain distance, assuring easy adjustment of the same for said distance, and the delivery of accurate shots.

The invention further consists in the novel features of construction, and in the arrangement and combination of parts to be hereinafter described and more particularly pointed out in the subjoined claims.

In the drawings:

Fig. 1 is a side elevation of a bow and arrow, showing the bow under strain and the arrow in position to be propelled the desired distance; said bow being equipped with my improved sight.

Fig. 2 is a side elevation of the center portion of the bow, showing my improved sight applied thereto.

Fig. 3 is a view of the central portion of the bow, looking at the same from the inner side thereof.

Fig. 4 is a view of the central portion of the bow, looking at the same from the outer side thereof.

Fig. 5 is a vertical section taken on line 5—5, Fig. 4, looking in the direction of the arrow crossing said line.

Fig. 6 is a vertical section taken on line 6—6, Fig. 4, looking in the direction of the arrow crossing said line.

Fig. 7 is a vertical section taken through the lens on line 7—7, Fig. 4, looking in the direction of the arrow crossing said line.

Fig. 8 is a horizontal section taken on line 8—8, Fig. 4.

Fig. 9 is a detached perspective view of the slide block adjustably arranged within the primary gage and serving as part of said gage for determining elevation.

Fig. 10 is a view similar to Fig. 2, with the lens reversed, such as may sometimes be found desirable for propelling arrows at close range; for example, at targets set thirty or forty feet distant.

The bow 11 may be of any common form, and

when not under strain may be perfectly straight, a cord 12 being attached to opposite ends of the bow in the usual manner, which when drawn upon while holding the bow centrally between its ends, will flex the bow and place the same under strain in the usual manner so that the arrow designated 13 will be propelled through space under considerable force. Beneath a point medially between the ends of the bow, a handle is provided, usually by winding a leather band 14, or some other similar material around the bow. However, some bows are provided with special forms of handles and others are entirely devoid of any covering or handle at the point usually grasped by the guiding hand.

On the outer side of the bow 11, which is usually flattened, as best shown in Fig. 8, an elevation guide 15 is applied. This guide is constructed of sheet brass or other suitable material stamped into channel formation to provide an inner wall 16 and two spaced side walls 17, the inner wall being extended beyond the side walls to form securing lugs through which fastening screws 18 are passed that are threaded into the bow, thus securely fastening the guide to the bow. Between said guide and the body of the bow, a rubber, or similar pad or cushion, 19 is placed. The side walls 17 are provided with guide slots 20, and adjacent the slot in one of said side walls, graduations 21 are arranged.

A slide block 22 is adjustably retained within the elevation guide and has overhanging side flanges 23 which bear against the outer edges of the side walls 17 of said guide. Passed transversely through the slots 20 of said guide and through the slide block 22 is a screw shank 24 which projects from a lens frame 25, said shank being rotatably and longitudinally movable in said slots and block and being provided with screw-threaded portions 26 adjacent and outside of said side walls, onto which thumb nuts 27 are threaded, said thumb nuts bearing against the outer surfaces of the side walls 17, which are slightly flexed thereby and clamped against opposite sides of the slide block for the purpose of securely fastening the same in any adjusted vertical position within the guide 15.

The lens frame 25 is in the form of an open ring, and confined therein is a circular lens 28 in the form of a prism, opposite faces being at an angle to each other, the outer face being normally in a plane at right angles to the line of flight of the arrow, or approximately so, while the inner face thereof is at an acute angle thereto; an angle of ten degrees thereto being highly effective for the purpose intended, but this may be varied. The prism lens is easily inserted into the lens frame upon enlarging the latter, and for this purpose the lens frame is provided, where open, with two outstanding lugs 29 through which a screw 30 is passed, said screw being loosely passed through one of said lugs and threaded into the other so that the lugs are drawn together upon tightening said screw and reduce the diameter of the lens frame so as to fasten the lens securely within said frame. For this purpose the circular portion of the lens frame is made concaved interiorly to receive the convex rim or edge of said lens.

