An adjustable arrow rest having a support and structure to adjustably position the support with respect to a bow to permit movement of the support in a generally up and down direction with respect to the longitudinal dimension of a bow. An assembly is adjustably positioned on the support with the assembly including a plunger having an arrow-engaging tip and structure to yieldingly bias the plunger for supporting engagement of the tip with the shaft of an arrow.

The assembly may also include structure to vary the position of the plunger and structure to vary the biasing force on the plunger. This permits adjustment of the position of the plunger and the biasing force which the plunger may exert in yieldingly supporting the shaft of an arrow.

A spring biased support member may be provided in a bow to cooperate with the plunger to provide a lateral support for an arrow shaft positioned therebetween. An additional assembly may be mounted on the support with its plunger engaging an arrow shaft. The two assemblies and the spring biased support member provide a three-point support for an arrow shaft.
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ADJUSTABLE ARROW REST

BACKGROUND OF THE INVENTION

Previously, arrow rests for an archery bow have been considered as perishable items. Thus, they were replaced periodically much like a bow string. Arrow tests were made of various materials such as feathers, leather, thin plastic, bristle brushes, nylon brushes, etc. During usage, arrow rests became worn through numerous contacts with an arrow shaft and eventually they would be replaced with a new arrow rest, etc.

During the wearing-out process of previous arrow rests, their contour would change which would change the position of the arrow shaft slightly with respect to the bow. This would, in turn, have an adverse effect upon the accuracy of the arrow's flight. Additionally, previous arrow rests, being made of perishable materials, frequently broke at inopportune times, such as during an archery contest or on a hunting trip. The unreliability of previous arrow rests and the inaccuracy resulting from their usage have created many problems for archers.

Accordingly, there is a need for an improved arrow rest which is more durable than previous arrow rests and which does not change in its contour during usage.

SUMMARY OF THE INVENTION

In providing an improved arrow rest which is more durable and also offers a wide variation of adjustments to suit the archer, the bow, the manner in which the arrow is released, etc., the arrow rest of the invention includes support means and means to adjustably position the support means with respect to a bow to permit movement of the support means in a generally axial direction with respect to the bow. An arrow rest assembly is adjustably positioned on the support means. Thus, by movement of the support means with respect to the bow and movement of the assembly with respect to the support means, a wide variety of adjustments may be made in positioning the assembly with respect to the bow.

The assembly includes a plunger which has an arrow-engaging tip. Means are provided to yieldingly bias the plunger for supporting engagement of the plunger tip with the shaft of an arrow. Thus, with the assembly positioned with respect to the bow, the arrow-engaging tip of the plunger provides yieldable supporting engagement between the plunger tip and the shaft of an arrow.

The adjustable arrow rest may also include means on the assembly to vary the position of the plunger. Additionally, also, the arrow rest may include means on the assembly to vary the biasing force on the plunger. These further means of adjustment provide more flexibility in the use of the arrow rest for bows of various draw weights. Additionally, these further adjustments provide more flexibility in the use of the arrow rest for arrows of various diameters and the use of the arrow rest in conjunction with various types of arrow releases.

In the use of the arrow rest for hunting, a cap having a low-frictional surface may be positioned on the tip of the plunger. Thus, with the arrow rest providing support for the shaft of an arrow, the arrow shaft is engaged by the cap rather than the plunger tip. This reduces the noise which would otherwise occur through contact of the arrow shaft with the plunger tip during drawing of the bow.

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BRIEF DESCRIPTION OF THE DRAWINGS

With reference to the drawings, which are merely illustrative of an embodiment of the invention,

FIG. 1 is a side view of a compound bow with an arrow rest of the invention mounted on the bow; FIG. 2 is an enlarged fragmentary side view of the handle section of the bow taken on the broken lined circle denoted 2 in FIG. 1 and illustrating the placement of the arrow rest with respect to the bow;

FIG. 3 is an end view of the handle section shown in FIG. 2 as seen from the direction of the inner surface of the handle section;

FIG. 4 is a top sectional view taken along the line 4--4 of FIG. 2;

FIG. 5 is an end view, similar to FIG. 3, showing use of the arrow rest for hunting with a plastic cap positioned on the tip of the arrow rest plunger and with vanes being shown on the arrow shaft; and

FIG. 6 is a sectional view taken along the line 6--6 of FIG. 3 illustrating the internal structure of the arrow rest assembly.

