

Sept. 21, 1965

P. B. GRABLE
ARCHERY BOW

3,207,146

Filed Dec. 13, 1962

2 Sheets-Sheet 1

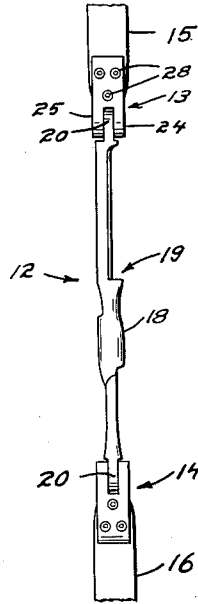
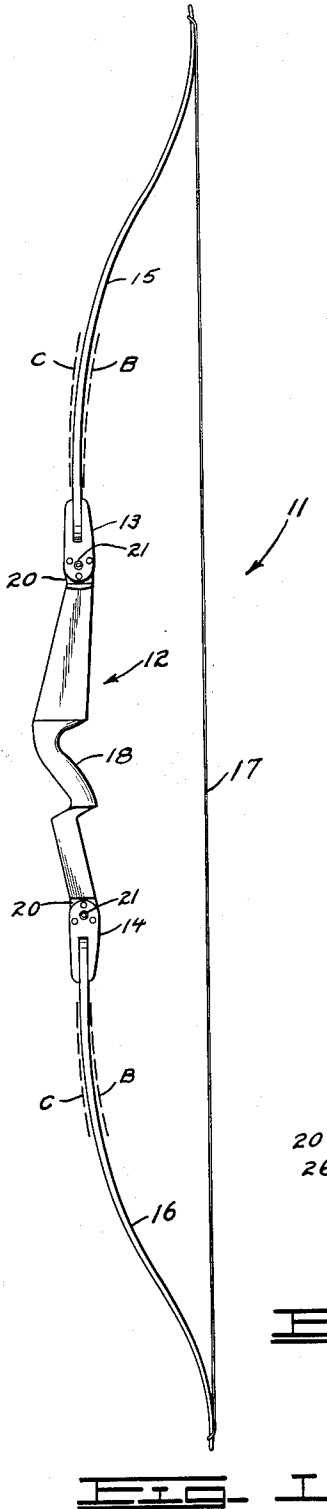


FIG. 2

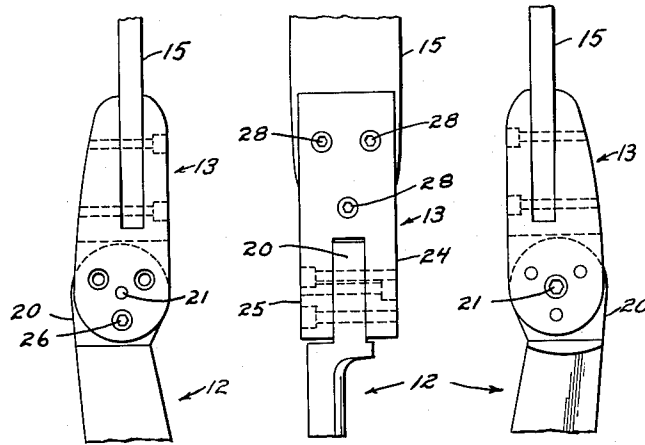


FIG. 3 FIG. 4 FIG. 5

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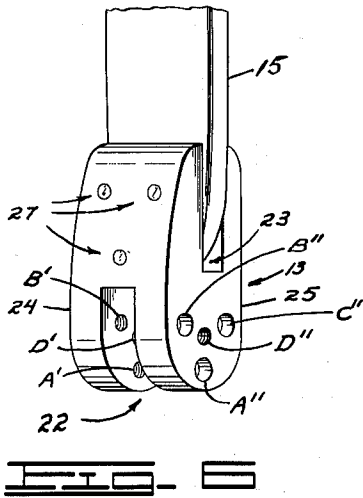


