

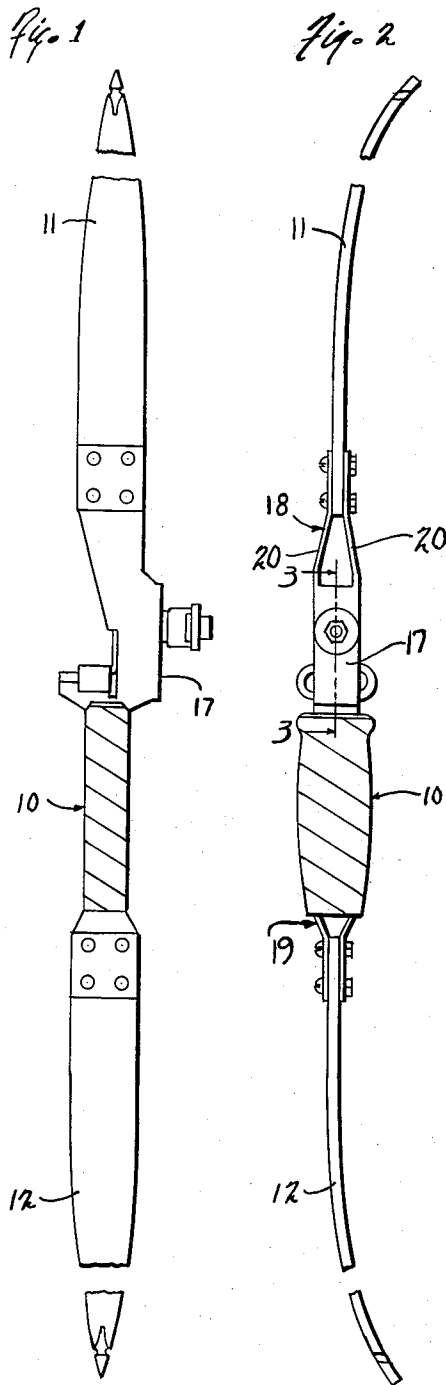
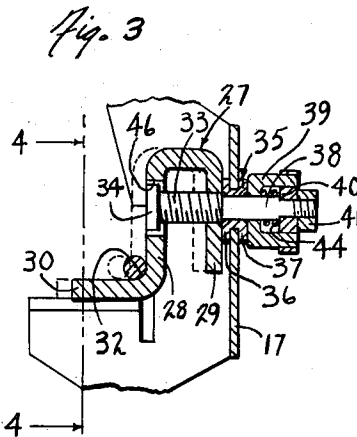
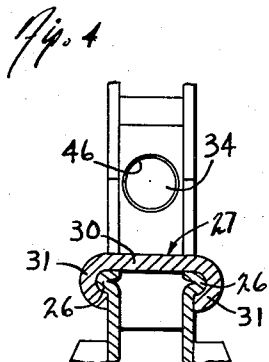
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ARCHERY BOWS

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2 Sheets-Sheet 1



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Fig. 5

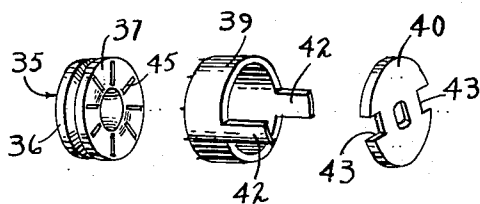


Fig. 6

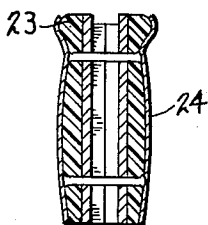


Fig. 7

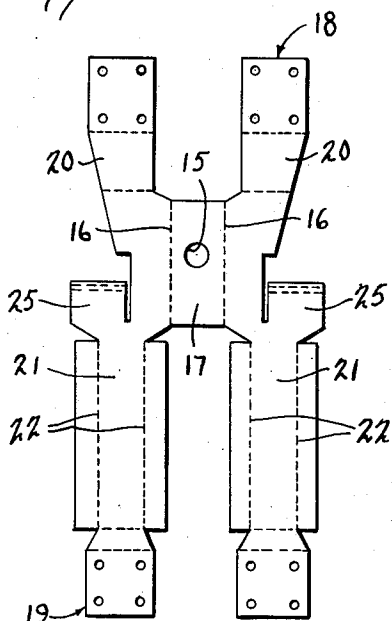
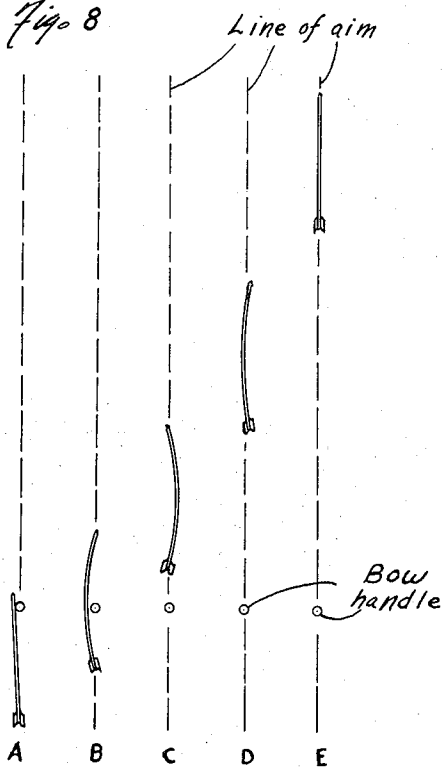


Fig. 8



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My invention relates to archery bows and the principal object of my invention is to provide new and improved bows for this purpose.

