

[54] **ARCHERY BOW HAVING RESILIENTLY MOUNTED BOW LIMBS**

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[58] Field of Search..... 124/23, 24, 25, 30 R, 124/22

[56] **References Cited**

UNITED STATES PATENTS

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747,692 12/1966 Canada..... 124/23

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[57] **ABSTRACT**

A separable bow comprising a handle and a pair of limbs, an upper and a lower limb, the foot of each limb being disengageably interconnected with the handle and being supported movably to and fro, with respect to the handle, in conformity with vibrations caused in the limb when an arrow is shot. Each limb is supported by two projections in the handle and each projection has a resilient member associated therewith for absorbing the vibrational movements of each limb.

3 Claims, 7 Drawing Figures

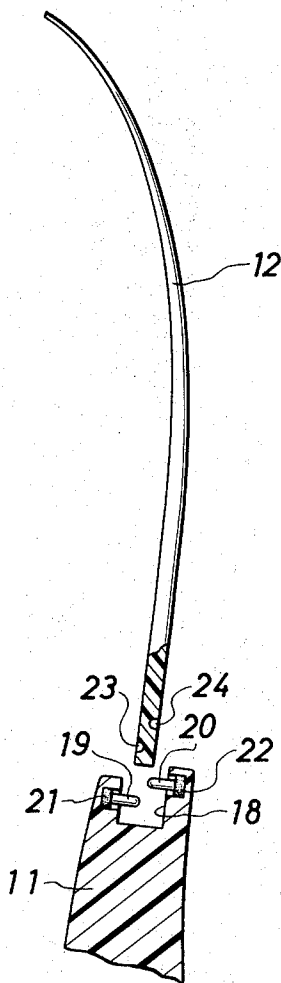


Fig. 1

PRIOR ART

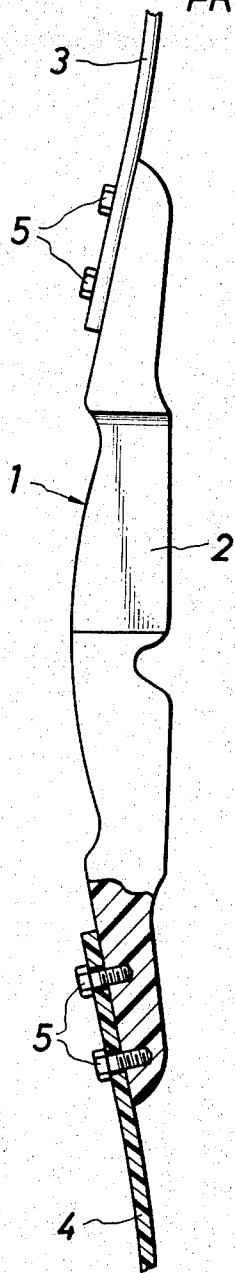


Fig. 2

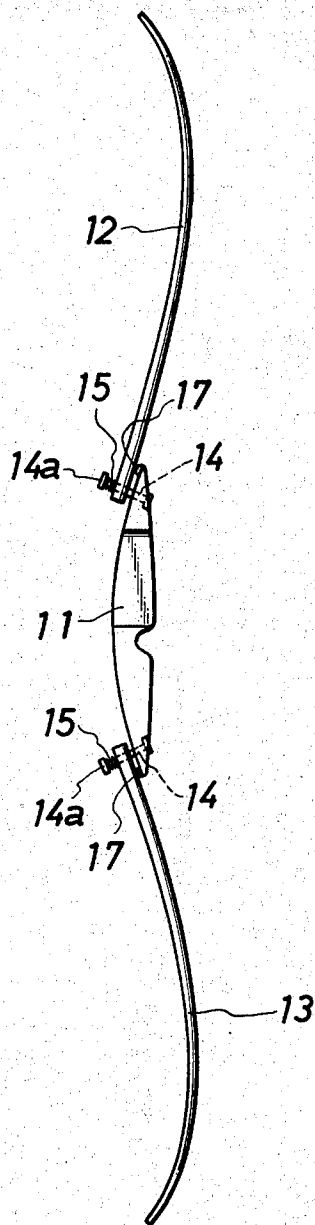


Fig.3

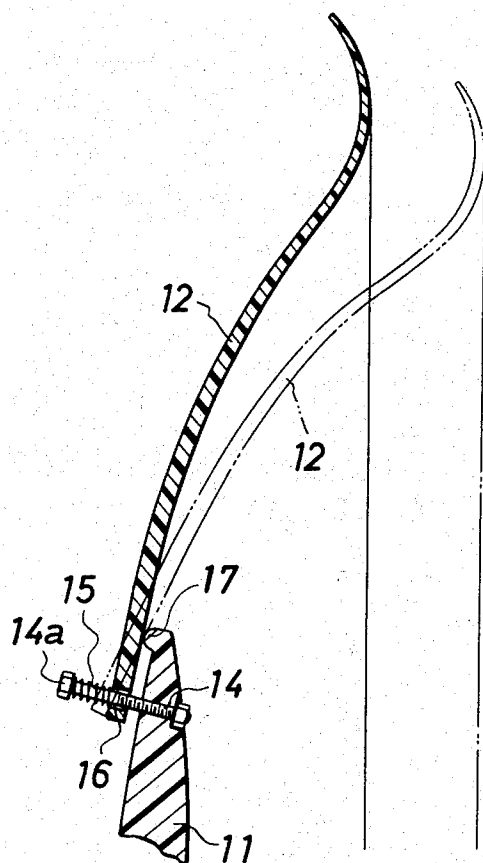


Fig.4

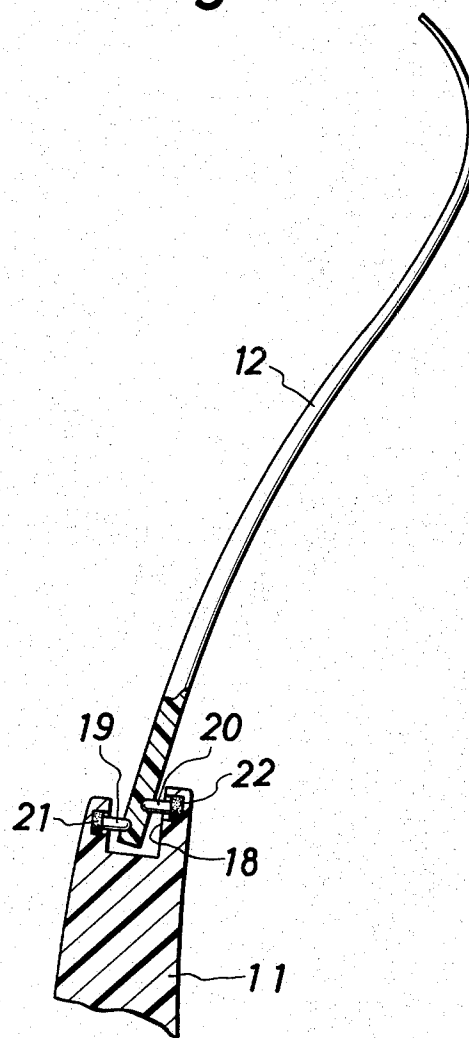


Fig.5

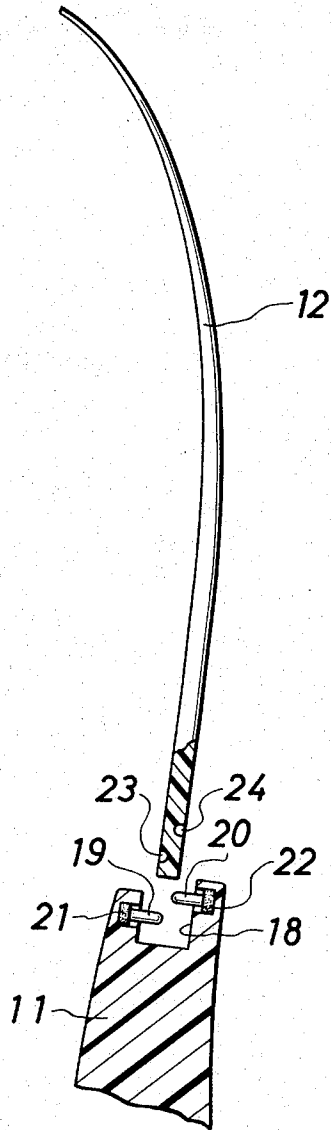


Fig.6

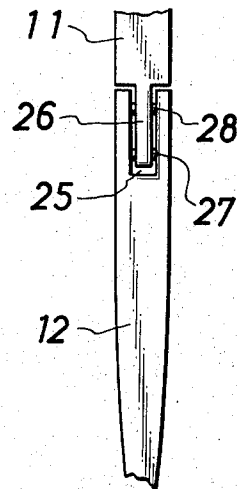
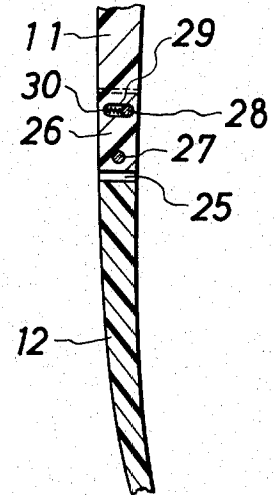


Fig.7



ARCHERY BOW HAVING RESILIENTLY MOUNTED BOW LIMBS

BACKGROUND OF THE INVENTION

This invention relates generally to a bow, and more particularly to a bow having a separable structure.

