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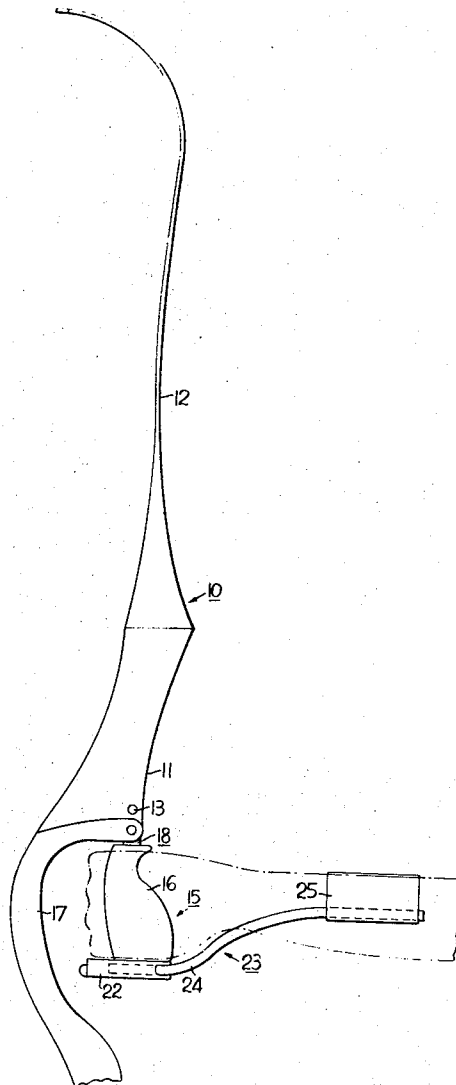
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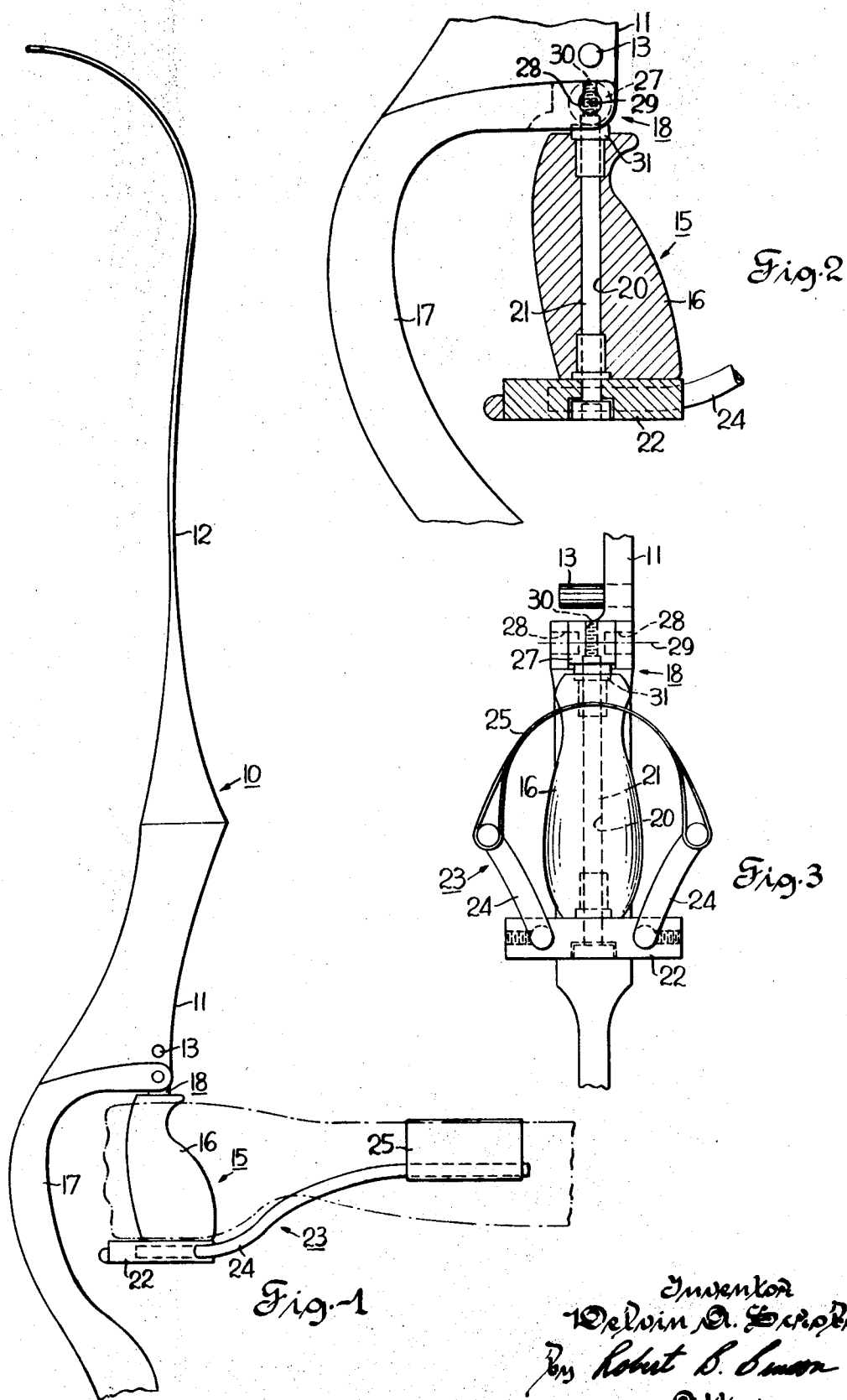
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[54] **ARCHERY BOW WITH ROTATABLE HANDGRIP**
 4 Claims, 6 Drawing Figs.

