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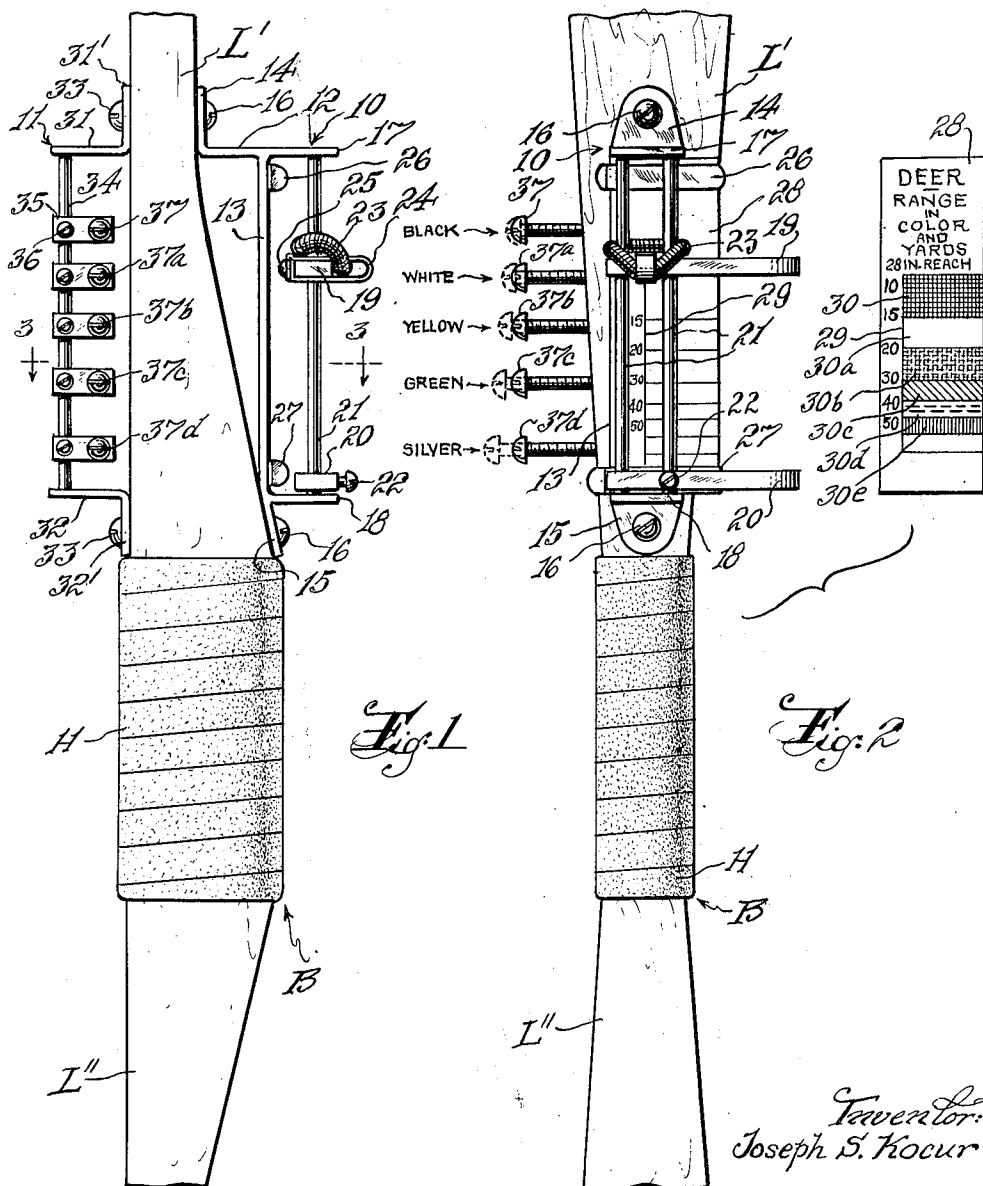
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COORDINATED BOW SIGHT AND RANGE FINDER