DETAILED DESCRIPTION

FIG. 1 illustrates a compound bow 2 having a handle section 4, a handle 5, and upper and lower limbs 6 and 8 affixed to the handle section. An arrow rest 9 of the invention is affixed to the handle section 4 in a position for supporting the shaft of an arrow while the upper and lower limbs 6 and 8 are joined to the handle section 4 by channel support members 10 and 12.

A bow string 14 is connected through bow string cables 16 and 18 to eccentrically mounted pulleys 20 and 22. The bow string cables 16 and 18 are each fixed to their respective pulleys 20 and 22 with the cables each positioned within a groove (not shown) in a pulley.

Draw cables 24 and 26 are connected respectively to channel support members 10 and 12 with the draw cables passing over respective draw pulleys 28 and 30 and secured at their outer ends to the eccentrically mounted pulleys 20 and 22. The draw cables 24 and 26 are each secured to their pulley 20 or 22 by being positioned within a groove (not shown) which is axially offset with respect to the groove which contains the bow string cable as described previously. The draw pulleys 28 and 30 are joined to the upper and lower limbs 6 and 8 by the use of connectors 32 and 34.

The compound bow 2 shown in FIG. 1 does not form a part of this invention and is illustrated only to demonstrate the manner of using the arrow rest 9. For a more detailed description of a compound bow, reference is made to U.S. Pat. No. 3,486,495, issued Dec. 30, 1969.

Turning to FIG. 2, the arrow rest, referred to generally as 9, may be secured to the inner or back surface 36 of the handle section 4 by a carriage support bracket 38. The support bracket 38 is joined to the back surface 36 by bushing screws 40 which may engage recessed bushings 42, shown in phantom line drawing within the handle section 4.

Formed integrally with the support bracket 38 is a U-clamp 44 positioned at the lower end of the support bracket. An aperture 46 is formed between the legs of the U-clamp 44 and an adjustment screw 48 passing through the legs of the U-clamp 44 may be threadedly secured to the innermost of the two legs. On rotation of the adjustment screw 48, the legs of the U-clamp 44
may be brought into closer contact to, thereby, reduce the size of the aperture 46.

An L-shaped carriage rod, generally denoted 50, has one of its legs 51 positioned within the aperture 46 while the other of its legs 53 extends forwardly toward the front of the handle section 4. By rotation of the leg 51 with respect to aperture 46 on loosening of the adjustment screw 48, the leg 53 may move upwardly or downwardly in a generally axial direction with respect to the bow 2. An arrow rest assembly, generally designated 52, is positioned on the leg 53 and the assembly, thereby, experiences upward or downward movement in response to movement of the leg 53.

If desired, the arrow rest 9 may be secured to a front surface 49 of the handle section 4 rather than being secured to the back surface 36. The securing of the rest 9 to the front surface 49 is illustrated in phantom line drawing in which the support bracket is designated 38', the U-clamp as 44', and the leg as 53'. When mounted on front surface 49, the arrow rest 9 may be adaptablely positioned in the same general manner as when the rest is positioned on back surface 36 to provide reliable and uniform support for an arrow shaft during draw of the bow and discharge of the arrow.

The handle section 4 may include an offset portion 54 to provide a window for placement of an arrow shaft with the assembly 52 being mounted within the offset portion. As illustrated, the assembly 52 includes an externally threaded cylindrical body 56 which is threadedly engaged with threaded apertures passing through the legs of a U-clamp 58. The legs of the U-clamp 58 define an aperture 59 which surrounds the leg 53 of the L-shaped carriage 50. To fix the position of the cylindrical body 56 with respect to the U-clamp 58, a lock nut 60 may be threadedly engaged with the body in bearing engagement with one of the legs of the U-clamp 58. By loosening the lock nut 60 and then rotating the cylindrical body 56, the body may be moved axially in one direction or another with respect to the U-clamp 58 depending upon the rotational direction of the body.

A plunger 62 extending from the body 56 is biased yieldingly to an extended position in which its tip may contact the lower side surface of an arrow shaft illustrated in phantom line drawing as 64. A side rest guide 66 may be positioned on the handle section 4 to contact the side surface of the arrow shaft 64. With the plunger 62 directed upwardly against the underside of the shaft 64 and angled toward the side rest guide 66, the arrow shaft is supported on its undersurface and is also supported on either side with respect to lateral movement. If desired, the side rest guide 66 may be in the form of a yieldably biased plunger with the result that the arrow shaft is then yieldingly supported on its undersurface and also on both of its side surfaces.