Two types of bows are conventionally known. One type consists of a single inseparable bow body and a string. Whether the bow is made of wood, horn or steel, the figure of this type is nearly the same in all countries, having generally two limbs or inflections, between which there is stretched a right string. While, another type comprises a separable structure, having a handle and a pair of limbs, an upper and a lower limb, which are disengageable from each other, and when in use, the foot of each limb is apposed to each end of the handle and is made in a facial or face-to-face contact therewith and is secured thereto by a connecting member, e.g. two pairs or more of bolts and nuts so that a single bow may be formed.

The former, as the structure of its bow body is all in one, only one specific bow thereof would not be available for plural purposes, e.g. such as for hunting, field and target. For different item of shooting sports, it would be necessary therefore to prepare for plural bows of different specifications, whereby it would cause the user to bear a heavy economical burden. Because of its long size, it is also troublesome to carry it. Still displeasure of this type of bow is that the limbs which are most apt to be worn out of the bow body are not replaceable, thus if either of two limbs of bow body should happen to be given a damage, it would come to that the bow as a whole is no more available for further use while there are still much wear in the handle and the remaining limb.

The latter, differing from the bow as referred to in the preceeding paragraph, is of a separable structure. Either upper or lower limb, or both may be replaced with another or another pair when worn out or when selecting for a desired item of shooting. It also comes in handy, because it can be disassembled and can be easily carried. But yet, unavoidable shortcoming has this bow. It comes from the structure. As a result of the structure of this type of bow in which the handle and each limb are secured and held together in a facial or face-to-face contact, a sudden shock or vibration produced just after the shooting has been performed would come down upon the handle, and which might cause the bow and the course of an arrow unstable, lowering the percentage of hitting the mark.

SUMMARY OF THE INVENTION

A principal object of this invention is to provide a novel and improved bow having a separable structure adapted to stabilize the bow and the course of arrow setting free from the bow, thereby a satisfactory shooting may be attained.

Another object of the present invention is to provide a novel and improved separable bow adapted to be readily assembled and disassembled wherein certain parts of the bow are replaceable with aim that the desired bow intended to the purpose may be quickly ready for use.

A separable bow according to one aspect of the present invention comprises a handle, a pair of limbs consisting of an upper limb and a lower limb, the foot of each limb being interconnected disengageably with the

handle and supported movably with respect to the handle, and resilient means resiliently supporting the foot of the limb in the handle, whereby a sudden shock or vibration accruing in connection with shooting of an arrow can be absorbed, which absorption would help an excellent archery to be performed.

