

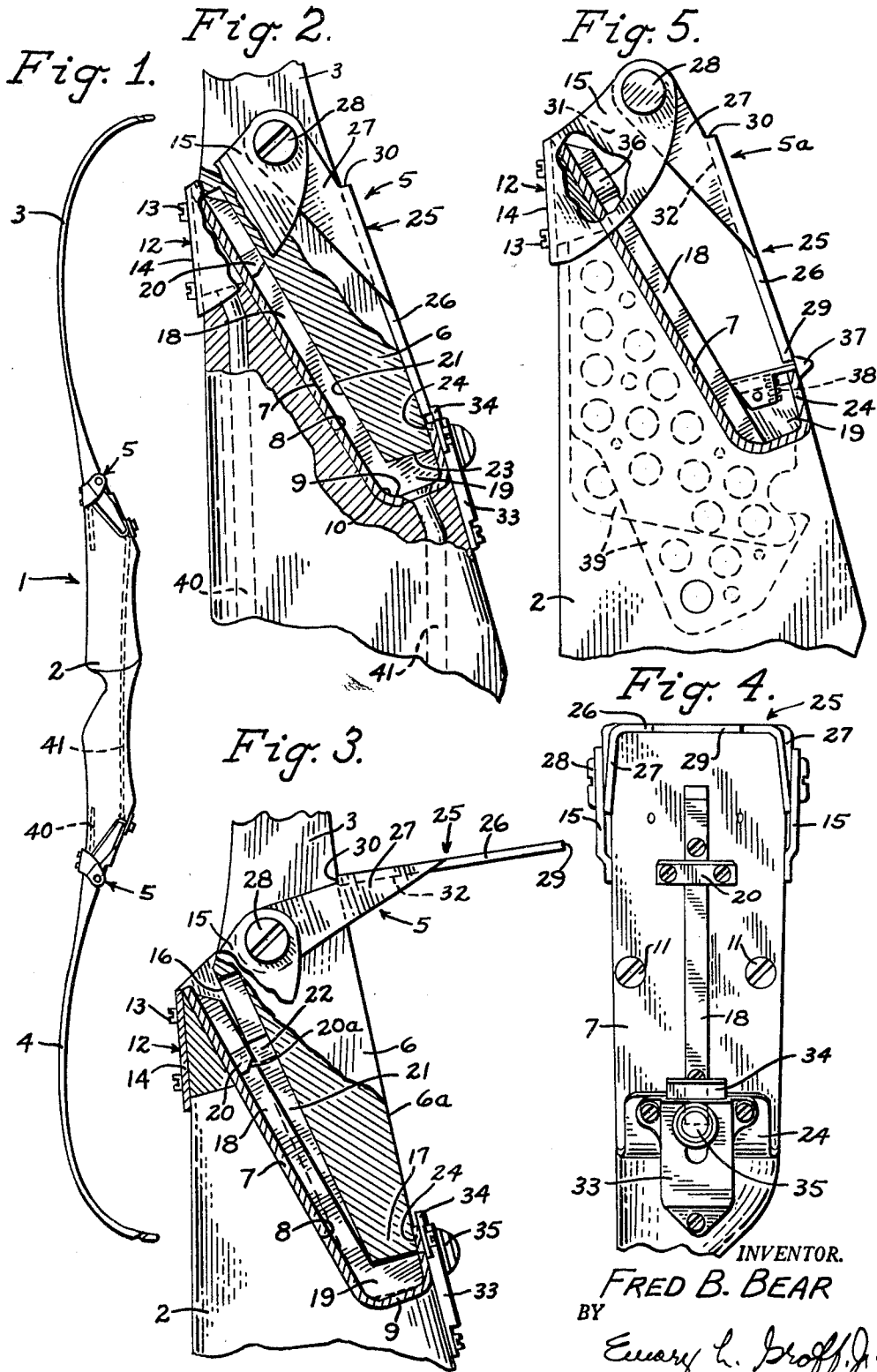
March 24, 1970

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3,502,063

TAKEDOWN BOW

Filed May 20, 1968



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3,502,063

TAKEDOWN BOW

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Filed May 20, 1968, Ser. No. 730,498

Int. Cl. F41b 5/00

U.S. Cl. 124—23

10 Claims

ABSTRACT OF THE DISCLOSURE

An archery bow having removable limbs attached to a handle section by means of a socket receptacle including alignment means mating with the limb butt. A cover plate is pivotally attached to the receptacle and movable from an open position to a closed position providing a wedge locking action.

