Jan. 12, 1954 W. L. GASKELL 2,665,679

ARCHER'S BOW

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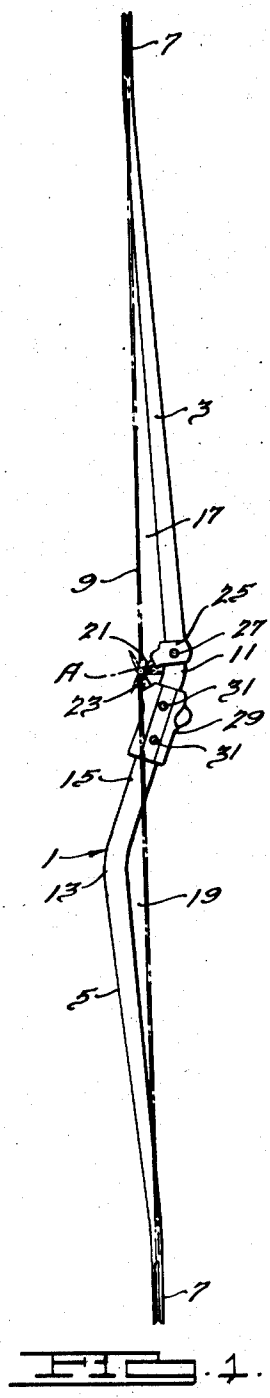


FIG. 1.

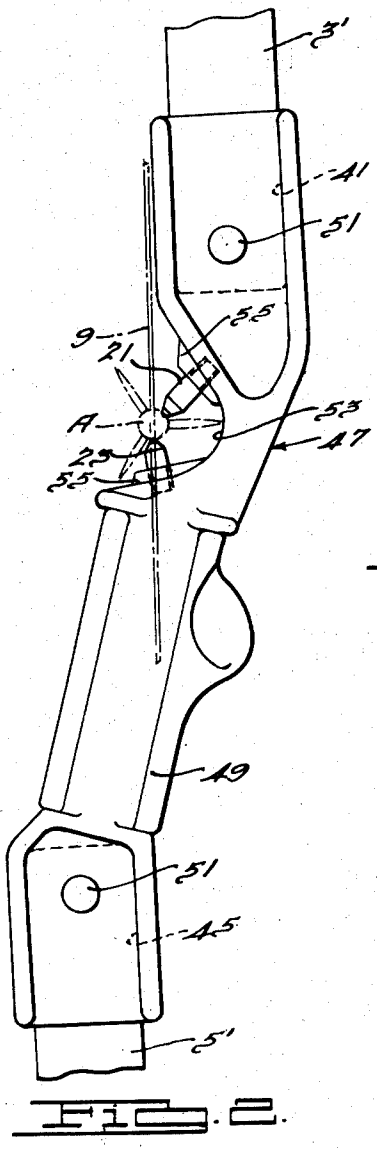


FIG. 2.

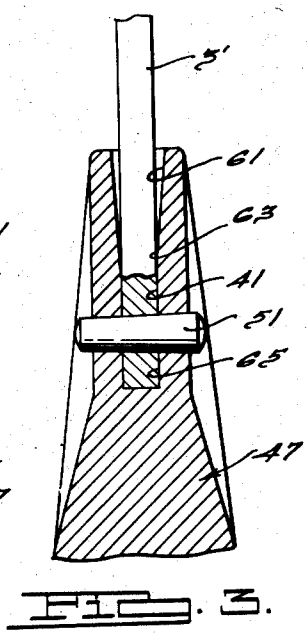


FIG. 3.

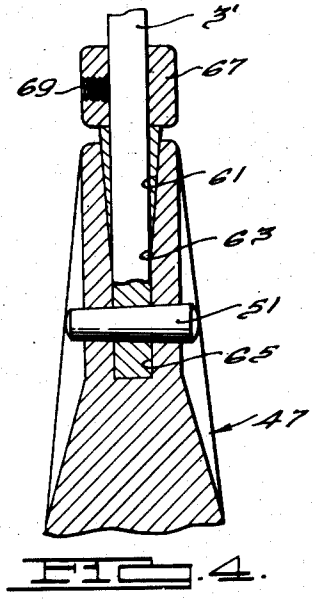


FIG. 4.

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ARCHER'S BOW

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This invention relates to archery bows and its principal objects are to improve the sighting characteristics and increase the accuracy of such bows.

In ordinary archery bows, the arrows are supported on the side of the bow and thus in a plane which is spaced laterally from the plane defined by the bowstring as the latter moves from taut to released position. A lateral component of force is therefore imparted to the arrow which may cause it to bend or to drift. This component also represents lost energy so far as distance is concerned. Sighting is done along the arrow so that the line of sight is also displaced from the plane of action of the bowstring. Both offset setting of the arrow and offset sighting are departures from an optimum construction, wherein the arrow is set in the plane of force applied by the bowstring and sighting is done also in this plane, so that considerable skill is required to do accurate shooting with the ordinary archer's bow.