FIG. 6

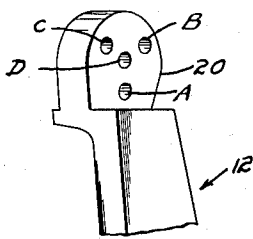


FIG. 7

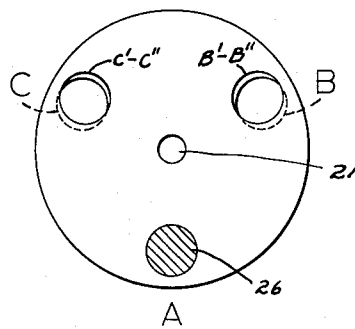
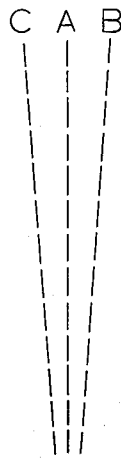


FIG. 8

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ARCHERY BOW

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5 Claims. (Cl. 124-24)

This invention relates to a take-apart archery bow and more particularly to a take-apart bow having pivotally adjustable limb portions that can be adjusted so as to selectively vary the draw weight of the bow.

Heretofore, an archer has had to use a different bow for each particular type of "shooting" that he has planned to do. The reason for this has been that different draw weights are required in different archery situations. For instance, while a bow having a specific draw weight would be satisfactory for target competition, it would not be satisfactory for hunting purposes.

Inasmuch as the draw weight of a bow is a function of the configuration of the bow itself, it is readily apparent that the draw weight of a single piece bow cannot be selectively varied so that one bow could be used for a variety of "shooting" situations.

The advent of the take-apart bow has provided an opportunity to alleviate this problem to a certain degree. In the take-apart bow devices of the prior art, sets of interchangeable limbs have been provided for use on a single handle member. Thus, by owing several sets of limbs of varying draw weights, the owner of a take-apart bow can change the draw weight of his bow by substituting a different set of limbs therein.

However, one of the bows of the prior known art have had the capacity of a single bow having variable draw weight so as to be a truly multi-purpose archery bow. Even in the case of take-apart bows, a plurality of limb sets have been required to achieve the variable draw weight goal.

It is thus seen that a need has existed for a multi-purpose bow which can be selectively adjusted for hunting, distance or target shooting and the like, as desired.

A further need has existed for an archery bow in which the configuration thereof can, in effect, be varied so as to selectively vary the draw weight of the bow, as desired.

Another need has existed for a bow in which variable draw weight adjustment capability can be achieved without the addition or substitution of ancillary parts thereto.

It is therefore an object of this invention to provide a multi-purpose bow in which the draw weight thereof can be selectively varied so as to adapt the bow for any type of archery activity desired.

Another object of this invention is to eliminate the necessity for an archer to own a different bow for each type of archery activity in which he participates.

A still further object of this invention is to provide an archery bow in which the draw weight thereof can be selectively varied solely by adjustments to the bow itself and not by addition or substitution of ancillary parts.

Yet another object of this invention is to provide a take-apart archery bow having pivotally mounted limbs that can be pivotally adjusted so as to selectively change the draw weight of the bow.

Another object of this invention is to provide an archery bow having great versatility in use while maintaining simplicity and ruggedness of construction.

Other objects and advantages found in the construction of my invention will be apparent from a consideration of the following specification in connection with the appended claims and the accompanying drawings.

In the drawings:

FIGURE 1 is a side elevation view of the take-apart bow showing in phantom line the representative positions to which the pivotally connected limbs can be moved.

FIGURE 2 is a front elevation view of the take-apart bow illustrating the central handle portion and the limb portions pivotally connected thereto.

FIGURE 3 is an enlarged right side elevation view of the upper socket portion of the take-apart bow illustrating the interrelationship between the central handle portion, the pivotally connected socket, and the limb member.

FIGURE 4 is an enlarged front elevation view of the upper socket portion of the take-apart bow illustrating the mating relationship between the end portion of the handle member, the pivotally connected socket, and the limb member.

FIGURE 5 is an enlarged left side elevation view of the portion of the bow as shown in FIGURES 3 and 4.

FIGURE 6 is a rear perspective view of one of the socket members illustrating the adjustment holes through the arms thereof and showing the base of a limb mounted therein.

