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2,815,015

ARCHERY BOW

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Fig. 1.

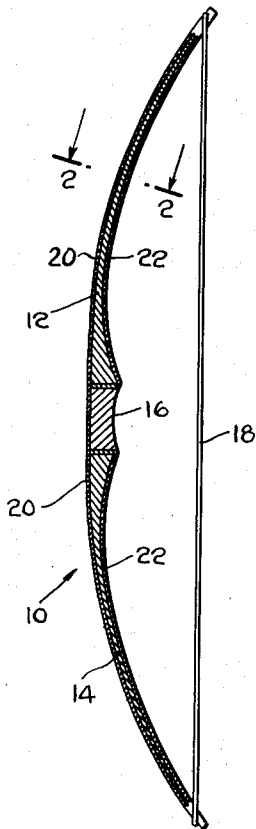


Fig. 2.

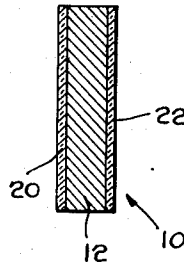
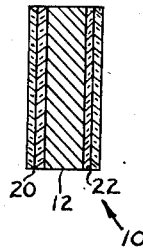


Fig. 3.



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2,815,015

ARCHERY BOW

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5 Claims. (Cl. 124—23)

My invention relates to novel improved archery bows of laminated construction to increase their strength and quality.

Heretofore it was the custom to construct archery bows of solid pieces of natural wood such as maple, yew or osage, or other suitable woods of bow quality. In the evolution of archery bows, bowyers realized that the forces acting on the belly or facing of the bow, were different from those acting on the outside or backing.

It soon became apparent that if the bow were laminated on its facing and/or on its backing with woods or other materials of different properties, the quality of the bow could be improved. Efforts exerted in this direction are evidenced by the Bear Patents 2,613,660 and 2,665,678 wherein a lamination is applied to the belly side of each of the respective bows.

My bow, like the Bear bows, is also constructed of laminations of different materials, but the materials in my bow are resistant to even greater tensile and compressive stresses than have heretofore been known and applied to archery bows.

It is the desideratum of my invention to provide an archery bow that is more durable, more efficient, and more serviceable than bows constructed in accordance with the prior arts.

Accordingly, it is an object of my invention to provide an archery bow that will have a greatly increased casting power per unit weight than prior art bows, a bow that will withstand greater compressive and tensile stresses than those known heretofore, thereby materially reducing the development of hysteresis effects, and enabling the construction of a bow that is shorter in length, but one that will have the same beneficial qualities of bows that must, of necessity, be made substantially longer in length.

Features of the invention that enable accomplishment of these beneficial objects and purposes over the prior art archery bows reside in the construction of a bow having at least a novel lamination of glass fibres impregnated with an epoxy resin. In actual tests this novel lamination has shown an ability to withstand pressures upward of 100,000 pounds per square inch.

Other and further objects of my invention reside in the structures and arrangements hereinafter more fully described with reference to the accompanying drawings in which:

Fig. 1 is a longitudinal section through an archery bow constructed in accordance with the teaching of my invention.

Fig. 2 is a cross section of Fig. 1 taken on line 2—2.

Fig. 3 is a cross section of a modification showing stacked laminations.

In the drawings, 10 identifies an archery bow having a pair of flexible limbs 12 and 14. The limbs 12 and 14 are oppositely disposed and taper away from an integral interconnecting widened hand grip 16 located substantially centrally of the bow 10.

Each of the limbs 12 and 14 may be of a bow mate-

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rial, for example, yew, maple, osage, hickory, or any other suitable bow material. They taper and curve longitudinally outwardly and away from the hand grip 16, and are joined together at their ends by an arrow-casting bow-string 18.

In the figures of the drawings there is shown a lamination 20 secured to the back side of the bow 10 to provide an integral backing therefor. The lamination 20 extends for the effective working length of the bow 10, and although in practice it is formed of two like strips generally joined at approximately the longitudinal center of the length of the bow, this is because of the inability of presently known methods that will enable a single lamination to be secured to the full length of the backing of the bow. However, for purposes of description let it suffice to note that the two-piece lamination 20 does not detract from the invention and therefore it is aptly termed "a lamination."

Secured also to the belly or facing of each of the limbs 12 and 14 of the bow to form an integral part thereof, are laminations 22. The facing laminations 22 are of the same construction as the previously mentioned laminations 20.

The similar laminations 20 and 22 comprise glass fibres of either parallel or cross-weave construction impregnated under pressure with an epoxy or epon resin that permits flexible movement of the fibres. The epoxy resins, although well known, are polymers or condensation products of either bisphenol and epichlorohydrin or glycerol and epichlorohydrin. It has been found that the epon adheres to the glass fibres stronger than prior used resins. The epon therefore effectively coats the fibres and provides an insulator and absorber between adjacent fibres to prevent them from rubbing together.