The principle, nature and utility of the present invention will be better understood from the following detailed description of the invention when read in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings:

FIG. 1 is an enlarged longitudinal sectional view showing the principal and major part of a conventional bow having a separable structure;

FIG. 2 is a fragmentary side view of a separable bow embodied in accordance with the present invention;

FIG. 3 is an enlarged longitudinal sectional view of the principal part of the separable bow as shown in FIG. 2, illustrating the operation of the bow;

FIG. 4 is an enlarged longitudinal sectional view of the principal part of a separable bow embodied according to another aspect of the present invention;

FIG. 5 is an exploded view of the bow as shown in FIG. 4, illustrating an upper limb disengaged from the end portion of the handle;

FIG. 6 is a plan view of the principal part of a separable bow embodied according to further aspect of the present invention; and

FIG. 7 is a longitudinal sectional view of the same bow as shown in FIG. 6.

DETAILED DESCRIPTION OF THE INVENTION

Referring now to the drawing, FIG. 1 is taken up only for the purpose of a reference and for a better understanding of the present invention in comparison with a conventional separable bow, which comprises a bow body 1 having a handle 2 and a pair of limbs, an upper limb 3 and a lower limb 4, wherein the foot of each limb 3 or 5 is connected with the end portion of the handle by a couple of bolts 5, namely the handle and limb are integrally connected face to face with each other.

In an example shown in FIGS. 2 and 3, reference numeral 11 indicates a handle which is shaped out of the blocks of woods or plastics by cutting, or molded or formed by the injection molding or compression. Above all, lamination of hard, resilient woods with waterproof synthetic cements, glass fiber reinforced plastic or steel gives excellent results, and is increasingly being used in making same. Reference numerals 12 and 13 are an upper limb and a lower limb, a pair of these limb being respectively made up to be of the desired width and length or in the desired shape in accordance with the purpose and use. The foot of the upper limb 12 or of the lower limb 13 is connected with the handle 11 at a short distance from the end of the handle 11 by a connecting member 14 such as a bolt so as to permit easy disengagement of the limb from the handle. The connecting member 14 is fixed to the handle 11 and is adapted to permit the foot of the limb 12 or 13 to slide along an axis of the connecting member 14. The foot of the limb has a through hole 16 within which the connecting member 14 is inserted and freely movable. When connecting the foot of the limb to the handle, the connecting member 14 is inserted into the hole 16 and

is rigidly screwed into the handle. To prevent the connecting member 14 from unscrewing out of the handle, a nut may be attached to one end of the member 14 which comes out of the handle at the opposite side thereof. Thus the foot of the limb 12 or 13 is permitted to make a to-and-fro movement substantially in a direction in which an arrow is shot. A resilient member such as a coiled spring 15 is provided between the head 14a of the connecting member 14 and the foot of the limb 12 or 13 in such a manner that, when the foot of the limb 12 or 13 is moved toward the head 14a of the connecting member 14, the coiled spring 15 is compressed against its resiliency. The foot of the limb 12 or 13 connected with the handle 11 at a location leaving a small space from the edge of the handle is further mounted or supported at the edge of the handle 11 by a supporting member 17 which is provided at the edge of the handle 11 in the form of a single or plural knob-like or a linear projection(s). The plural knob-like projections or linear projection is extended linearly in a direction substantially at right angles to the direction in which the limb is extended. The support of the limb by the handle is achieved therefore by a point contact as in the knob-like projection or by a linear contact as in the plural knob-like projections or a linear projection.

As is apparent from the above description, with the separable separable bow according to one aspect of the invention, the limb 12 or 13 is supported or held by the handle 11 only at two points, that is, at one point where the connecting member 14 is provided and at the other point where the the supporting member 17 exists, and further the limb is supported so that it can be movable, with respect to the handle, against the resiliency of the coiled spring 15. For such reasons, the vibration or shock caused in the limb when an arrow is released from the bow body and string, is hardly transmitted to the handle 11, being effectively absorbed by the above-mentioned coupling construction. It is noted that this advantage is most effectively achieved by the fact that the limb is only abutted against the handle at the supporting member 17 in a state of a point or linear contact, and that the foot of the limb is movable along the axis of the connecting member, and further the fact that the resilient member 15 functions as a shock-absorber, vibrating along with the limb subjected to the vibration or shock.