FIGURE 7 is a perspective view of the upper end of the central handle member illustrating the socket-receiving extension provided thereon and showing the adjustment holes provided therethrough.

FIGURE 8 is a schematic view illustrating the relative axial alignment of the adjustment holes in the socket arms and handle extension, respectively, and showing thereabove in phantom line the respective relative positioning of the longitudinal axis of the limb when each set of adjustment holes is selectively placed in co-axial alignment.

General description

In general, a take-apart archery bow is provided having two pivotally adjustable limbs mounted on a central handle member. A limb receiving socket is pivotally mounted at each end of the handle member and is adapted to receive the butt end of a limb.

As will be described hereinafter, each socket member is adapted to permit selective forward and rearward pivotal movement of the limbs within the draw plane of the take-apart bow. Lock means are provided in association with the handle member and the limb-receiving socket members so as to permit selective locking of the limb members in any angular position to which they may have been pivoted within the draw plane of the bow.

The limb-receiving socket members are easily detachable from the handle portion. Thus, the take-apart bow can be dismantled without the necessity of removing the limbs from the socket members. This is a distinct advantage over previous precision-type take-apart bows. Heretofore, repeated disassembly of the limb members from the socket portions has resulted in mis-alignment of the limbs due to wear occasioned by repeated wood to metal contact.

In the preferred embodiment of the instant invention, the handle and socket members are fabricated from aluminum metal. Thus, a take-apart bow is provided whereby metal to metal surfaces are employed at the juncture wear point between the handle and socket members. This results in a bow which retains its correct alignment even after repeated assembly and disassembly.

Specific description

As shown in FIGURE 1, the take-apart bow 11 consists of a central handle member 12, limb retaining socket members 13 and 14 and pivotally connected to the ends of the handle member 12, and limbs 15 and 16 mounted in and extending outwardly from the socket members 13 and 14, respectively. A string 17 completes the operative assembly.

The central handle member 12 is fabricated from alu-

minum metal and is configured to provide an integrally formed grip portion 18 and a sight window 19.

As shown generally in the drawings and specifically in FIGURE 7, the central handle member 12 has an elongate configuration and is provided with socket receiving extensions 20 at the ends thereof. A centrally located pivot pin receiving hole D is provided through each of the socket receiving extensions 20 so as to receive a pivot pin 21 therethrough. Three lock pin receiving holes A, B, C are provided through each socket receiving extension 20 and are radially positioned at equal distances from the centrally located pivot pin receiving hole D, as shown in FIGURE 7.

As shown in the perspective view of FIGURE 6, limb receiving sockets 13 and 14 are provided which are adapted for mating engagement with the socket receiving extensions 20 provided on the handle member 12. Each socket is fabricated from aluminum and is provided with slots 2 and 23 at the ends thereof. The handle extension receiving slot 2 is defined by arms 24 and 25. Co-axially aligned pivot pin holes D' and D'' are centrally provided through the arms 24 and 25, respectively. Lock pin receiving holes A', B', C' and A'', B'', C'' are also provided through the arms 24 and 25, respectively. As shown in FIGURE 6, the lock pin receiving holes A', B', C' and A'', B'', C'' are equidistantly and radially positioned about the pivot holes D' and D'', respectively.

The lock pin receiving holes A', B' and C' are threaded so as to selectively and threadedly receive the lock pin 26. The lock pin receiving holes A'', B'' and C'' are countersunk so as to receive the head of the lock pin 26.

The limb receiving slot 23 is transverse of the handle extension receiving slot 22 and is located at the opposite end of each respective socket. Limb retaining pin holes 27, suitably threaded, are provided in the socket so that threaded limb retaining pin 28 can be utilized to lockably retain a limb which has been inserted into the limb receiving slot 23.

The limbs 15 and 16 are fabricated from wood or plastic laminates and are well known in the art. Retaining pin holes are provided through the base of the limbs which, when the limbs are inserted into their respective sockets, go into co-axial register with the limb retaining pin holes 27 provided in the sockets. Thus, the limb retaining pins 28 can be used to selectively lock the limbs in their position in the socket members. This unique and structure for the mounting of the limbs permits the use of wide, thin limbs of substantially constant thickness without the need of a built-up butt portion at the point where the limb joins the socket member. This reduces the cost, ease of fabrication, and time for fabrication of the limbs.