The resulting flexible laminations 20 and 22 made of this construction are materially stronger and have an unusually higher modulus of elasticity than those employing either a phenol-formaldehyde or a polyester resin. Moreover, when the novel laminations 20 and 22 are secured to both the belly and the backing of the bow, there results a construction that is more resistant to the compressive stresses placed on the belly or facing, and to the tensile stresses placed on the backing when the bow is bent preparatory to casting an arrow.

In addition to its ability to resist higher stresses than bows of a different construction, my bow 10, having a lamination 20 and/or 22 of glass fibres impregnated with an epoxy resin, will be easier to manufacture. When a resinous lamination is employed it is generally the practice to secure the same to the limbs of the bow by the use of an adhesive or a glue, preferably a well known urac glue. When a urac glue has been so used in connection with a resinous lamination, it also has been necessary to apply an additive to the lamination to aid in curing the glue, otherwise the gluing process is long, cumbersome and expensive.

To those who are familiar with the art it is recognized that additives, after a period of time, break down the resin to which they are applied. If the resin is used to impregnate any fibrous material, the additive also weakens the fibre structure of such impregnated material by slowly eroding the same. This process of erosion usually is not perceptible until a period of use has transpired, after which hysteresis develops rapidly to render the bow substantially worthless.

An archery bow 10 constructed in accordance with the teaching of my invention requires no additives to cure the glue employed to secure the laminations to the limbs and to make them an integral part of the bow. In my bow construction the epon which impregnates the glass fibres of the laminations 20 and 22 needs no additive to

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be used with a laminating glue, and particularly none with a urac glue. It takes readily to urac glue and also to many other adhesives to result in a durable bond to woods employed in the manufacture of bows. As a consequence, the possibility of erosion is entirely eliminated. Hysteresis effects are materially delayed, and will result only from unusually high stresses applied to the bow over unusually prolonged periods of use. Accordingly, manufacture of the bow 10 is far easier, far cheaper, and much simpler and faster, than prior art bows. Quite obviously, in the absence of eroding additives, hysteresis will develop only as a result of use, and not as a result of chemical reactions.

In practice, the bow 10 is constructed as shown in the drawing, and includes a lamination 20 on the backing and laminations 22 on the facing of the limbs 12 and 14 with the laminations 20 and 22 comprising a glass fibre material impregnated under pressure with an epoxy resin. This construction results in the provision of a bow of unusually great strength and resistance to breakage.

It has been found that the novel lamination 20 or 22 comprising glass fibres impregnated with an epon may be applied to the bow 10 to form either just the backing side thereof or just the facing thereof, the exact location of the lamination 20 or 22 depending upon the use of the archery bow. Because my lamination 20 or 22 is so unusually strong, it may be made integral with the bow to form just a single side thereof and still result in a bow construction that is stronger and of better quality than prior art archery bows.

The laminations 20 and 22 have been described as comprising glass fibres impregnated under pressure with an epon. It has been found that the laminations 20 and 22 may include a single layer of glass fibres (Fig. 2) that is impregnated under pressure with an epoxy resin. However, depending upon the use of the bow 10, the laminations 20 and 22 may comprise a plurality of layers of glass fibres, see Fig. 3, each of which is impregnated under pressure with an epon. Each additional layer of glass fibres materially increases the strength of the lamination as a whole, and therefore when just one side of the

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bow is constructed with this multiple-layer lamination, the strength of the bow is materially increased.

While there have been shown and described and pointed out the fundamental novel features of the invention as applied to a preferred embodiment thereof, it will be understood that various omissions and substitutions and changes in the form and details of the device illustrated and in its operation may be made by those skilled in the art, without departing from the spirit of the invention. It is the intention, therefore, to be limited only as indicated by the scope of the claims appended hereto.

I claim:

1. An archery bow having at least two coextensive wooden limbs each having a face and a back, a lamination of glass fibres impregnated with an epon resin adapted to be secured directly to said limbs, said impregnating epon resin serving to insulate adjacent ones of said glass fibres from each other, and a fast curing glue cooperating with said impregnating epon resin to secure said lamination directly to the wooden limbs without the aid of curing additives.

2. An archery bow as in claim 1, said fast curing glue being of the urac type.

3. An archery bow as in claim 2, said laminations being secured to the face of each of said limbs.

4. An archery bow as in claim 2, said laminations being secured to the back of each of said limbs.

5. An archery bow as in claim 2, said laminations being secured to the face and back of each of said limbs.

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