FIG. 4, which is a sectional view taken along the line 4-4 of FIG. 2, illustrates the bushings 42 as positioned within a recess 68 in the handle section 4 as, for example, when the handle section is made of metal. As stated previously, the structure of the compound bow 2 is not a part of the present invention. Thus, the arrow rest of the invention is not restricted in its usage to a compound bow or to a bow having a metallic structure. The arrow rest 9 may be utilized with any type of bow such as a longbow, a recurved bow, a bow formed from wood or from wood laminated to plastic or metal, etc.

The side rest guide 66, as stated, may be in the form of a yieldably biased plunger and is so illustrated in FIG. 4. The side rest guide 66 is shown as contained within a cylindrical body 70 having a spring 72 positioned therein which bears against the underside of the side rest guide 66. The cylindrical body 70 may conveniently be recessed in a hole formed in the handle section 4 such that the side rest guide 66 is positioned for yieldable engagement with a side surface of the arrow shaft 64.

When used in hunting, as illustrated in FIG. 5, the plunger 62 may include a plastic cap 73 positioned over its tip. The plastic cap 73 may be secured to the tip of the plunger 62 by any convenient means such as by the use of internal threads on the cap which engage external threads on the plunger tip. The plastic cap 73 is conveniently formed of a material having low-frictional properties such as Teflon (a trademark of E. I. DuPont de Nemours). The use of the plastic cap 73 reduces the noise that results from contact of the arrow shaft with the plunger tip during draw of the arrow. Also, the cap 73 provides a larger supporting surface for arrows having a larger diameter shaft.

Plastic vanes, denoted as 75, are frequently used instead of feathers in steadying the flight of an arrow. Using three vanes 75, as illustrated, the arrow shaft 64 may be positioned with the vanes at 1, 5, and 7 o'clock. This avoids contact of the vanes 75 with the arrow rest plunger 62 or with the side rest 66 during release of the arrow — which could throw the arrow off its intended path of flight.

As indicated in FIG. 5, a second arrow rest assembly 90 having an L-shaped carriage rod 92 supported by a U-clamp 94 may be mounted to resiliently bias a cap 96 against the arrow shaft 64. The second assembly 90 may be mounted by a support bracket 98 that is connected to either the back surface 36 or front surface 49 (see FIG. 2). Through use of the second assembly 90 in conjunction with assembly 52 and the side rest guide 66, three point suspension may be provided for the arrow shaft 64. This stabilizes the position of the shaft 64 in providing increased accuracy during draw and discharge of an arrow.

As illustrated, the second assembly 90 is positioned to avoid contact of the cap 96 with the vanes 75. Thus, with arrow vanes 75 positioned at 1, 5 and 7 o’clock, the second assembly 90 may, for example, be adjusted to positioned the tip 96 at approximately 9 o’clock.

In use of a second arrow rest assembly 90, the cap 96 may be removed so that the tip of the plunger 99 directly contacts the shaft 64. The cap 96 functions in the same manner as the previously described cap 73 in reducing noise during draw of the arrow or in providing a larger supporting surface for the arrow shaft.

The internal structure of the assembly 52 is shown in FIG. 6 which is a sectional view taken along the line 6-6 of FIG. 3. The cylindrical body 56 includes a bore 74 that is stepped at 78 and leads to a smaller bore 76. The exterior surface of the plunger 62 is also stepped at 80 and leads to an enlarged head 82. The step 80 of the plunger 62 bears against the step 78 with the plunger in its fully extended position to retain the head 82 within the cylinder 56.

A recess 84 formed within the head 82 may receive one end of a coil spring 86 while the other end of the spring bears against the inner end of a threaded plug 88. The external threads on the plug 88 engage internal
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threads in the bore 74. Thus, by rotation of the plug 88, e.g., by insertion of an Allen wrench within the external socket in the plug, the plug may be moved inwardly or outwardly with respect to the bore to vary the compressive force exerted by the spring 86 against the plunger 62. As mentioned in regard to FIG. 5, the tip of the plunger 62 may be threaded for retention of a plastic cap 73 and, as illustrated, the plunger 62 includes a threaded tip 90.

The pressure exerted by the shaft of an arrow on an arrow rest will vary with the draw weight of the bow. Thus, by varying the biasing force exerted by the plunger 62, the present arrow rest can be adjusted for use on bows of varying draw weight. Also, in the case of a compound bow, as described, where the draw weight can be varied by adjusting the position of the limbs with respect to the center section, the present arrow rest can be adjusted to suit varying draw weights for the same bow.