This invention relates generally to archery bows and more particularly to a takedown bow comprising a rigid handle section having improved clamping members at the ends thereof for receiving, aligning and securely retaining a pair of removable outer limbs.

Two common practices were most often utilized in providing a takedown bow construction in the past. Several disadvantages have been inherent in both such arrangements. One manner has been to provide a bow with a ferrule for engaging a removable limb having parallel sides and experience has shown that it was practically impossible to provide a construction which would permit ready assembly and disassembly of the components while at the same time providing a joint which did not squeak or rattle during use of the bow. Another manner was to provide the bow handle section with closed wall tapered sockets of metallic construction for receiving the butt ends of the two limbs; however when subsequently stringing and drawing such a bow it was found that because of the tapered joint between the components, the two limbs were forced so tightly into an assembled relationship that it was extremely difficult to disassemble the bow without the necessity of utilizing tools in order to pry apart the limbs from the handle section, with the obvious attendant danger of damaging the bow components.

The present invention provides for a bow construction which overcomes the difficulties encountered with the previous takedown bows by providing an improved receptacle assembly at either end of a substantially rigid handle section for the reception of the tapered ends of an upper and lower bow limb. It will be readily appreciated that when practically all types of takedown bows are strung and subsequently used by the archer that a terrific force is applied inwardly from the butt end of each limb toward the handle section, whereupon the limbs are usually forced into ever-increasing pressure within the attaching means being used. This force fitting of the bow components is cumulative throughout the continual shooting of the bow due to the vibrations of the limbs which force the butt ends thereof into a tighter and tighter engagement with the clamping means, particularly when a wedged type clamping assembly is provided. The present invention recognizes this problem by providing improved means in the nature of a hinged locking plate which may be readily manipulated both during assembly and disassembly of the takedown bow and allows relatively effortless removal of the bow limbs regardless of the tightness of their fit within the clamping assemblies.

In addition to the principal advantage of ease of assembly and disassembly while yet providing for a most rigid connection when in use, several general advantages

of a takedown bow of the present type will be apparent, such as the ease of shipping, transporting and storing the bow when in its disassembled condition. Furthermore, by the present invention an archer may utilize a single handle section together with numerous sets of limb sections according to the shooting conditions at hand. This interchangeability of limbs with a single handle section permits the accommodation of limbs of different weights and/or lengths to allow an archer to participate with a single handle section in both hunting and competitive shooting, for example.

Accordingly, one of the objects of the present invention is to provide an archery bow of an improved takedown construction.

Another object of the present invention is to provide a takedown archery bow including a handle section having pivotal receptacle assemblies at either end thereof and cooperating with tapered end portions on an upper and lower detachable limb.

A further object of the present invention is to provide a takedown archery bow having hinged clamping assemblies on the handle section for joining with tapered butt end portions on the limbs and including finger manipulatable release means for relieving the locking pressure provided by the hinged portion of the clamping assemblies.

With these and other objects in view which will more readily appear as the nature of the invention is better understood, the invention consists in the novel construction, combination and arrangement of parts hereinafter more fully described, illustrated and claimed.

The preferred and practical embodiment of the invention is shown in the accompanying drawing, in which:

FIGURE 1 is a side elevation of an archery bow according to the present invention.

FIGURE 2 is a fragmentary side elevation, partly in section, showing in detail the hinged receptacle assembly of the present invention.

FIGURE 3 is a view similar to FIGURE 2 but showing the hinged locking plate pivoted from its locked position and the butt end of the bow limb as it is being detached from the handle section.

FIGURE 4 is a fragmentary rear perspective view of the clamping assembly as shown in FIGURE 3 and with the limb butt removed.

FIGURE 5 is a fragmentary side elevation, partly in section, of a modification of a clamping assembly included in the present invention.

Similar reference characters designate corresponding parts throughout the several figures of the drawing.

