Jan. 3, 1961 L. J. VENEKO 2,966,903

METHOD OF MAKING A GLASS FIBER BOW

Filed July 20, 1959 2 Sheets-Sheet 1

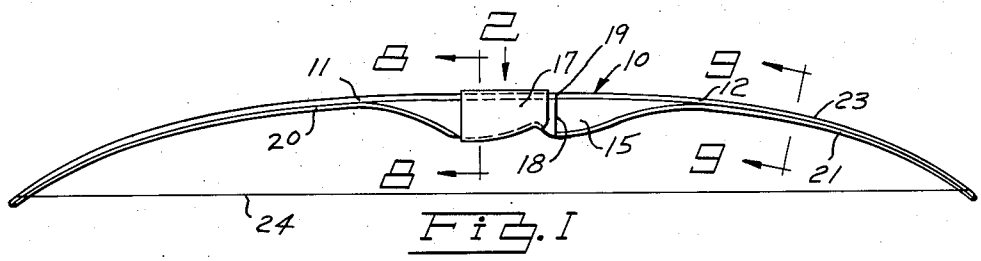


Fig. 1

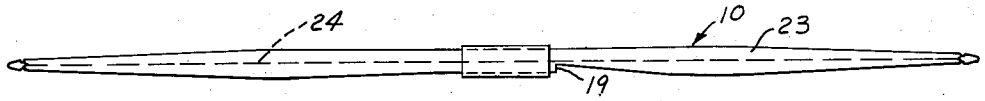


Fig. 2

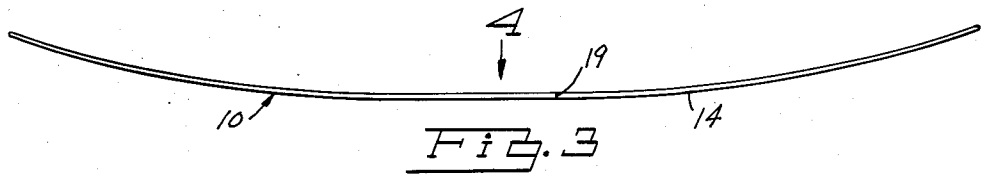


Fig. 3

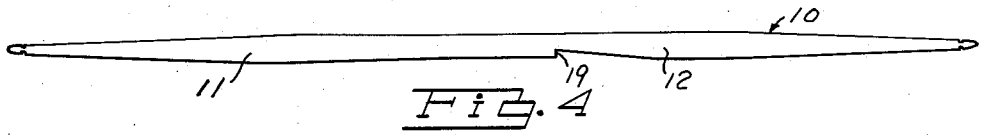


Fig. 4

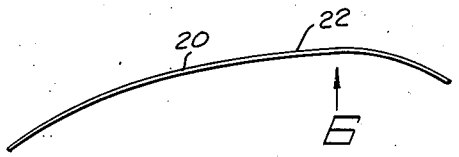


Fig. 5

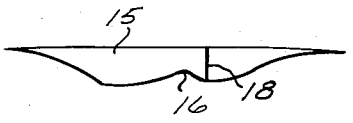


Fig. 7

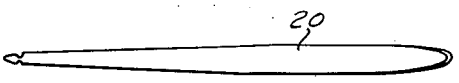


Fig. 6

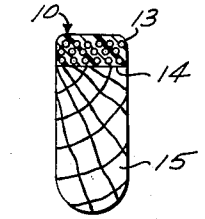


Fig. 8

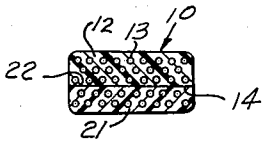


Fig. 9

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METHOD OF MAKING A GLASS FIBER BOW

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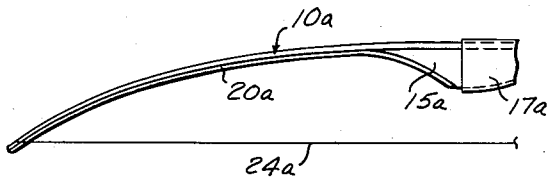