Modern archery has advanced to a point where bows and arrows are matched to secure maximum distance and accuracy. Usually, the pull of a bow is measured in pounds and the arrow to be shot by a bow of known pull should be specifically designed for that amount of pull.

Thus, theoretically, a 50 pound bow should be used to shoot 50 pound arrows, although a deviation of about 5 pounds will not materially affect accuracy. To use too stiff or too flexible an arrow with a bow of known pull will alter arrow flight from expected travel unless compensation is made for the variation. Of greater importance is the fact that an arrow may be broken, with serious consequences, if it is too flexible for a predetermined bow.

To many beginners in the sport of archery, the matching of bow and arrow is not always deemed of importance and therefore their enjoyment of the sport suffers because they are not getting the full benefit of matched equipment. Further, with the many types of bows of various pulling power, many sport stores are not able to stock arrows for all bows. Heretofore, the archer merely suffered with unmatched equipment, but my invention makes it possible for archers to adjust their bow and thereby compensate for unmatched equipment.

In the drawing accompanying this specification and forming a part of this application, there is shown, for purposes of illustration, an embodiment which my invention may assume, and in these drawings:

FIGURE 1 is a broken, front elevational view of a bow, illustrating an embodiment of my invention,

FIGURE 2 is a broken, side elevational view of the bow illustrated in FIGURE 1,

FIGURE 3 is an enlarged fragmentary sectional view corresponding generally to the line 3—3 of FIGURE 2,

FIGURE 4 is a sectional view corresponding generally to the line 4—4 of FIGURE 3,

FIGURE 5 is a separated, perspective view of certain parts of my improved bow,

FIGURE 6 is a fragmentary sectional view through the handle construction,

FIGURE 7 is a layout of the blank from which the handle is formed, and

FIGURE 8 is a diagrammatic representation of arrow flight.

The embodiment of the invention herein disclosed comprises a handle or hand grip portion 10, to the opposite ends of which are secured the limbs 11 and 12. The customary string is strung between the free ends of the limbs 11, 12, in the usual manner.

The handle portion 10 includes a formed sheet-metal member, and FIGURE 7 illustrates a blank from which the handle member is formed, dotted lines indicating bend lines.

The central portion of the blank is pierced to form a circular opening 15, and the sides of the blank are bent in the same direction along the lines 16—16 to produce the flat central portion 17 and the upper and lower legs 18 and 19.

The upper leg is formed by the facing parts 20—20 between which the upper limb 11 is secured. The two parts 21—21 (FIGURE 7) comprising the lower leg are bent on lines 22 to form a pair of channels with the

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legs of the channels facing and aligned to provide a hollow box section. Grip portions 23 (see FIGURE 6) are secured to the channels, and leather or other suitable facing 24 may be secured to or wound around the grip portions to provide an attractive, comfortable and surely-gripped hand-hold for the bow. The lower extremities of the lower leg are brought together in closely spaced facing relation and the lower limb 12 is secured therebetween.

When the blank is bent along the lines 16—16, portions 25—25 are brought in facing, parallel relation. The upper ends of the portions 25—25 are curled, as seen at 26 in FIGURE 4, to provide ways along which an arrow saddle or rest 27 is adapted to slide.

The saddle comprises a U-shaped body including a pair of connected, parallel legs 28, 29, and a foot 30 extending at right angles from the lower end of the leg 28 and having curled side flanges 31—31 which slidably fit over the ways 26—26. The rounded corner 32 between the leg 28 and foot 30 defines the surface against which an arrow is normally rested when the bow is drawn, aimed and released.

The leg 29 is formed with an opening into which the body 33 of a screw is threaded, the screw having a head 34 at one end against which the leg 29 is adapted to abut when the saddle 27 has been moved to an extreme position to the left when viewed in FIGURE 3 by proper rotation of the screw, the head acting as a positive stop for the saddle in its left hand direction of movement. The leg 29 abuts an end of an attaching grommet 35 in its extreme right hand position as shown in FIGURE 3.

The grommet 35 passes through the opening 15 in the central portion 17 of the handle, and has heads 36, 37 on opposite sides of the wall of portion 17 to firmly connect therewith. The grommet 35 forms a bearing for an unthreaded portion 38 of the screw. A metal cup 39 has its bottom wall disposed against the grommet head 37, this bottom wall being apertured to closely pass the unthreaded portion 38 of the screw.