Filed May 2, 1955

2 Sheets--Sheet 1



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2 Sheets-Sheet 2

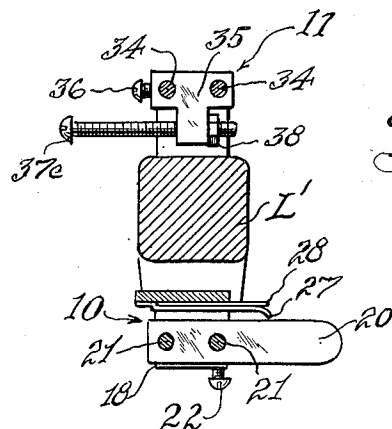


Fig. 3

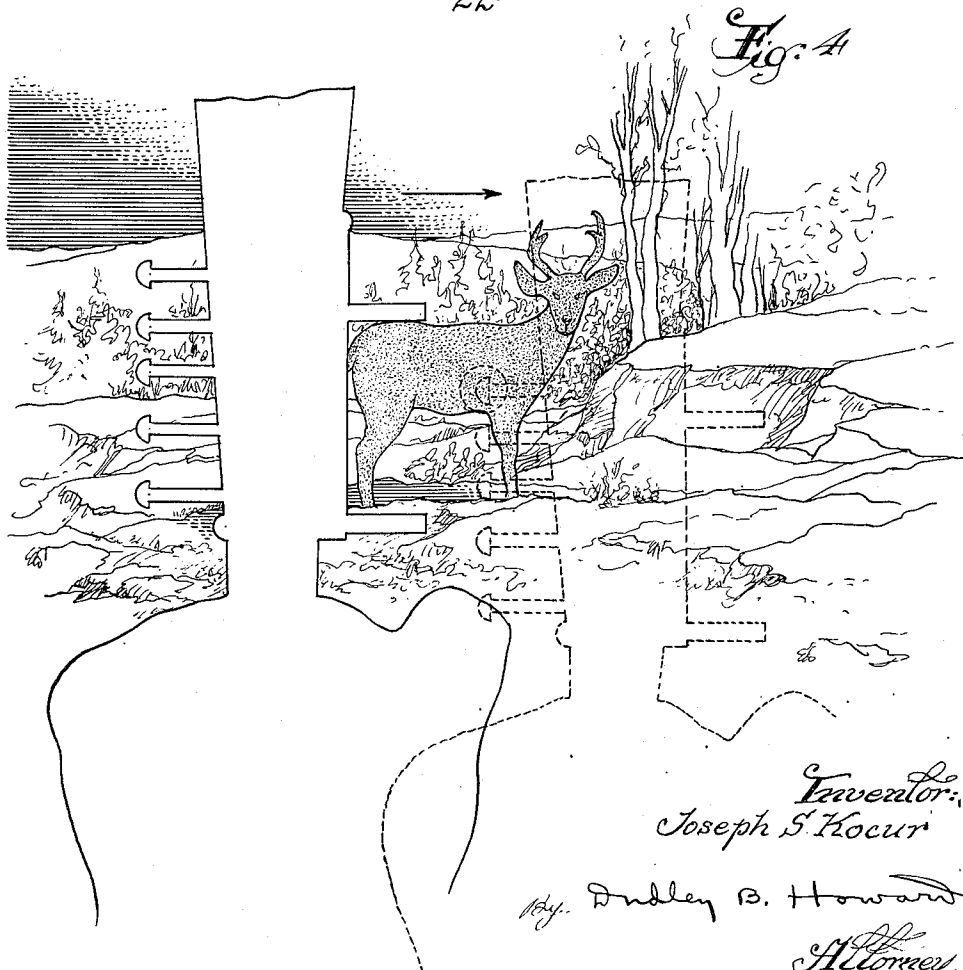


Fig. 4

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1

2,767,472

COORDINATED BOW SIGHT AND RANGE FINDER

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9 Claims. (Cl. 33—46)

The invention relates in general to archery and has particular reference to range finding and sighting instruments to be mounted on a bow for use in hunting game with bow and arrow.

I am aware that it is not broadly new to combine a range finder with a bow sight, but the combination instruments of this nature invented heretofore have not proved to be practically successful for game hunting because of the time required to translate a range reading into the appropriate sight setting. Although one such invention purports to effect perfectly coordinated sight-setting when range determination has been completed, no allowance is made for preliminary sight adjustment to correct for the particular flight characteristics of the set of arrows to be used on a hunting occasion. In other words, the prior art bow sight and range finder combinations are not the instruments of precision and speed required in hunting elusive game animals such as deer.

A hunter may have the luck to encounter a standing or slowly moving game animals at sufficiently close range for an accurately aimed bow and arrow shot but may have only about four or five seconds of time in which to determine the range and bring a properly elevated sight to bear upon the target before the latter becomes aware of the hunter's presence through sight, scent or sound and leaps away too fast for the release of an accurate shot. It therefore is the primary object of my present invention to provide a combination range finder and bow sight which is of such construction that range determination and sight setting may be coordinated accurately in the few seconds of time that usually will be available before the game vanishes from sight.