[52] U.S. Cl. 124/23,
 124/30 R
 [51] Int. Cl. F41b 5/00
 [50] Field of Search 124/24, 23,
 22, 30, 41

ABSTRACT: An archer's bow having a handle connected to the bow to permit the handle to pivot around an axis perpendicular to the longitudinal axis of the bow and rotate about an axis substantially parallel to the longitudinal axis of the bow completely independently of the bow.





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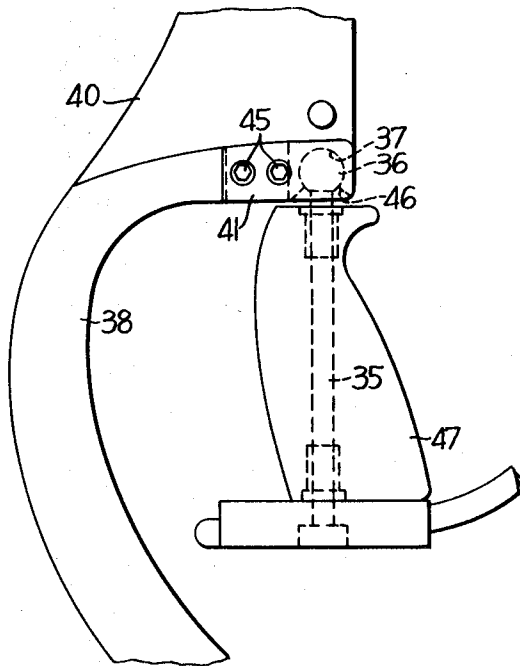


Fig. 4

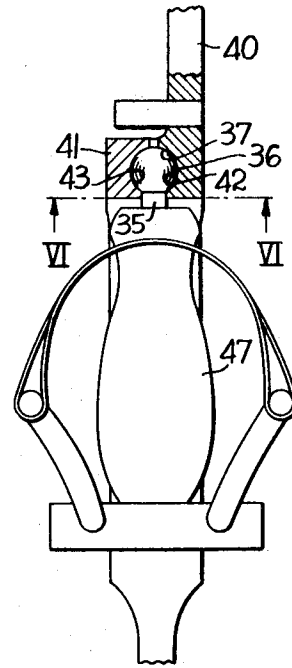


Fig. 5

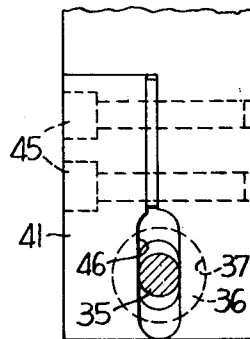


Fig. 6

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ARCHERY BOW WITH ROTATABLE HANDGRIP

This invention relates generally to an archer's bow. More specifically, this invention relates to a new handle assembly mounted on the bow in a manner to isolate some movements of the archer's hand from the bow.

In the use of an archer's bow a rather substantial force is exerted in drawing the bowstring. Even among experienced archers whose hands and wrists are conditioned for holding the bow, the magnitude of the force applied in drawing the string is such that it is practically impossible to hold the bow perfectly steady and eliminate all tendency toward deflection. It is essential especially for archers involved in competition that the bow be held as steady as possible until the arrow has cleared the bow. Any slight movement of the wrist during aiming or upon release of the bowstring will greatly magnify the error in the course of the arrow's flight since the rear end of the arrow is guided by the bowstring which is a considerable distance to the rear of the bow when drawn. Also, the arrow rest and center section are in contact with the arrow during the initial stage of its flight. Hence any movement of the bow during this stage of the arrow's flight has a significant effect on the accuracy of the flight of the arrow.