Referring now to the drawing, more particularly FIGURE 1, the invention will be seen to comprise an archery bow, generally designated 1, including a rigid integral handle section 2 provided with a removable upper limb 3 and lower limb 4. The two ends of the handle section 2 are each provided with a socket receptacle 5 fixedly attached thereto and adapted to removably engage the butt 6 of each limb. This butt will be seen to include front and rear faces which taper toward the free end of the butt. As shown most clearly in the enlarged views of FIGURES 2-5 each socket receptacle 5 and 5a includes a substantially flat base plate 7 which is positioned against a sloping surface 8 formed in the end of the rigid handle section 2. A bottom wall 9 joining one end of the base plate 7 projects substantially normal to the base plate and abuts a transverse surface 10 provided in the handle section adjacent the sloping surface 8.

It will be understood that the construction of both the handle section 2 and the bow limbs 3 and 4 may be of any suitable material such as solid wood or plastic composition or any of the various laminations of either one or both of these materials as presently found in the manufacture of archery bows. The limb socket receptacles 5 are

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thus permanently affixed to the ends of the handle section 2 by suitable fastening means such as the screws 11—11 which pass through the base plate 7 and enter the handle section through the sloping surface 8 thereof. The terrific pivotal as well as axial strain through the limb butts 6 when a bow is strung and subsequently drawn is readily appreciated, and accordingly additional means are provided to further distribute the resultant strains placed upon the socket receptacles 5. As shown in FIGURE 2 a U-shaped member 12 is affixed to the front side of the handle section adjacent the free end thereof and is secured by means of the screws 13—13. The U-shaped member 12 includes a front mounting wall 14 which overlies the front side of the handle section and is provided with a pair of rearwardly extending spaced apart side arms 15—15.

The inner ends of each of the upper and lower limbs 3 and 4, specifically the butts 6—6, are provided with a sloping base 16 and end 17 shaped substantially in a congruent manner with respect to the aforescribed base plate 7 and bottom wall 9 of the socket receptacle 5 such that when the limbs are positioned within the receptacles in the locked position of FIGURE 2, a close fit will be apparent. Means are provided to insure both longitudinal and transverse alignment of the butts 6 when positioned within the socket receptacles so that the limbs of the completely assembled bow will be properly axially aligned with the handle section 2. FIGURES 4 and 5 disclose two embodiments of structure provided for this purpose. As shown in FIGURE 4 a longitudinal guide bar 18 is centrally disposed upon the base plate 7 of the socket receptacle and extends substantially the greater part of the length of the surface 8. Positioned adjacent the lower end of the guide bar 18 and mounted upon the bottom wall 9 is a guide web 19 the width of which is preferably equal to that of the longitudinal guide bar 18. Disposed at a distance spaced from the free end of the guide bar 18 is a transverse guide bar 20 the free ends of which are spaced inwardly a substantial distance from the lateral edges of the base plate 7 as shown most clearly in FIGURE 4. As the base 16 of the limb butt and the end 17 thereof are shaped in a manner to substantially conform to the configuration of the receptacle base plate 7 in bottom wall 9, so also must means be provided to mate or cooperate with the configuration of the aforescribed longitudinal guide bar 18 and transverse guide bar 20, in addition to the bottom guide web 19. This is achieved by providing in the base 16 of the limb butt a longitudinal guide recess 21 extending substantially the length of the base 16 and an intersecting transverse guide recess 22 which is of a length to sufficiently include the length of the transverse guide bar 20. Also, a guide web notch 23 is formed in the end 17 of the butt to cooperate with the guide web 19.

From the foregoing description, it will be understood that during the initial stages of assembling the upper and lower limbs 3 and 4 to the handle section 2, the butt portions 6—6 of the respective limbs are positioned as shown in FIGURE 3 wherein it will be seen that the limb is tilted slightly toward the back of the bow to permit the guide web notch 23 to fully straddle the guide web 19, thereby allowing the butt 6 to be pushed as far as possible into the pocket of the receptacle 5 and toward the center of the handle section 2. Following placement of the limb as shown in FIGURE 3, it is then pivoted counterclockwise as viewed in this figure toward the front of the bow handle section to allow the longitudinal guide bar 18 and transverse guide bar 20 to mate within the respective longitudinal guide recess 21 and transverse guide recess 22, whereupon this much of the assembly will then appear as shown in FIGURE 2. To assist in urging the butt into a tight placement within the bottom pocket, the edge of the transverse guide bar 20 adjacent the bottom wall 9 is beveled as a 20a. As a result, when the lower edge of the transverse recess 22 strikes this bevel 20a, the butt 6 will be forced downwardly toward the wall 9.