In an effort to improve the accuracy of archery bows it has been proposed heretofore to set the arrow in the plane of the bowstring. This has been accomplished by providing either an arrow-receiving aperture in the center of the bow, or an arrow-receiving notch which opens into the side of the bow and extends across the center of the bow. The principal difficulty with both these methods is that they weaken the bow and therefore require compensatory design features which often lead to such complications as to nullify the beneficial effects obtained. Furthermore, they leave considerable bow material in the actual plane of vision of the archer which tends to obscure the complete target and to that extent, at least, to have an adverse effect upon sighting.

The bow of the present invention permits setting of the arrow and sighting in the plane of the bowstring, but is not subject to the objections set forth above. In the present bow, a substantial portion of preferably both the limbs does not lie in the plane of the bowstring but is laterally offset thereupon by an amount sufficient to accommodate an arrow rest, and for a longitudinal distance which is sufficient to allow a target to be observed with both eyes. Since the bow is not in any respect cut away or apertured to make room for the arrow, it is not weakened and normal limb shapes can be employed. It is therefore possible to use cross sections of maximum efficiency and optimum characteristics, and to have a lightweight bow.

The invention is illustrated in the accompanying drawings, in which:

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Figure 1 is a rear elevation of the improved bow;

Fig. 2 is an enlarged view of a central portion of a modified form of the bow; and

Figs. 3 and 4 are slightly enlarged sectional views through the limb socket and handle of the form of bow shown in Fig. 2 with the wedge blocks shown in Fig. 4.

Figure 1 illustrates a single piece bow embodying features of the invention. The bow 1 is made from suitable metal, such as an aluminum alloy, and has limb portions 3 and 5 that are provided at their extremities with bowstring-receiving catches (not shown) and grooves 7 that define the plane in which the bowstring 9 moves as the bow is stressed and unstressed. The limb portions 3 and 5 are inclined outwardly and away from the plane of the bow string, but are integrally joined at elbow portions 11 and 13, in a central part of the bow, by the handle section 15 which intersects the plane of the bow string. The inclined portions of the limbs 3 and 5 are preferably straight and of varying cross-sectional area, as is conventional in bow construction, and may be of any desired cross-sectional shape. It is evident that the offset areas 17 and 19 between the limbs 3 and 5 and opposite sides of the plane of the bow string 9 extend a substantial longitudinal distance and greatly facilitates sighting of a target.

The arrow A is supported upon a pair of arrow rests 21 and 23, which are preferably of the pin-point type to minimize friction. The arrow rest 21 is mounted in a collar 25 that is secured to the bow in a suitable manner, as by brazing or by a setscrew 27, which permits collar adjustment. The other arrow rest 23 is secured to a handle fitting 29 that is suitably attached to the inclined handle section 15, as by brazing or adjustment screws 31. The collar 25 and handle 29 are preferably positioned and arranged so that the arrow A is supported in a position opposite the elbow 11, which is a point of maximum opening of the offset 17, thus leaving ample room for the feathers to pass by without striking the bow. It is to be noted that the axis of the arrow A lies in the plane of the bow string, and that this condition may be maintained with various diameter arrows by threadably mounting the arrow rests in the collar 25 and handle 29 so that they may be radially moved with respect to the arrow, or by shifting the positions of the collar 25 and handle 29 through the medium of adjustment screws 27 and 31.

The invention may also be embodied in the

multi-piece type of bow, which may be taken down to facilitate transportation and storage. Such a bow is illustrated in Fig. 2, and it may be assumed that the limbs 3' and 5' are the same as limbs 3 and 5 of the integral bow of Fig. 1. The limbs 3' and 5' fit in sockets 41 and 45 that are provided in the ends of a handle 47 that includes an inclined hand grip portion 49 that is shaped to fit the archer's hand. The handle 47 is preferably formed from a suitable metal, such as aluminum alloy, and it is evident that the limbs 3' and 5' may be formed of any suitable material such as wood, glass, etc. The sockets 41 and 45 are offset from the plane of the bow string 9 and located so that the limbs 3' and 5' incline inwardly, as in Fig. 1. The limbs are held in the sockets by tapered pins 51 that pass through registering apertures in the limbs and the handles.

In the event that the offset of the top end of the handle 47 is not sufficient to provide thoroughly satisfactory sighting and permit free passage of the arrow feathers, the side of the handle 47 may be recessed, as shown at 53. The pinpoint arrow rests 21 and 23 are adjustably threaded into suitable bosses 55 in the recess to support the arrow A in the plane of the bow string.

It will be noted that the center of symmetry of the bow of Fig. 2 is substantially at the point at which the resultant reaction force is applied to the hand grip 49 by the archer, and it is apparent that the bow of Fig. 1 could be readily constructed to provide for this feature, if desired.

As indicated above, the principal incentive behind the present development in archers' bows was a desire to improve sighting and accuracy. With the old type of bow, considerable limb material was placed above or directly to the right of the arrow so that when the archer's head was turned to look down the arrow, prior to shooting, the right eye observed little more than a limb. Consequently, in the old bows, the sighting was done really with just one eye, that eye being the left eye for right-handed archers. It will be appreciated that this negatives the very purpose for which human beings and animals have two eyes. When only one eye is used, the mechanism of parallax cannot be employed to determine the distance of the archer from the target. With the present bow, the limb is offset so that there is nothing in the line of sight of the right eye, and both eyes can be used in aiming the arrow at the target.