By reason of the opposite faces of the lens being disposed at an angle to each other, the lens is gradually thickened in a diametral direction from a certain point at the edge thereof to a point diametrically opposite. From the foregoing it will be understood that the lens frame can be so

positioned on the bow that the lens is in the line of sight of the archer; also that the lens frame can be enlarged to loosen the lens and permit it to be rotated so that the plane of greatest angularity between the two faces thereof may be vertical or positioned at any angle to the vertical at one or the other side thereof.

I provide the lens with center-denoting or centering means, and while this can be accomplished in various ways, I preferably divide the lens into sections, in the form of sectors, preferably quadrants, and for this purpose have wires stretched diametrically across the outer face of the lens at right angles to each other, these wires being permanently secured at opposite ends to the lens frame, and will of necessity be otherwise disposed if sectors other than quadrants are provided. It is, however, in all instances, essential to have the wires radiating from the axis of the lens, so stated with reference to the outer surface thereof. It will, however, be understood that the sector-forming lines may be formed on the lens directly in any suitable manner, or the exact center of the lens may be otherwise denoted.

It will be apparent from the foregoing that the lens is bodily movable along the bow, and to effect a movement in such direction, it is simply necessary to loosen one or both of the thumb nuts 27, preferably both, and slide the slide block 22 along the guide 15. If desired, the lens may be rotated with the screw shank 24 as its center of rotation, so as to change the angularity of the lens with reference to the bow, and in some instances it might be of advantage to rotate the lens within the lens frame, which is easily accomplished by loosening the screw 30 and moving the lens circularly in either direction. The lens may also be completely reversed in position so that the thick portion thereof shown at the bottom of Fig. 2, will be at the top, as shown in Fig. 10, or this reversal may be effected by rotating the lens within the lens frame. By bodily reversing the lens the oblique side thereof will face toward the target or other object against or into which the arrow is to be propelled, but when completely reversing the lens within its frame, the oblique side thereof will face the archer.

It may here be stated that my improved sight is therefore a universally adjustable one, and the various adjustments which may be effected individually, or in any desired combination, are for the following purposes.

The range or elevation can be adjusted by sliding the lens upwardly or downwardly on the bow through the medium of the slide block, movably arranged within the elevation guide 15. A secondary elevation adjustment may be effected by tipping the lens with the screw shank 24 as its center. Lateral adjustment may be effected by moving the lens nearer to or farther from the bow; this being accomplished by adjusting the thumb nuts 27 on the screw shank and sliding said shank within the guide 15, including the slide block 22.

By rotating or circularly moving the lens to the right or left within the lens frame, any correction in horizontal aim may be made, and when the lens is rotatively moved, the sector-forming wires will enable the correct positioning of the image of the target under refraction so that when a combination of these adjustments are effected, accurate shots are assured. The primary adjustment for elevation is easily effected, due to the use of the graduations on the guide 15, and when once known for a target or other

object set at a definite distance, it is only necessary to position the slide block so that its upper or lower edge or any other definite portion thereof is in alignment with a certain graduation on the guide, known to be proper for the distance of the target, other adjustments being properly made.

With the lens positioned as shown in Fig. 2, or approximately so, and the target or other object positioned at one-hundred yards, the bow is elevated approximately to the position shown in Fig. 1. The point of aim is naturally above the target, but the image of the target will appear centrally in the lens, the center of the image reflected being at the point of crossing of the gage wires 32.

During the flight of the arrow propelled through space, the trajectory will be curved or somewhat parabolic, and the arrow will consequently land at a distance of one-hundred yards considerably below the point of aim. If the adjustments of the sight are properly made, the arrow should strike the center or bull's-eye of the target. If, however, it is found that the arrow has passed to the right of the target above the plane of the center, in shooting the next arrow, the archer may find it necessary to locate the image of the target slightly farther into the lower left hand quadrant of the lens so as to compensate for the deviation in the landing of the arrow or, if desired, he may adjust the sight with reference to the slide block 22 within the guide by slightly greater projection of the lens from its position on the bow, or he may also find a slight lowering of the sight with reference to the guide 15 of advantage.