A further object of the invention is to provide a coordinated range finder and bow sight combination instrument of this character which is of extremely simple construction so as not to add unduly to the weight of the bow on which it is mounted, nor adversely affect its balance, and one which consequently will be inexpensive to manufacture.

Other objects, advantages and features of the invention will become apparent as the following specific description is read in connection with the accompanying drawings, in which:

Fig. 1 is a fragmentary side elevation of a typical hunting bow having the invention attached thereto; Fig. 2 is a similar rear elevation showing in exploded relation the code card used therewith; Fig. 3 is a horizontal cross-section on line 3—3 of Fig. 1; and Fig. 4 is a silhouetted fragmentary rear elevation of the bow and instrument in operational use, range-finding manipulation being shown in full lines and sighting after swinging the bow horizontally in broken lines.

Referring now in detail to the drawings, wherein like reference characters designate corresponding parts in the several views, the structure of the combination bow sight and range finder instrument and the manner in which it is mounted on a hunting bow are illustrated in Figs. 1 to

2

3, inclusive, whereas the mode of use in hunting is depicted more or less graphically in Fig. 4.

The bow B includes a handle H and upper and lower limbs L' and L'', respectively, which usually are integral with the handle. My combination instrument comprises a range finder component 10 and a sight component 11. Both components are intended to be mounted on the upper limb L' of the bow, where they are approximately at eye level when the bow is held in normal shooting position with the top of the handle horizontally opposite to the chin. For reasons which will become apparent later, the range finder component is mounted preferably on the rearwardly presented face of upper limb L', i. e. facing the archer, whereas the sight component is mounted on the forwardly presented face.

The range finder component 10 includes a frame 12 which may be in the form shown but is capable of considerable modification within the spirit of the invention and scope of the claims. It is desirable however to utilize a structure that provides an elongated vertical plate, or strip, 13 arranged with its broad surfaces presented to front and rear, respectively. Feet 14 and 15 at the respective upper and lower ends of plate 13 are provided for attachment to the rear face of upper bow limb L' by suitable means, such as taping or the screws 16—16 shown in the drawings. Projecting rearward from the respective upper and lower ends of plate 13 are horizontally flat flanges 17 and 18 to support mounting means for the horizontally extending upper and lower spanning bars 19 and 20 which project outward from the right side of the bow for a right-handed archer. In the range-finding operation to be described more fully hereinafter, relative vertical adjustment, or controlled separation, of spanning bars 19 and 20 is effected manually. While various equivalent ways may be found to mount the spanning bars in subsequent development of the invention, I prefer to perforate them for reception of a side-by-side pair of parallel guide rods 21—21 that extend vertically between the upper and lower frame flanges 17 and 18 previously described. Both spanning bars are initially slidable on guide rods 21—21, but it is preferred to lock lower bar 20 in position, which may be done conveniently by use of setscrew 22. The upper spanning bar 19, however, is to be slidable under light finger pressure but adapted to be secured frictionally in any adjusted position. This securing action may be performed by various known means, but it is preferred to use the detent 23 shown in Figs. 1 and 2, which is in the form of a looped coil spring that embraces guide rods 21—21 and is secured against accidental detachment from spanning bar 19 or vertical displacement in relation thereto by being threaded through a retaining yoke 24 carried by said bar. Retaining yoke 24 straddles the upper and lower faces of spanning bar 19 and preferably is affixed to the latter by screw means 25 at the inner, or front, edge thereof.

A pair of spring clips 26 and 27 are affixed to the left side edges of frame plate 13 in overlying relation to the rearwardly presented face of the latter to serve as convenient means to grip and hold a range-sight code card 28 in clearly visible relation to the spanning bars.

It may be explained at this juncture that the range-sight code card bears a scale 29 calibrated in terms of yards of range to the target, such as a game animal, and the movable spanning bar 19 traverses the scale as a pointer. In addition to the numerical divisions of scale 29, the spaces between divisions are colored distinctively as successive bands 30—30a—30b—30c—30d in accordance with a range-sight code capable of almost instantaneous interpretation and use under conditions of low visibility and by persons with defective visual acuity when the necessity for reading the indicated scale numerals might prevent a sufficiently quick shot at the game.

There will be a range-sight code card especially calibrated for each kind of target animal or fowl, such as the deer illustrated in Fig. 4. Because the range will vary in direct proportion to the apparent height of a target of characteristic size, that criterion has been adopted in connection with my code scale. Moreover, the different hunters who may have use for such a card are likely to differ in arm reach, which will affect the use of the range finder component. Therefore, it is necessary also to provide cards for any particular game animal in a series calibrated for the commonly occurring variations in reach.