A washer 40 fits over a non-circular, reduced end of the screw, the washer having a corresponding opening so that it and the screw are held against relative rotation. A nut 41 holds the washer against displacement. The cup 39 has a pair of ears 42—42 extending from its open end, the ears passing through slots 43 in the washer 40 to hold the latter and the cup against rotation, yet permitting a limited amount of axial movement. A spring 44 is disposed between the bottom of the cup 39 and the washer 40 to normally urge the two in a direction away from each other. The facing walls of the cup 39 and the grommet head 37 are provided with radially extending ribs 45 which are urged to mating position by the spring 44 but which may ride one over the other to permit adjustment of the saddle 27. The ribs 45, it will be appreciated, yieldably hold the adjusting screw against rotation.

In the position of parts shown in full lines in FIGURE 3, the saddle 27 is in its extreme right hand position and the screw head is disposed within an opening 46 in the leg 28.

The bow of my invention may be termed a center-shot bow, that is, a bow wherein the arrow rest is close to the center of the bow as viewed with respect to the axis of the bow string 14. In bows of this type, the arrow is normally placed about 1/8 inch off center and to accomplish proper rest for the arrow, the adjusting screw is rotated in the proper direction to move the saddle 27 to the left, as viewed in FIGURE 3, a distance of about 1/8 inch. The saddle and bow will then be in position shown in dotted lines in FIGURE 3.

The bow and arrow, in a center-shot bow and with the arrow 1/8 inch off center, are diagrammatically represented in FIGURE 8. When the arrow is shot from the

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bow, theoretically it should fly off to the left, as viewed in FIGURE 8, since it passes along the left side of the bow handle while the released string returns to the center of the bow.

However, with an arrow of the correct stiffness or spine for the bow weight, this is not true, for the arrow, under sudden and terrific pressure from the string, actually buckles around the bow handle and subsequently straightens out in flight to follow a course along the line of aim instead of going to the left as its position in FIGURE 8 would indicate. This phenomena is known as the archer's paradox and is the reason why such care had previously been required to insure proper match of the spine of the arrow with the drawing weight of the bow. Heretofore, if the arrow was too stiff for the bow, it would not bend sufficiently around the bow handle and fly off to the left. On the other hand, an arrow that is too weak in the spine would buckle too much and fly off to the right, or might break.

Although the required spine of an arrow is generally determined by the drawing weight of the bow, this method of determination can only be used as a guide and not as an absolute rule, for two bows of identical drawing weight may not necessary have identical casts, and hence the faster bow will require a stiffer-spined arrow than the slower bow. An archer may determine the cast of the bow by observing which way the arrows he shoots tend to group. If to the left, he need merely move the arrow saddle to the right, as viewed in FIGURE 3, to compensate; if to the right, he is required to move the saddle to the left.

As before mentioned, the center-shot bow has its arrow rest or saddle about $\frac{1}{8}$ inch to the left of center, which is about the right amount to compensate for the release action and arrow flight characteristics. Bows of this type are favored by tournament archers because, putting less stress on an arrow shaft, they can shoot arrows of much lighter spine and weight without fear of breakage from bending at the bow handle. Since breakage of an arrow too light in spine for a predetermined bow may be a dangerous thing, it will be appreciated that my invention, by providing for adjustment of the bow for arrow spine, affords a measure of safety to the archer.

FIGURE 8 shows typical arrow patterns during succeeding steps in the arrow's flight. Step A shows the arrow in the preferred off-center position. Step B shows the arrow as it flexes around the bow just after it has been released. Step C shows a reverse flex of the arrow, the

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amount of curvature being slightly decreased from that of step B because of the arrow spine. Step D shows the arrow beyond step C with the arrow again reverse flexing but again in a lesser degree, and this may continue until the arrow is straight, as shown in step E, and on the line of aim.

In view of the foregoing, it will be apparent to those skilled in the art that I have accomplished at least the principal object of my invention, and it also will be apparent to those skilled in the art that the embodiment herein described may be variously changed and modified, without departing from the spirit of the invention, and that the invention is capable of uses and has advantages not herein specifically described; hence it will be appreciated that the herein disclosed embodiment is illustrative only, and that my invention is not limited thereto.

I claim:

1. An archery bow, comprising a hand grip, resilient limbs connected to and extending from opposite ends of said grip, a grommet extending through a wall of said hand grip, and having heads abutting opposite surfaces of said wall, an adjusting screw passing through said grommet and journaled thereby, an arrow saddle threaded on said screw and movable toward and away from the center of said bow by corresponding rotation of said screw, a cup-shaped member rotatably mounted on said screw, a washer fixed to said screw and having driving connection with said cup-shaped member to rotate the same and yet permit axial movement therebetween, a spring in said cup-shaped member and interposed between the bottom wall thereof and said washer, said spring urging a surface of said cup-shaped member against one head of said grommet, and mating rib means between said one head and said member surface to yieldably hold said screw from rotation.

2. The construction according to claim 1, and further including guides on said saddle for slidably engaging with ways on said hand grip.

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