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To prevent the end 17 of the butt 6 from coming out of the bottom of the socket receptacle 5 during the aforescribed movement to the position of FIGURE 2, an up-turned lip 24 is provided on the receptacle and extends outwardly from the bottom wall 9 thereof such that a pocket-like arrangement is available at the bottom of the receptacle.

Unique means are provided for the further tightening and locking of the inserted limbs in the form of a hinged locking plate, generally designated 25, and comprising a cover plate 26 having a pair of side legs 27—27 depending therefrom and extending in a plane parallel to the two side arms 15—15. Suitable pivot members 28 connect the side legs to the side arms. The lateral dimension of the cover plate 26 may be reduced at its free end to provide a locking tip 29 while the opposite edge of the cover plate 26, which is well spaced from the pivot members 28—28, is designed to serve as a pressure edge 30 as will be apparent hereinafter. The open space defined by the two side arms 15—15 on the one hand, and the pressure edge 30 and the base plate 7 on the other hand, may be referred to as a butt passage 31. It is at this point that a critical feature of the present invention should be understood. In the closed or locked position of the locking plate 25 as shown in FIGURES 2 and 5, the transverse dimension of the space within the butt passage 31 between the pressure edge 30 and the base plate 7 is substantially less than this corresponding dimension when the cover plate 26 is pivoted approximately 90° to the open position as shown in FIGURE 3. It will be appreciated that the initial assembly of the limb butt as shown in FIGURE 3 may be readily achieved with the cover plate 26 in the open position as shown, wherein the pressure edge 30 is spaced a substantial distance from the base plate 7 of the socket receptacle. Then, when the limb has been pivoted toward the front of the bow to the position shown in FIGURE 2, the hinged locking plate 25 is pivoted about the members 28, bringing the locking tip 29 toward the back surface 6a of the butt and the socket receptacle lip 24. Before the locking tip 29 reaches the plane of the socket receptacle lip 24 the pressure edge 30 of the cover plate, and more particularly the pressure surface 32 on the underside of the cover plate 26 immediately adjacent the edge 30, makes the initial contact with the back side 6a of the limb butt 6. If the limb butt is not fully seated within the socket receptacle, that is, if the three guide members are not fully disposed within their respective recesses in the butt, then continued closing movement of the locking plate 25 will force the limb butt into its fully seated position as a result of the contact of the pressure surface 32 on the back side 6a of the limb butt 6. Even with the limb butt fully seated as above described, the cover plate 26 will not move to the position shown in FIGURE 2 without the application of extra force adjacent the locking tip 29 thereof, which force in effect actually deflects the metal material of the cover plate 26 thereby causing a substantial increase in closing force being applied by the pressure edge 30 and pressure surface 32 upon the back of the limb butt 6 to most securely attach the limb to the handle section.

A displaceable catch arrangement is provided adjacent the lip 24 of the socket receptacle 5 to retain the locking plate 25 in its closed position. As shown in FIGURE 4 a catch housing 33 is mounted upon the outside of the lip 24 and includes therein a sliding or reciprocating catch bar 34 which reciprocates in a plane overlying the outer surface of the lip 24 and is normally spring urged outwardly by any suitable means beyond the free edge of the lip 24 so that it is necessary to axially displace the catch bar 34 such as by means of the catch operator 35 to fully lock the cover plate 26 in the position shown in FIGURE 2, wherein it will be seen that the locking tip 29 is disposed in the same plane as the socket receptacle lip 24.

Disassembly of the present takedown bow is but a

simple matter in view of the present construction. The sliding catch bar 34 is released to permit the cover plate 26 to move upwardly about the pivot members 28—28 whereupon it will be understood that the pressure surface 32 and pressure edge 30 will then be disposed a substantially spaced apart distance from the back side 6a of the limb butt 6. Thereafter, it is only necessary to strike the front of the bow limbs adjacent the socket receptacle 5 to disengage the longitudinal guide recess 21, transverse guide recess 22 and guide web notch 23 from their respective bars and webs within the socket receptacles such that the limb may be merely lifted out through the butt passage 31.