In using the range finder component, the bow is held at arm's length in vertical shooting position, as shown in Fig. 4, with the lower spanning bar 20 in apparent line with the ground beneath the target animal. Then, with a finger of the free hand, the upper spanning bar 19 is slid up or down, as the case may be, until it appears to rest upon the back of the animal. The range may be read on scale 29 just beneath upper spanning bar 19, simultaneously with observation of the coinciding color indication. The translation of either range yardage or color into sighting elevation to be used will be explained after the structural details of sight component 11 have been described. It may be added at this point, however, that a red band 30e has been located below the 50 yards range division of the scale to warn against trying a shot at this excessive range.

The frame of sight component 11 is somewhat abbreviated in structure and includes respective upper and lower horizontally flat plates 31 and 32, which have feet 31' and 32' to be attached to the forwardly presented face of upper limb L' of the bow by convenient means, such as screws 33—33, directly opposite to range finder component 10. Parallel vertical guide rods 34—34 interconnect plates 31—32 and serve as convenient means to support a series of horizontally extending slides 35 for vertical sliding adjustment. Each slide may be secured in adjusted position by means such as setscrew 36. Bead sights 37—37a—37b—37c—37d are supported by the respective slides 35 in a row between the top and bottom of sight component 11 and project outward from the side of the bow opposite to spanning bars 19 and 20. Each bead sight preferably is in the form of a simple headed screw having longitudinally adjustable screwthreaded engagement with its corresponding slide 35. The head of the screw serves conveniently as the bead of the sight and as further means by which horizontal adjustment for windage correction may be effected with use of a screwdriver or knife blade. The respective beads and range-related bands of the code card scale are colored alike in accordance with the translational code from top to bottom successively in sharply contrasting colors or shades, such as black, white, yellow, green and silver. A locknut 38 (Fig. 3) has been provided, preferably on the end of each bead sight opposite to the head, or bead, for locking abutment against the corresponding end of the slide 35 in which the said bead sight is fitted to secure the sight in horizontally adjusted position.

The operational use of my improved combination range finder and sight will now be described in connection with deer hunting.

Before starting out, and probably on the preceding day, the particular arrows which it is desired to use should be tested by actual shooting at different distances on a practice archery range. The reason for this is the fact that apparently well matched arrows may differ in flight characteristics, such as weight, balance, spine, etc. Testing should be at the distances corresponding to the yardage scale of the code card to be used for deer and calibrated for the hunter's actual reach, which on the illustrative card is 28 inches. Testing should commence with shooting at 10 yards distance with uppermost bead sight 37 and progress with use of sight 37a at 15 yards, sight 37b at 20 yards, sight 37c at 30 yards, and sight 37d at 40 yards. At each distance, the bead sight used should be adjusted vertically, if necessary, until a satisfactorily close pattern

of hits is obtained, after which setscrew 36 is finally tightened to retain the sight-setting. Any arrows which deviate markedly from the target pattern are rejected.

When the hunting grounds are reached, it is time to consider the effect of existing wind conditions in relation to possible deflection of arrows in flight. If there happens to be negligible wind velocity, the bead sights may be arranged in true vertical alignment, as represented in full lines in Fig. 2. This setting of "zero windage" also applies if the hunter can choose a down-wind stand from the probable direction of approach of deer, or if, in stalking a deer under observation, he can approach the deer from the much-to-be-desired down-wind direction. If, on the contrary, there happens to be a strong side wind blowing, the respective sight beads should be adjusted away from the wind, as to the left for a wind from the right-hand direction, as shown by way of example in broken lines in Fig. 2.

Now, upon reference to Fig. 4, it will be assumed that a deer has appeared broadside to the hunter at close range. In order to get an accurate shot which will kill and not just wound the deer, the hunter will hold the bow in vertical shooting position at arm's length toward the deer and glance along the right side of it just long enough to hold the lower spanning bar on an apparent level with the deer's feet and manually flip the upper bar up or down, as the case may be, until it appears to rest upon the deer's back. That gives him the range in yards on the scale of the code card, if he can read it under the existing light conditions. In any event, the color of the band just under the upper spanning bar should be sufficiently visible. In the illustrative example represented in Fig. 4, the indicated range is 10 yards and the color indication is black, so the hunter quickly swings the bow to the right (direction of the arrow) until the deer is visible from the other side of the bow and brings top bead sight 37 to bear on the most vulnerable area of the deer's body, which is that marked by the imaginary circle, and he shoots his arrow at this aiming point.