Furthermore, slight vertical movements of the hand just prior to releasing the arrow are imported to the bow thereby causing an imbalance of forces in the end portions of the bow which results in a stronger pull on the upper or lower part of the bow. This in turn causes the arrow to deflect from the intended course. This problem is especially acute with archers involved in competitive marksmanship because they tend to take a longer time to aim the arrow before release.

In my copending U.S. application Ser. No. 712,472, now U.S. Pat. No. 3,491,738, I illustrated a unique bow that overcomes the problems mentioned above through the use of a crescent-shaped handle assembly slidably mounted on the bow to pivot about an axis substantially perpendicular to the longitudinal axis of the bow to isolate slight movements of the archer's hand on the bow during aiming and releasing. The handle is also rotatably mounted relative to the handle assembly to allow rotational movement around an axis substantially parallel to the axis of the bow to further isolate movement of the archer's hand from the bow.

This invention constitutes an improvement on the bow of my copending application by eliminating the crescent shape assembly and providing a simplified connection between the handle and the bow that still provides for rotational movement of the handle around an axis parallel to the bow as well as limited pivotal movement about an axis transverse to the longitudinal axis of the bow. This novel connection eliminates some of the fine machining required in my previous bow and locates the critical pressure focal point nearer the arrow draw plane of the bow which simplifies the balancing of the forces in the bow. This structure greatly minimizes the problem of unequal forces in the limbs of the bow when the string is drawn.

Therefore it is an object of this invention to provide a new and improved archer's bow.

Another object of this invention is to provide a new and improved handle for an archer's bow that can pivot relative to the bow about an axis perpendicular to the longitudinal axis of the bow.

Another object of the invention is to provide a new and improved handle for an archer's bow that can rotate relative to the bow about an axis extending substantially longitudinally of the bow.

Another object of this invention is to provide a new and improved handle for an archer's bow that is connected to the bow at a single point and rotates about an axis substantially parallel to the longitudinal axis of the bow and about an axis perpendicular to the longitudinal axis of the bow to substantially isolate inadvertent movements of the handle from the bow during aiming and releasing of the arrow.

Other objects and advantages of this invention will be apparent from the following description when read in conjunction with the accompanying drawing, in which:

FIG. 1 is a side view of little more than half of the archer's bow incorporating the handle assembly of this invention;

FIG. 2 is an enlarged cross section view of the bow handle assembly of this invention;

FIG. 3 is an end view of the bow handle shown in FIG. 2;

FIG. 4 is a view of an alternative handle assembly of this invention;

FIG. 5 is an end view partially in section of the handle assembly of FIG. 4; and

FIG. 6 is an enlarged view of the handle assembly of FIG. 5 taken along the line VI-VI.

Referring more particularly to the drawing by characters of reference, the bow 10 illustrated in FIG. 1 is of the composite recurve type and comprises an elongated member having a central section 11 and highly flexible end or limb portions 12 (only one of which is shown) curved forwardly in the usual manner for receiving the string of the bow.

The central section 11 of the bow 10 is substantially wider, thicker and more rigid than the limb portions 12 which may be detachably mounted on the central section. As shown in FIG. 3, the upper portion of one side of the central section 11 is cut away to near the centerline of the bow in the usual way to facilitate shooting the arrow. An arrow rest 13 extends outwardly from the central section 11 to provide a guide for the arrows.

The preferred handle assembly 15 of this invention consists of a handle member 16 positioned in a cutout portion 17 in the central section 11 of the bow and is connected to the bow by a pivotable joint 18. The handle 16 is formed to fit the archer's hand and has a longitudinal extended bore 20 defined therein. An appropriate pin 21 extends through the bore in the handle and is connected to the joint 18 at the upper end and to a base member 22 at its other end. The handle 16 is mounted in free sliding relation relative to the pin 21 so that it can freely rotate around the pin. The axis of the pin is designed to be substantially parallel to the longitudinal axis of the bow 10 in its normal unstressed position.

As shown in FIG. 2, the joint 18 comprises a cylindrical bearing member 27 mounted in a bore 28 in the upper part of the central portion 17 of the bow to pivot about an axis 29 transverse to the longitudinal axis of the bow. The pin 21 is connected to the bearing member 27 by any suitable means such as by having its upper end screwed into an appropriate threaded bore 30 in the bearing member 27. A bushing 31 is mounted in the top of the handle and surrounds the pin 21 in sliding relation. The bushing is fixed relative to the handle so that the handle swivels around the pin 21 and hence around an axis substantially parallel to the longitudinal axis of the bow. In addition, the handle may pivot around an axis transverse to the bow because it is connected to the bearing member 27 which is slidably mounted in the bore 28.