The modification illustrated in FIGURE 5 is basically similar to the aforescribed embodiment and although a longitudinal guide bar 18 is shown affixed to the base plate 7, a pair of locator pins 36—36 are disposed on opposite sides of the guide bar 18 in place of the transverse guide bar 20 illustrated in FIGURES 2-4. Quite obviously, instead of a transverse guide recess 22 in the limb butt 6 only a pair of congruent holes (not shown) in the limb butt would be necessary to mate with the locator pins 36—36. In place of the sliding catch bar 34 a modified pivoted catch bar 37 is disclosed and cooperates with the locking tip 29 of the cover plate 26. In view of the inclined surface of the catch bar 37 it will be apparent that the locking action is fully automatic in that upon closing of the locking plate 25 the tip 29 automatically displaces the head of the catch bar 37 as the cover plate is moved to the position shown in FIGURE 5 whereupon a suitable spring 38 serves to return the catch bar 37 to the locking position.

Realizing the terrific strain that is imposed upon the socket receptacle 5 during use of the archery bow, it is advantageous to provide additional anchorage means to more rigidly attach the receptacles to the ends of the handle section 2. In the form of the invention illustrated in FIGURE 5 it will be seen that a pair of perforated anchor fins 39—39 extend into the material forming the handle section 2. These fins 39 which are secured to the base plate 7 and bottom wall 9 of the socket receptacle by any suitable means are preferably elongated planar elements and may include perforations or notches to enhance the anchorage of the fins within the material of the handle section. Other anchor means are shown in FIGURE 2 comprising a front anchor rod 40 and a rear tie rod 41. The front anchor rods 40 serve the same purpose as the anchor fins 39 shown in FIGURE 5 while the rear tie rod 41 will be seen to comprise an integral rod rigidly attached to and joining each of the two socket receptacles 5-5 mounted at opposite ends of the handle section 2 (FIGURE 1). Quite obviously, the tie rod 41 may be utilized in combination with anchor fins 39 wherever it is deemed necessary in order to provide the strongest security for attaching the socket receptacles to a handle section.

I claim:

1. A takedown archery bow including a handle section and a detachable limb, a socket receptacle fixedly secured to the end of said handle section and having a sloping base plate, a bottom wall and an upturned lip defining a pocket therebetween, side arms extending normal to said base plate on each side thereof adjacent

the end of said base plate opposite from the end with said bottom wall, said limb provided with a butt having a sloping base, an end and a back surface, guide means on said base plate, means on said butt base mating and engageable with said guide means to insure alignment therebetween, and a locking means movably attached to said side arms and defining a butt passage between said arms, said base plate and said locking means whereby, when said limb butt is disposed through said butt passage with said guide means and said mating means engaged, said butt locking means will move to overlie and engage said limb butt back surface and lock said limb butt to said handle section.

2. A takedown archery bow according to claim 1, wherein said guide means includes a bar extending longitudinally on said base plate and said mating means on said butt base comprises a recess for receiving said bar.

3. A takedown archery bow according to claim 1, including catch means on said receptacle lip, said limb butt locking means including a cover plate having a locking tip at the free end thereof, whereby said tip engages said catch means when said locking plate is moved to overlie and lockably engage said butt back surface.

4. A takedown archery bow according to claim 2, including an additional bar extending transverse of said longitudinally extending bar and said butt base includes a transverse recess for mating with and receiving said transverse bar.

5. A takedown archery bow according to claim 4, wherein said transverse bar is provided with a bevel along its along side which is adjacent said receptacle pocket.

6. A takedown archery bow according to claim 2, including locator pins on opposite sides of said bar, and said butt base includes holes mating with said pins.

7. A takedown archery bow according to claim 3, wherein said cover plate is provided with a pair of side legs parallel to said side arms, a pressure edge on said cover plate at the end opposite said locking tip, whereby said butt passage is bounded by said side legs and side arms on two sides, said pressure edge on an intermediate side and said base plate on the remaining side.

8. A takedown archery bow according to claim 1, including a guide web on said receptacle bottom wall, and said limb end is provided with a notch mating with said web when said limb is inserted into said pocket.

9. A takedown archery bow according to claim 1, including a socket receptacle at both ends of said handle section and a pair of detachable limbs.

10. A takedown archery bow according to claim 9, including anchor means attached to said receptacles and embedded within said handle section.

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