Fig. 10

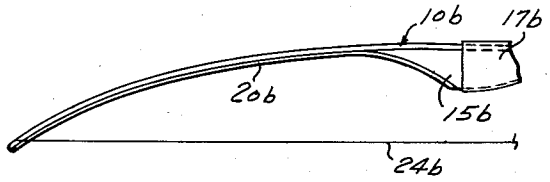


Fig. 11

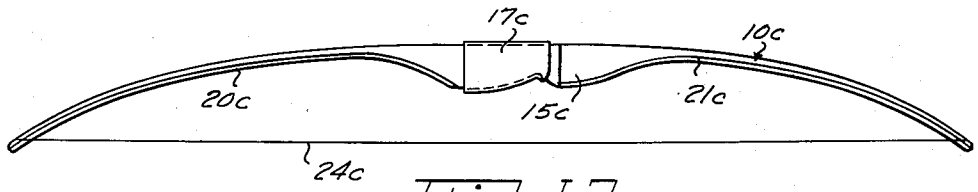


Fig. 12

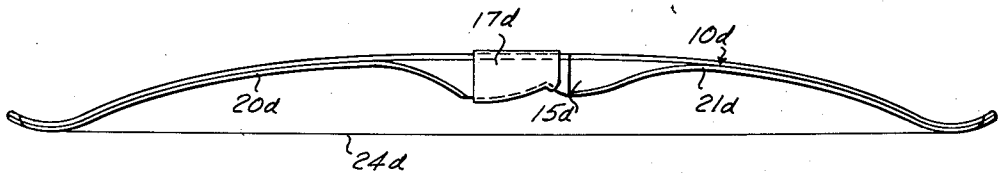


Fig. 13

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2,966,903

METHOD OF MAKING A GLASS FIBER BOW

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1 Claim. (Cl. 124—23)

This invention relates to improvements in the archery bow art and more particularly, to a novel and improved method of making a glass fiber bow.

Heretofore plastic reinforced glass fiber has been used in the making of solid and composite type bows. In the making of a solid plastic reinforced glass fiber bow, the bow is molded in a predetermined curved manner which is opposed to the line of draw. This method has proved to be costly and inaccurate and not satisfactory since it does not allow for any range of draw pulls or draw weights. The molding of a solid bow of this type to a preconceived taper and thickness to provide a predetermined draw weight has proved to be costly and a hit and miss proposition. In order to make bows of different draw weights, it is necessary when making a solid bow in the aforedescribed manner to hand tiller the bow to the described draw weight, that is, the inner face of the bow must be sanded and adjusted to provide the proper draw weights described and to provide a proper bending of the bow limbs into a proper parabola when an arrow is shot. For example: If a solid type bow is molded to a predetermined draw weight of 70 pounds, in order to reduce the draw weight to a lower amount, as for example, 60 pounds, it is necessary to sand off the inner face surface of the bow. Ordinarily by sanding off three to four thousandths of an inch of material on the inner face of the bow, the draw weight can be reduced by approximately one pound. Accordingly, it will be seen that to reduce the draw weight by ten pounds, a considerable amount of material must be sanded off. During the aforementioned sanding operation, the glass fibers are exposed, cut and chafed, and many failures have resulted in the solid type glass fiber bow from such sanding and adjusting operations. Accordingly, it will be seen that the molding of a solid type glass fiber bow to a predetermined tapering thickness is not desirable and is a distinct disadvantage. The aforementioned failures are caused by the fact that when the glass fibers or strands run lengthwise of the bow in an unidirectional manner and that any exposed cut or chafing reduces the strength of the bow which results from the normal high tensile strength of unidirectional glass fibers.

In a composite type laminated type glass fiber bow a tapered core which is usually made from wood is used and this core is a neutral core and does not perform any work. The core is usually backed and based by a strip of plastic reinforced with glass fiber and the bow is also provided with a wood handle riser. The correct parabola formed in a composite bow when it is drawn is predetermined by the tapered core and any adjustments thereof are again made by sanding on the inner face of the bow, that is, on the exposed face of the plastic strip which is reinforced with glass fiber. Also, any adjustments in the draw weights must be made on the exposed outer face of the backing strip. It will be seen that the sanding of the exposed inner and outer face of a composite glass

fiber bow again results in the exposing of the glass fibers and failures which result therefrom.