An arm support member 23 is connected to the handle assembly to steady the archer's arm during aiming and shooting. As shown in FIG. 3, the support member has a pair of arms 24 connected at one end to the handle base 22 and extend away from the bow. A suitable sling member 25 extends loosely between the other ends of the support arms 24 to form a support for the archer. This member provides the archer with a support from which he can apply pressure on the handle as the bowstring is being drawn and provides a steadying means to minimize the deflection of the handle relative to the bow when the bowstring is drawn.

An alternative embodiment of the invention is shown in FIGS. 4-6 in which the handle is attached to the bow by a ball and socket-type joint. The pin 35 has a ball 36 at its upper end that fits into a socket 37 formed in or attached to the central section 38 of the modified bow 40.

As shown in FIGS. 5 and 6 the socket is formed between a detachable section 41 and the inside of the central section 38. Mating cutout portions 42 and 43 are formed in the compli-

mentary surfaces of the central section and the detachable section 41 to define a sphere to receive the ball 36. After the ball has been placed within the sphere the detachable section is connected to the central section of the bow by suitable bolts 45.

A slot 46 is formed in the bottom of the socket 36 between the detachable member 41 and the central section 38. The pin 35 on which the ball 36 is attached extends through this slot 46 and has an appropriate handle 47 mounted thereon. The sides of the slot 46 limit the movement of the pin sideways of the bow but do not impede the movement of the pin and handle about an axis transverse to the longitudinal axis of the bow. Furthermore, the handle and pin can rotate within the socket. Hence, the handle can rotate and pivot independently of the bow to isolate the bow from slight movement of the hand during shooting of the bow in substantially the same way as the handle assembly shown in FIGS. 1—3.

In operation the archer grips the bow handle 16 and the sling 25 engages his arm used to grip the bow. When the string of the bow is pulled taut by the archer his hand gripping the handle may move slightly without transmitting the movement of the bow. For example, if the archer's hand tends to pivot the handle in either direction around an axis perpendicular to the longitudinal axis of the bow the handle will force the bearing member 27 or the ball 36 to pivot slightly within the bore 28 or socket 37 and hence about an axis transverse to the longitudinal axis of the bow without imparting any motion to the bow. If the archer's hand tends to rotate the handle 16 in either direction around its longitudinal axis, the handle will rotate around the pin 21 and hence around an axis substantially parallel to the longitudinal axis of the bow. Slight movements of the handle are entirely independent of the bow and are not transmitted thereto.

As the archer draws the bowstring he applies considerable counter forces on the bow handle. These forces are concentrated at the junction of the pin and the socket or bearing member which is located very close to the draw plane of the arrow. This minimizes the problem of balancing the forces in the bow and simplifies the manufacture of the bow.

Although but two embodiments of this invention have been illustrated and described it will be apparent to those skilled in the art that various changes and modifications can be made therein without departing from the spirit of the invention or the scope of the appended claims.

What I claim is:

1. An archer's bow comprising an elongated flexible member having an enlarged central section,

a bowstring extending between the ends of said member, said central section having a cutout portion for receiving a handle and a bore positioned above said cutout portion extending therethrough transverse to the longitudinal axis of said bow,

a handle assembly having a free end and a fixedly attached opposite end, said opposite end having a bearing member mounted in said bore in said central portion to permit pivoting of said opposite end of said handle assembly about an axis substantially transverse to the longitudinal axis of said bow in a plane defined by said bow and bowstring,

said assembly having a handle to be gripped by the archer, said handle being connected to said bearing member to pivot therewith and being mounted for rotation about an axis substantially parallel to the longitudinal axis of the bow whereby rotational and pivotal movements of said handle during aiming and shooting of the bow will not be transmitted to the bow.

2. The bow of claim 1 in which an arm support member is connected to said handle assembly to support the archer's arm during aiming and shooting of said bow.

3. An archer's bow comprising an elongated flexible member having an enlarged central section, means at each end of the said member for receiving a bowstring,

said central section having a cutout portion,

a detachable member mounted on said central section above said cutout,

said member comprising a sphere on one end positioned within a socket in said central section,

a handle assembly having a pin-type member extending from said sphere,

said pin-type member extending through a slot in said central section into said cutout section, the sides of said slot preventing said pin from moving in a sideways direction while allowing said pin to pivot about an axis substantially transverse to the longitudinal axis of said bow in a plane defined by said bow,

a handle to be gripped by the archer mounted on said pin for rotation about said pin on an axis substantially parallel to the longitudinal axis of the bow whereby movement of said handle during aiming and shooting of the bow will not be transmitted to the bow.

4. The bow of claim 3 in which an arm support member is connected to said handle assembly to support the archer's arm during aiming and shooting of said bow.