As shown generally in the drawings, the sockets 13 and 14 are pivotally connected to the handle extensions 20 by use of a pivot lock pin 21 through the pivot pin holes D', D and D''. The pivot pin hole D'' in socket arm 25 is threaded so as to threadedly receive the threaded end of pivot pin 21. The pivot pin hole D' in socket arm 24 is countersunk so as to retainably receive the head of the pivot pin 21 therein. Thus assembled, each socket is connected to the handle member 12 and is pivotally movable about its respective pivot pin 21.

The sockets 13 and 14 with their respective limbs fixedly mounted therein can be locked in any desired position in relation to the handle 12 by use of a lock pin 21 inserted through the socket arms 24 and 25 and the handle extension 20 therebetween. This is accomplished by pivoting the socket member until selected of the lock pin receiving holes A', A'' or B', B'' or C', C, C'' are in co-axial register or alignment. Only one of the sets of holes A', A'' or B', B'' or C', C, C'' can be in co-axial alignment at one time. For instance, when the socket arm lock pin receiving holes A' and A'' are co-axially aligned with the lock pin receiving hole A in the handle extension 20, the lock pin 26 is lockably insertable

therethrough. In this position, the longitudinal axis of the limb in relation to the handle portion is shown by phantom line A. This relationship is shown schematically in FIGURE 8. (The holes shown by partial hidden lines are the lock pin receiving holes B and C provided through the handle extension 20.)

If it is desired to tilt the longitudinal axis of the limb rearwardly, the lock pin 26 is removed from point A and the socket member is rotated clockwise until the socket arm lock pin receiving holes B' and B'' are in co-axial alignment or register with the handle extension lock pin receiving hole B. The lock pin 26 is then inserted therethrough. The longitudinal axis of the limb is then in the position shown by phantom line B.

If it is desired to tilt the longitudinal axis of the limb forward, the lock pin 26 is removed and the socket member is rotated counterclockwise until the socket arm lock pin receiving holes C' and C'' are in co-axial alignment or register with the handle extension lock pin receiving hole C. The lock pin 26 is inserted therethrough and the longitudinal axis of the limb is then in the position shown by phantom line C.

For purposes of illustration, an upper socket member 13 has been utilized. The lower socket member 14 would operate in the same basic manner so that the upper and lower limbs could be adjusted equally, thus maintaining the symmetry of the take-apart bow.

Although the preferred embodiment of the invention has been described as having three sets of lock pin holes, it is within the scope of the invention to use any number of such holes or an arcuate slot arrangement so as to provide any number of desired positions to which the limbs could be adjusted. In addition, any other method of pivotally adjusting the limbs to any desired angular position in relation to the handle may be utilized and is intended to be within the scope of this invention.

FIGURES 3, 4 and 5 are right, front and left side views, respectively, of the upper socket member 13 illustrating the mating use relationship between the limbs, the socket members and the handle member. It is within the scope of the invention to make the limbs integral with the socket members. In this manner, a limb member would be provided which was itself pivotally mountable on the handle member 12. However, a degree of interchangeability would be sacrificed if this were done.

It is also within the scope of the invention to provide bifurcated arms at each end of the handle member which would matingly receive an extension provided on the sockets or limbs, thus reversing the structural pivotal arrangement described herein. The basic operation of the bow would remain the same.

OPERATION

In use, the take-apart bow 11 is assembled as shown in FIGURE 1 and in the manner described heretofore. A take-apart bow is thus provided in which the draw weight can be varied by pivotally adjusting the limb thereof to any desired angular setting within the draw plane thereof.

For instance, the draw weight of the bow can be decreased by adjusting the limbs to the position shown by phantom line B in FIGURES 1 and 8. On the other hand, the draw weight can be increased by adjusting the limbs to the position shown by phantom line C.