FIGS. 4 and 5 exemplify another embodiment of the present invention. There is formed at each end of the handle 11 a groove 18 having a sufficient depth to fix in and hold the foot of an upper limb 12 or a lower limb 13. The foot of the limb 12 or 13 is disengageably held together with the handle 11 by a pair of projections 19 and 20 which are set in opposite inner sides of the groove, raising out the respective free ends inward in such disposition as if they form a step. The projections 19 and 20 are, respectively, connected to resilient base members 21 and 22 as of rubber, which are inserted in recesses formed in the walls of the groove so that the projections are movable in the lengthwise direction of the respective projections against the resiliency of the base members 21 and 22. When the foot of the limb 12 or 13 fixed in the groove 18 of the handle 11, the groove catches and holds said foot in such a manner that the projection 19 engages with a recess 23 formed on one side of the foot, and that the other projection 20 does likewise with a corresponding recess 24 formed on the other side of the foot. The limbs 12 and 13 are

thus gripped and held on by the handle 11 at least at two points as mentioned above, which makes the engagement between the handle and limbs sure and solid.

FIGS. 6 and 7 show a further embodiment of the present invention. The foot of a limb (a lower limb is shown) is bifurcated to form a groove 25 which is to receive and hold on a projecting longitudinal member 26 provided at each end of a handle 11. A shaft 27 is fixed to the foot of the limb 12 so as to bridge the lower part of the groove 15. Around the shaft 27 is rotatably supported the longitudinal member 26 of the handle 11. Another shaft 28 is inserted in the limb 12 at a distance somewhat above the shaft 27 so as to bridge the upper part of the groove 25. An elongated groove 29 is formed in the handle 11 to receive the shaft 28, as shown in FIG. 7. The elongated groove 29 is extended substantially in a direction in which an arrow is shot, or more precisely along a locus depicted by the shaft 28 when the limb 12 is rotated about the shaft 27. A resilient member such as a coiled spring 30 is inserted in the elongated groove 29 and is disposed between the shaft 28 and the handle 11 in such a manner that, when a string is stretched between the limbs, the coiled spring 30 is compressed against the resiliency thereof.

By employing a shaft attaching structure wherein the shaft 27 is easily removable, the limb 12 is foldable about the shaft 28 toward the handle 11 when not in use.

As will be apparent from the above description, the particular separable bow in accordance with the present invention has, in common with all the embodiments, a structure in which a pair of limbs are respectively connected with a handle by being held on at least at two points on the handle and is resiliently supported by spring means, and this will effectively prevent the transmission to the handle of the shock or vibration produced in the limbs just after the performance of shooting. Thus it will stabilize the bow and the course of an arrow shot and will improve the certainty of hitting the mark.

At the same time, the bow of this invention can be easily assembled and disassembled due to its particular separable structure. When finished the play, or when worn out, or when selecting for a desired item of shooting, either an upper limb or a lower limb, or both can be easily taken off out of a handle to stow away or to replace with another or another pair with the desired width, length or in desired shape according to the purpose and use.

I claim:

1. A separable bow for shooting an arrow comprising a handle having an upper and lower end portion, each of said end portions having a groove defined by opposite walls of said handle, a pair of limbs consisting of an upper limb and a lower limb, said upper and lower limbs having foot portions to be inserted, respectively, into said grooves of the upper and lower end portions of said handle, said limbs being subjected to vibrational movements when an arrow is released from the bow, mounting means for mounting said limbs on said handle with the foot portion of each of said limbs movably supported by said handle, with respect to said handle, in conformity with the vibrational movements of said limbs, said mounting means comprising a pair of projections extending, respectively, from the opposite walls of said handle toward said groove in an offsetting relationship to each other and a corresponding pair of

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recesses in the foot portions of each of said limbs, said pair of projections fitting into said recesses so as to engageably support said foot portions and resiliently supporting means for resiliently supporting said limbs, said resiliently supporting means comprising resilient members positioned, respectively, at each of said projections and serving to absorb the vibrational movements of said limbs.

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2. The separable bow as claimed in claim 1 wherein each of said limbs is supported by said handle substantially said pair of projections.

3. The separable bow as claimed in claim 1 wherein said resiliently supporting means comprises a resilient base member attached to said handle and supporting each of said projections.

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