The nocking point of the arrow on the bow string will change to some extent depending on whether the arrow is released by the archer's fingers or by an arrow release of some type. Thus, the use of an arrow release or a specific type of release, will also affect the force imparted by the arrow shaft to the arrow rest. This may be adjusted for in the present arrow rest in maintaining accuracy by varying the biasing force which the arrow rest imparts to the arrow shaft.

Another factor which affects the use of an arrow rest is the size of the arrow shafts. The present arrow rest, being fully adjustable, may be used with arrows of varying shaft diameter. The position of the rest itself, as described, may be adjusted in an axial or transverse direction with respect to the bow. Also, the axial position of the plunger 62 may be varied and the biasing force of the spring 86 against the plunger may be varied through movement of the plug 88. This permits adjusting the rest to the archer, the draw weight of the bow, the release, and the size of the arrows to obtain the maximum in accuracy and reliability.

We claim:
1. An adjustable arrow rest comprising:
   an assembly including a sliding plunger having an arrow engaging tip and means to yieldingly bias the plunger for supporting engagement with the shaft of an arrow;
   first means releasably attached to a second means for supporting said assembly at a position spaced from a bow;
   second means adapted to be mounted on a bow operatively connected to said first means to permit movement of said first means and said assembly with respect to said second means in an upward or downward direction generally along the longitudinal dimension of a bow and to also permit transverse movement of said first means and said assembly with respect to generally the longitudinal axis of a nocked arrow supported by a bow;
   said second means including a quick release to fix said first means and said assembly in a desired position vertically with respect to the longitudinal dimension of a bow and transversely with respect to the longitudinal axis of a nocked arrow supported by a bow to fix said first means and said assembly in the new position, and
third means operatively connecting said assembly to said first means to releasably fix the angle of said assembly so as to vary the angle between the longitudinal axis of the plunger and the long dimension of a bow.

2. The adjustable arrow rest of claim 1 including means on said assembly to vary the position of said plunger.

3. The adjustable arrow rest of claim 1 including means to vary the biasing force on said plunger.

4. The adjustable arrow rest of claim 1 including means to vary the position of said plunger, and means to vary the biasing force on said plunger.

5. The adjustable arrow rest of claim 1 including a cap having a low frictional surface, and means to position said cap on the tip of said plunger for engagement of said surface with a shaft of an arrow.

6. The adjustable arrow rest of claim 1 wherein said assembly includes:
a cylindrical body; said plunger being retained within said body and biased to an extended position with respect to said body, and
means to adjustably position said body in an axial direction to vary the extended position of said plunger.

7. The adjustable arrow rest of claim 6 wherein said body includes an internal thread; a spring positioned within said body with one end of the spring bearing against the plunger to bias the plunger to its extended position; a threaded plug in engagement with the internal thread of said body, and the plug being in engagement with the other end of said spring, whereby the biasing force of said spring may be altered by threadable rotation of said plug with respect to said body.

8. The adjustable arrow rest of claim 6 including an external thread on said body and a support having an internal thread in engagement with the external thread on said body, whereby rotation of the body with respect to the support moves the body in an axial direction with respect to the support.

9. The adjustable arrow rest of claim 1 including yieldable arrow engaging means adapted to be positioned on a bow to exert a yielding force against the side surface of an arrow shaft, and said assembly being positionable to yieldingly bias said plunger tip in an upward direction angled toward said yieldable arrow engaging means, whereby an arrow shaft is supported on its undersurface by engagement with said plunger tip and is supported with respect to lateral movement between said plunger tip and said yieldable arrow engaging means.

10. The adjustable arrow rest of claim 9 including an additional assembly including a plunger having an arrow engaging tip and means to yieldingly bias the plunger for supporting engagement of the plunger tip with the shaft of an arrow, and said additional assembly being positioned to provide a third-point of suspension to an arrow shaft with the shaft being contacted by the plunger tip of said assembly, said yieldable arrow engaging means, and the plunger tip of said additional assembly.
11. The adjustable arrow rest of claim 1 wherein said first means includes:
   an L-shaped support member having legs;
   one leg of said support member being supported by said second means for rotational movement with respect to the bow, and
   the other leg of said member engaging said third means to support said assembly.

12. The adjustable arrow rest of claim 1 wherein said first means includes a support member which is rotatable in a plane which parallels the longitudinal dimension of a bow with rotation of said member providing movement of said assembly in a direction along the longitudinal dimension of a bow.