By providing slightly more projection of the lens from the bow, the lateral deviation from the center of the target will be compensated for, and by slightly lowering the axis of the screw stud within the guide 15, the slight elevation above the plane of the center of the target will be compensated for, thus on the next shot the arrow will strike the center of the target, or closely approach the same.

In the event that the target is distant one-hundred forty yards, tilting of the lens may be found of advantage. The point of aim will also be somewhat higher and the curvature of the trajectory somewhat greater. Although the bow will be elevated slightly for the increased distance, the tilting of the lens will position the image of the target centrally within the lens. If desired, instead of effecting the stated vertical and lateral adjustment of the lens, the lens may be bodily rotated within the lens frame, and the deviation, laterally and vertically from the true center of the target, compensated for in such manner. The image of the target under such adjustment will be axially reflected in the lens, although the arrow will land at the distance of the target in a lower plane and to the left of the previous shot, so as to more closely approach the center of the target, if not strike the exact center.

It is sometimes found of advantage to completely reverse the lens so that the thick portion thereof is at the top, as shown in Fig. 10, or this can be accomplished by rotating the lens within its frame one-half of a complete circle. In such cases, the point of aim will be lower than the target, yet the image of the target will appear reflected centrally or axially within the lens. A different adjustment tiltably of the lens sight is required when reversing the lens within the

frame than found necessary when reversing the entire frame with the lens in it, due to the changed angles of the surfaces thereof, but in both instances the point of aim will be in a lower plane than the target, and the image of the target reflected centrally within the lens. Under such arrangement the adjustments to compensate for deviations from the center of the target are effected in the manner described.

It is to be noted that although the lens is rotatably arranged within the lens frame, rotation of the lens within its frame does not in any manner change the location of the gage wires 32, and the point of crossing of said wires is always at the axis of the lens, irrespective of the position rotatably of said lens.

The rubber or other pad 19 interposed between the elevation guide 15 and the bow 11 is designed to relieve or at least minimize the shock to which the lens and other parts of the device would be subjected upon recovery of the bow to normal position after being strained, thus preventing loosening of the parts or breaking of the lens likely to otherwise occur under the severe jolts created upon releasing the arrow and allowing the strained bow to recover its normal condition.

While I have illustrated my invention in what I now consider the preferred construction and arrangement, modifications may be resorted to without departing from the invention as claimed herein, or sacrificing any of the advantages thereof.

Having thus described my invention, what I claim is:

1. A sight for bows, comprising a lens frame projecting laterally from the bow between its ends, and a prism lens rotatably arranged within said frame.

2. A sight for bows, comprising a lens frame tiltably supported from the bow in the line of sight of an archer using said bow, and a prism lens within said lens frame rotatably arranged therein.

3. The combination with a bow, of a lens frame supported by said bow and having a lens opening and gage wires spanning said opening, and a lens within said lens frame in the line of sight of an archer using the bow and along one of the surfaces of which lens said gage wires trend.

4. The combination with a bow, of a lens frame supported by said bow at one side thereof and between its ends, and a prism lens rotatably adjustable within said lens frame in the line of sight of the archer using the bow, and gage wires dividing said lens into sectors, said gage wires being secured to said lens frame to permit independent adjustment of the lens within said frame.

5. The combination with a bow, of a guide secured to the outer side of said bow centrally between its ends and extending in the direction of the length thereof, and a sighting device extending laterally from said guide and having a lens spaced laterally from said bow and adjustable in the direction of the length of said guide.

6. The combination with a bow, of a guide secured to said bow centrally between its ends and disposed along the length thereof, and a lens carried by said guide and extending therefrom in the line of sight of the archer using the bow, said lens being adjustable along the length of said bow and also in a direction at right angles to the length thereof.