It is another object of the present invention to provide a method of making a plastic reinforced glass fiber bow from a plurality of preformed parts and wherein any desired tillered operations may be carried out on the inner faces of the parts before they are assembled whereby any exposed glass fibers are enclosed and not exposed when the bow is in use.

It is a further object of the present invention to provide a novel method of making a plastic reinforced glass fiber bow of either the straight limb type or re-curved limb type of bow.

Other objects, features and advantages of this invention will be apparent from the following detailed description and appended claim, reference being had to the accompanying drawing forming a part of the specification wherein like reference numberals designate corresponding parts of the several views.

In the drawings:

Fig. 1 is a side elevational view of a bow made in accordance with the principles of the invention and showing the bow strung;

Fig. 2 is an outer view of the structure illustrated in Fig. 1 taken in the direction of the arrow marked **2**;

Fig. 3 is a side elevational view of a tapered blank used in making the bow of the present invention and showing the blank formed with the predetermined curve which is opposed to the line of draw;

Fig. 4 is an outer view of the structure shown and illustrated in Fig. 3 taken in the direction of the arrow marked **4**;

Fig. 5 is a side elevational view of a preformed tapered face strip which is used to form each of the limbs of the bow;

Fig. 6 is an inner view of the structure illustrated in Fig. 5 taken in the direction of the arrow marked **6**;

Fig. 7 is a side elevational view of a separate wood handle riser which may be used in the invention;

Fig. 8 is an elevational sectional view of the structure illustrated in Fig. 1, taken along the line **8—8** thereof and looking in the direction of the arrows;

Fig. 9 is an elevational sectional view of the structure illustrated in Fig. 1 taken along the line **9—9** thereof and looking in the direction of the arrows;

Fig. 10 is a fragmentary, side elevational view of a modified bow made in accordance with the principles of the invention;

Fig. 11 is a fragmentary, side elevational view of another modified bow made in accordance with the principles of the invention;

Fig. 12 is a side elevational view of still another modified bow made in accordance with the principles of the invention; and,

Fig. 13 is a side elevational view of still a further modified bow made in accordance with the principles of the invention.

Referring now to the drawings, and in particular to Figs. 1 through 4, the numeral **10** generally represents what may be termed the bow blank which is one of the components of a bow made in accordance with the principles of the invention. Fig. 1 shows an illustrative bow in the assembled and strung condition. Fig. 3 shows the bow blank in the condition or shape which it receives from the mold. That is, the blank **10** is molded in a curved manner opposed or reversed to the line of drawing of an assembled and strung bow. As shown in Fig. 1, the ends of the blank **10** taper slightly outwardly in thickness from the points indicated by the numerals **11** and **12**. These points generally indicate the inner end of the limb portions or those portions which are bent in the

operation of the bow. As shown in Fig. 4, the blank **10** also tapers outwardly in cross section from the area of the points **11** and **12**.

The blank **10** is molded to the desired reverse curvature by any conventional process and is made from a suitable plastic material reinforced with glass fiber strands which are continuous and are disposed in a unidirectional manner and which extend lengthwise of the blank. The glass fiber strands are indicated in Figs. 8 and 9 by means of the small circles numbered **13**. Any suitable plastic materials may be used, as for example, a polyester or phenolic resin may be used. The blank **10** is preferably molded to produce a draw weight of approximately 70 pounds, and is then reduced by tillering to any desired weight other than 70 pounds, that is, by sanding and adjusting on the inner face **14** of the blank **10**. It is possible to remove some of the material whereby the draw weight is changed. For example, by removing approximately three to four thousandths of an inch of material, it is possible to reduce the draw weight by about one pound. The draw weight of the bow can be predetermined by sanding on the inner face **14** before this component is assembled to the other parts as hereinafter described. This is a distinct advantage over the prior art methods since the inner face which is sanded on the blank **10** will be enclosed by the other parts.