In the illustrative example, the coordinated components of the instruments are represented as being designed for use by a right-handed hunter who holds the bow with his left hand and manipulates the string and nocked arrow with the right hand, but it is to be understood that the instrument will be manufactured in right-hand and left-hand models to suit all archers regardless of their particular handedness. However, in an emergency, an ingenious archer can modify a right-hand set of range finder and sight components so that they may be mounted in inverted positions on the bow for use by one who is left-handed.

It will be understood that it is intended to cover all changes and modifications of the example of the invention herein chosen for the purpose of illustration which do not constitute departures from the spirit of the invention and scope of the appended claims.

I claim:

1. The combination with a bow of a range finder component including a pair of spanning members, means to mount said spanning members on the bow for relative vertical separational adjustment in positions projecting horizontally from one side of the bow when in normal shooting position whereby said members may be adjusted to span the apparent outline of a target of substantially uniform known dimensions in its class, means providing a vertical scale of range indicia arranged on the bow in a position to be traversed by one of said spanning members, the other spanning member being stationary on the bow, and a sight component including a series of sighting members arranged in a vertical row to project horizontally from the side of the bow oppositely with respect to the spanning members, and means mounting said sighting members for vertical adjustment to permit setting the respective members in positions suitable for different ranges, said sighting members respectively bearing indicia corresponding to that of the respective range scale indicia.

5

2. The invention defined in claim 1, wherein the distinctive indicia of the range scale and the sighting members consists of different coloration for the respective ranges.

3. A combination range finder and sight to be mounted on a bow comprising: a range finder component including bow-attachable frame means, linear guide means carried by said frame means and adapted to be arranged parallel to a limb of the bow, a pair of spanning bars slidable on said guide means and projecting laterally therefrom whereby said spanning bars may be adjusted in relative separation to span the apparent outline of a target of substantially uniform known dimensions in its class, and a scale of measurement adapted to be arranged lengthwise of said guide means and being calibrated in terms of range in relation to successive variations in interval between the spanning members; and a sight component including frame means, linear guide means adapted to be arranged parallel to the guide means of the range finder component, plural slides longitudinally slidable on said guide means, means by which each slide may be secured in adjusted position on said guide means, and sighting members projecting laterally from the respective slides parallel to the spanning bars of the range finder component and in the opposite direction and being individually horizontally adjustable for wind deflection settings.

4. A combination range finder and sight as defined in claim 3, wherein each sighting member has screwthreaded connection with its corresponding slide.

5. A combination range finder and sight to be mounted on a bow comprising: a range finder component including bow-attachable frame means, linear guide means carried by said frame means and being in the form of parallel rods adapted to be arranged parallel to a limb of the bow, a pair of spanning bars slidable on said guide rods and projecting laterally therefrom whereby said spanning bars may be adjusted in relative separation to span the apparent outline of a target of substantially uniform dimensions in its class, means to secure one of said spanning bars fixedly to the guide rods, means to secure the other spanning bar in adjusted position on the guide rods and being in the form of a looped coil spring movable with said bar and frictionally embracing the said guide rods, and a scale of measurement adapted to be arranged lengthwise of said guide rods and being calibrated in terms of range in relation to successive variations in interval between the spanning members; and a sight component including frame means, linear guide means adapted to be arranged parallel to the guide means of the range finder component, plural slides longitudinally slidable on said guide means, means by which each

6

slide may be secured in adjusted position on said guide means, and sighting members projecting laterally from the respective slides parallel to the spanning bars of the range finder component and in the opposite direction.

6. A combination range finder and sight as defined in claim 5, wherein the range scale of the range finder component constitutes one of an interchangeable series differing in calibration for targets of respectively different known dimensions, wherein means is provided on the range finder component to mount each of the interchangeable scales removably in operative relation to the spanning members of said component, and wherein the respective graduated divisions of the range scale of the range finder component and the corresponding sighting members of the sight component bear identical indicia, whereby the appropriate sighting member for any indicated range may be selected instantaneously by visual matching of indicia.

7. A combination range finder and sight as defined in claim 6, wherein the corresponding indicia of the range scale divisions of the range finder component and the sighting members of the sight component are represented in matching colors.

8. The invention as defined in claim 1, wherein the range scale of the range finder component constitutes one of an interchangeable series differing in calibration for targets of respectively different known dimensions, and wherein means is provided on the range finder component to mount each of the interchangeable scales removably in operative relation to the spanning members of said component.

9. The invention as defined in claim 8, wherein the respective graduated divisions of the range scale of the range finder component and the sighting members of the sight component corresponding thereto bear matching colors.

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