7. The combination with a bow, of a guide secured to the outer side of said bow and substantially of channel formation in cross section to

provide spaced side walls, said side walls being longitudinally slotted, a slide block within said guide, a supporting element extending through said guide and slide block, and a sighting element supported at the outer end of said supporting element.

8. The combination with a bow, of a guide disposed lengthwise along the outer side of said bow, said guide being of channel formation in cross section to provide two spaced side walls and said side walls having slots extending lengthwise therein, a guide block slidably adjustable between said side walls, a lens having a lens frame and a screw shank extending therefrom and passed through said slots and said guide block, and clamping means threaded onto said screw shank to engage opposite side walls and clamp said shank in adjusted position, said clamping means permitting lengthwise adjustment of said screw shank through said slots and guide block.

9. The combination with a bow, of a lens frame carried by said bow and extending in a lateral direction therefrom, and a prism lens rotatably arranged within said lens frame.

10. The combination with a bow, of a lens frame adjustably arranged on said bow and having an open-ring portion, a prism lens rotatably arranged within said open-ring portion, and means for tightly clamping said lens within said open-ring portion.

11. A sight for bows, comprising a lens frame having a circular prism-lens rotatably arranged therein, and gage wires secured to said lens frame in a manner to radiate from a point coincident with the axis of said lens frame and to allow independent rotative adjustment of said lens within said frame without effecting said gage wires.

12. The combination with a bow, of a prism-lens supported from said bow in a manner to permit movement thereof in the direction of the length of said bow and in a direction towards and away from said bow.

13. The combination with a bow, of a prism-lens carried by said bow to permit of adjustment in the direction of the length of the bow, in a direction towards and away from said bow, and on a center permitting bodily tilting movement thereof.

14. The combination with a bow, of a sighting element applied to said bow midway between its ends and comprising a lens frame having a pivot support and a prism-lens therein, said lens frame being bodily tiltable with said pivot support as a center, said pivot support being transversely adjustable on said bow to position the axis of said prism-lens closer to or farther from said bow and being also mounted on said bow to permit adjustment bodily of said lens frame in the direction of length of the bow, said prism-lens being rotatably adjustable within said lens frame.

15. The combination with a bow, of a lens frame support extending laterally from and pivotally secured to said bow and a lens rotatably positioned within said frame and having one surface thereof at an acute angle to the other, said lens being thus gradually thickened from a certain point at its edge toward a diametrically opposite point, the pivotal securing of said lens frame permitting reversal of said lens by moving the lens frame thereof through a half revolution.

16. The combination with a bow, of a sighting element applied to said bow midway between its ends and comprising a lens frame having a pivot support and a prism lens therein, said lens frame

being bodily tiltable with said pivot support as a center and said pivot support being mounted on said bow to permit adjustment bodily of said lens frame in the direction of length of the bow, said prism lens being rotatably adjustable within said lens frame.

17. The combination with a bow, of a sighting element comprising a lens frame having a pivot support and a prism lens therein, said pivot support being rotatably mounted on said bow midway between its ends and extending laterally therefrom, said lens frame being bodily tiltable with said pivot support as a center and said prism lens being rotatably adjustable.

18. The combination with a bow, of a prism lens universally adjustable on the bow and provided with means to divide said lens into sectors

whereby distance, lateral and vertical positions of objects to be shot at and components of such positions can be determined.

19. A sight for bows, comprising a lens of prism formation universally adjustable on the bow and provided with means to determine the exact center of said lens, whereby distance, lateral and vertical positions of objects to be shot at and components of such positions can be determined.

20. The combination with a bow, of a prism lens universally adjustable on the bow at one side thereof in the line of sight of the archer whereby distance, lateral and vertical positions of objects to be shot at and components of such positions can be determined.

URQUHART WILCOX.

20	95
25	100
30	105
35	110
40	115
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70	145
75	150