The bow of the present invention further includes the handle riser **15** which is illustrated in Figs. 1 and 8 and which is made from wood and which is bonded to the inner face of the blank **14** by any suitable means and method. It will be understood, of course, that the handle riser **15** may be made integrally with the blank **10** out of the same plastic reinforced glass fiber material which is used in making the blank **10**. As shown in Figs. 1 and 7, the handle riser **15** is provided with an indentation **16** for gripping purposes. The middle portion of the handle riser may be covered with a suitable material as leather or the like, as indicated by the numeral **17**. The handle riser **15** may also be provided with the arrow groove **18**. As shown in Fig. 4, the blank **10** is also provided with a relieved or notched portion **19** which meets with the notch **18**.

As shown in Figs. 1, 5 and 6, the bow is provided with a pair of face strips **20** and **21** which are made from a plastic reinforced glass fiber material, the same as the blank **10**. As shown in Fig. 5, the face strips may be molded with a predetermined curvature and taper whereby it tapers outwardly both in cross section and thickness. The tapered face strips are bonded to the inner face of the bow blank **10** by any suitable conventional means and method. The inner face **22** of the face strips may be sanded, and adjusted to provide the desired finished taper whereby when the parts are all assembled, the bow will have the desired parabola formed when the bow limbs are curved in operation. It will be seen that the surfaces **14** and **22** which are sanded on the blank **10** and limbs **20** and **21** are disposed against each other in the assembled condition as shown in Fig. 9 whereby these surfaces are protected from the weather. Also any open or exposed glass fibers are enclosed whereby failures because of exposed or chafed glass fibers are eliminated. It will be seen that the fibers on the outer surface **23** of the curved blank are under tension when the bow is used and that these fibers are not chafed or exposed in any way by any sanding operation. The bow of the present invention thus overcomes the aforementioned disadvantages of the solid and composite glass fiber bows. In Fig. 1, the numeral **24** indicates the bow string.

Fig. 10 merely shows a fragmentary view of a modified bow made in accordance with the principles of the invention and the parts which are similar to the bow shown in Fig. 1 are marked with corresponding reference numbers followed by the small letter "*a*." The bow of Fig. 10 illustrates that it is possible to provide a bow having the proper and desired draw weight and parabola form when used, by making the face strip **20***a* constant in thickness and the blank **10***a* tapering outwardly in thickness.

Fig. 11 illustrates a further modification of the invention in which the bow is provided with a preformed blank **10***b* which is constant in thickness and in which the face strip **20***b* tapers outwardly in thickness. The parts of this bow which are similar to the first embodiment of Fig. 1 are marked with corresponding reference numerals followed by the small letter "*b*."

Fig. 12 is still another modification of the invention and the parts of this bow which are similar to the bow of Fig. 1 are marked with similar reference numerals followed by the small letter "*c*." In this embodiment the handle riser **15***c* is shown as being made integral or molded with the bow blank **10***c* and from the same plastic reinforced glass fiber material as used for the bow blank **10***c*.

Fig. 13 is illustrative of the fact that the invention may be practiced also in the making of bows of the re-curve type. That is, bows which have reverse curves formed on the outer ends of the limbs. The parts of this bow which are similar to the parts of the bow of Fig. 1 are marked with similar reference numerals followed by the small letter "*d*."

Experience has shown that the bow of the present invention is light in weight, compact and efficient in use. In the composition of the resin or plastic and glass fiber used for making the blanks it is preferable to maintain a constant ratio of approximately 25% resin to 75% glass fiber.

While it will be apparent that the preferred embodiments of the invention herein disclosed are well calculated to fulfill the objects above stated, it will be appreciated that the invention is susceptible to modification, variation and change without departing from the proper scope or fair meaning of the subjoined claim.

What I claim is:

The method of making an archery bow, comprising the steps of, molding a bow blank from a plastic, glass fiber reinforced material; molding a limb face strip for each of the bow limbs from a plastic, glass fiber reinforced material; forming a handle riser; tillering the inner surfaces of the blank and face strip; and, bonding the blank, face strip and handle riser together to form a unitary bow structure.

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