The particular offset limb construction of the present invention also endows the bow with several other advantages of note. In this connection, an important feature is that the axis of the arrow can be placed on the axis of the bow. Thus it is not necessary for the arrow to bend itself around the bow when it is released from the bow string. Consequently, the delicate operations of splining are eliminated and any type of arrow can be employed with the present bow. As is well known, feathers on the arrows serve to straighten out the path of flight of the arrow, which has a tendency to be somewhat snaky when shot from prior bows due to the fact that the arrow had been forced to bend around the bow. In the present bow the length of the feathers can be reduced considerably, due to the fact that the tendency to fishtail or snake is not present. Another advantage resulting from the fact that the arrow can be laid on the axis of the bow is that the energy which was previously needed to bend the arrow around the bow can now be used to give distance to the flight of the arrow with the result that the present bow shoots farther than the older type bows. Furthermore, the arrow is supported on needle points so that there is scarcely any friction between the arrow and the bow. Consequently, the energy lost due to friction is reduced appreciably. It has been noted that, perhaps as a result of these decreases in energy loss, the trajectory of the arrows shot by the present bow is much flatter than that of those shot by older type bows of equal weight.

The offset limb construction also provides another novel feature. This is a third type of movement in addition to longitudinal and lateral deflection of the bow. This movement is a twisting or torsion of the bow limbs about a nodal point located in an intermediate part of the bow. This twist or torsion of the bow seems to give an added snap to the arrow just prior to release, which is particularly beneficial in obtaining distance and good flight characteristics.

The bow of Fig. 2 may be also provided with another feature of practical importance, by virtue of which it is possible to vary the effective length of the limbs 3' and 5', and thus the strength or pull of the bow. This is accomplished by tapering the outer portion of the limb socket, as illustrated at 61 in Figs. 3 and 4, in connection with socket 41. When the limb is supported in this socket, it bends or cantilevers about the junction 63 between the tapered portion 61 and the straight portion 65 that fits the root of the limb. However, by slipping a wedge block 67 over the end of the limb 3' and securing it to the limb by screw 69 so that it fits against the walls of the tapered portion 61, the plane of zero-bending is raised to the end of the socket, as shown in Fig. 4. This decreases the effective length of the limb 3' and thus increases the pull required to draw back the bow string a given amount.

Modifications may obviously be made in the specific construction herein illustrated and described without departing from the spirit of the invention.

What is claimed is:

1. An archer's bow having limbs with tips adapted to receive a bow string, said bow having an arrow rest portion between said limbs and aligned with said tips in the bow string plane, the portions of said limbs adjacent the arrow rest portion of the bow of both of said limbs being bodily offset from the plane of the bow string on opposite sides thereof, so that said limbs are twisted as well as bent when stressed to shoot an arrow and enable an arrow to be set in said plane and also provide unobstructed sighting along the arrow.

2. An archer's bow comprising a hand grip having arrow rests extending outwardly therefrom and also limb sockets laterally offset on opposite sides of the rests, and limbs secured in said sockets, said limbs being inclined back from the sockets into the plane of an arrow supported on the rests and being there adapted to receive and support a bow string in the plane of an arrow supported on the rests.

3. An archer's bow comprising a pair of limbs integrally joined at their inner ends by an inclined portion, said limbs having outer ends to receive a bow string, said inclined portion extending across the plane of a bow string supported by said outer ends and the inner ends of the limbs being bodily offset from said plane on opposite sides thereof to provide unobstructed

sighting along an arrow, said bow including an arrow rest portion aligned with said outer ends in said plane.

4. An archery bow handle comprising a member having a hand grip portion, arrow rests on an intermediate part of the member, and portions on opposite ends of the hand grip portion provided with limb-receiving sockets that lie on axes that are on opposite sides and inclined back to intersect the plane of an arrow supported on said rests, whereby limbs supported on the handles are bodily offset on opposite sides of the arrow rests and permit sighting along the arrow and unobstructed travel of the arrow past the bow.

5. In an archery bow, a member having a hand grip portion, arrow rest means on an intermediate part of the member, portions on opposite ends of the hand grip portion being provided with walls defining limb-receiving sockets that lie on axes that are on opposite sides of the arrow rest means, limbs mounted in said sockets and inclined back toward the arrow rest means, said limbs having string receiving tips lying in a plane through the arrow rest means, said sockets having the outermost portions that lie in the plane of deflection of the limbs tapered so that these portions are larger than the limbs to be received

therein and the limbs bear against only the walls of the inner portions of the sockets, and wedge elements fitted in the tapered portions and bearing against the walls thereof and against the limbs to thereby vary the effective length of the limbs.

6. In an archer's bow, a handle portion, an arrow rest portion adjacent the handle portion and adapted to support an arrow along a predetermined axis, substantially straight limbs located on opposite transverse sides of said portions, said limbs extending outwardly in opposite longitudinal directions from said portions and being provided with bow string receiving tips aligned with each other in the plane of said axis.

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