Mechanically, this adjustment is accomplished by loosening the pivot pin 21 and removing the lock pin 26 from the set of lock pin receiving holes through which it is positioned. The sockets 13 and 14 are then pivotally adjusted until the desired set of lock pin receiving holes are in co-axially alignment. The lock pin 26 is then inserted therethrough and the pivot pin 21 is tightened into its locked use position. The bow is then ready for restringing and use.

The take-apart bow can easily be "knocked down" for storage purposes by removing the pivot and lock pins and disengaging the sockets 13 and 14 from the handle mem-

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ber 12. Thus, the limbs need not be removed from the socket member each time the bow is taken apart. This keeps wear on the limbs at a minimum and preserves the alignment of limbs.

It is thus seen that a highly versatile take-apart bow is provided which can be adapted for use in any type of archery activity by merely pivotally adjusting the limbs thereof so as to selectively vary the draw weight of the bow.

Angular adjustment of the bow limbs in relation to the handle member so as to vary the draw weight of the bow can be achieved by other means than by use of pivotal connectors. For instance, the butt end of the limb can be adapted for simple attachment to the tapered end of a standard central handle member. The longitudinal axis of each limb in relation to the longitudinal axis of the handle can then be varied as desired by selectively inserting wedge blocks of various angular sizes between the side of the butt end of the limb and the side of the end of the handle member.

Various other modifications of the invention may be made without departing from the principle thereof. Each of the modifications is to be considered as included in the hereinafter appended claims unless these claims by their language expressly provide otherwise.

Having thus set forth the nature of the invention, I claim the following:

1. In a take-apart bow, the combination comprising:

- (a) an elongate limb retaining handle member;
 - (b) limbs pivotally connected to the ends of said handle member; and
 - (c) lock means in association with said handle members and said limbs, said lock means adapted to selectively lock said limbs in desired pivotal positions within the draw plane of the bow so as to selectively vary the draw weight of the bow.
2. In a take-apart bow, the combination comprising:
- (a) an elongate limb retaining handle member having pivotally mounted limb socket means provided at each end thereof;
 - (b) a limb member provided in each of said socket means, each of said limb members selectively movable rearward and forward in the draw plane of the bow in response to selective movement of said socket means; and
 - (c) lock means in association with said handle member and said socket means so as to selectively lock said limbs in desired pivotal positions within the draw plane of the bow as so to selectively vary the draw weight of the bow.
3. In a take-apart bow, the combination comprising:
- (a) a central elongate limb retaining handle member;
 - (b) a limb-receiving socket member pivotally attached

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- to each end of said handle member, said socket member adapted for selective pivotal rearward and forward movement within the draw plane of the bow;
 - (c) a limb member fixedly attached to each of said socket members for selective rearward and forward movement within the draw plane of the bow in response to movement of said socket members; and
 - (d) lock means in association with said handle member and said socket members so as to selectively lock said socket members in desired pivotal positions within the draw plane of the bow.
4. In a take-apart bow, the combination comprising:
- (a) a central elongate limb retaining handle member, said handle member provided with limb socket-receiving extensions at each end thereof;
 - (b) limb-receiving socket members pivotally connected to said limb socket-receiving extensions, said socket members selectively pivotable rearward and forward within the draw plane of the bow;
 - (c) limb members fixedly attachable to said limb-receiving socket members, said limb members movable within the draw plane of the bow in response to selective pivotal movement of said limb-receiving socket members; and
 - (d) lock means in association with said limb socket-receiving extensions and said socket members, said lock means adapted to selectively lock said socket members and said limbs in desired pivotal positions within the draw plane of the bow.
5. In a take-apart bow, the combination comprising:
- (a) a central elongate limb retaining handle member, said handle member provided with limb receiving extensions at each end thereof;
 - (b) limbs pivotally connected to each end of said handle member, said limbs provided with bifurcated arm extensions at one end thereof for mating engagement with said limb receiving extensions so as to permit rearward and forward pivotal movement of said limbs within the draw plane of said bow; and
 - (c) lock means in association with said handle member and said limbs, said lock means adapted to selectively lock said limbs in desired pivotal positions within the draw plane of the bow.

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