Oct. 14, 1952 F. B. BEAR 2,613,660

GLASS FIBER-REINFORCED ARCHERY BOW

Filed Feb. 15, 1946

FIG.1.

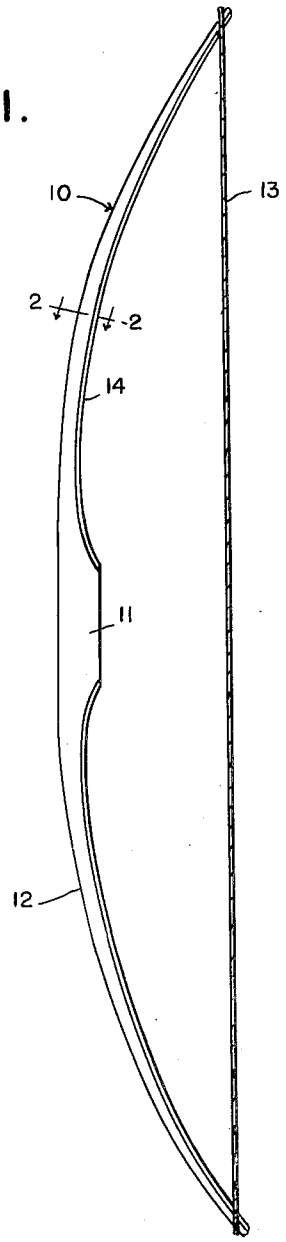
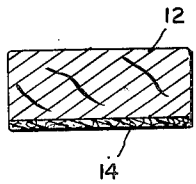


FIG.2.



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GLASS FIBER-REINFORCED ARCHERY BOW

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7 Claims. (Cl. 124—23)

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The invention relates to archery bows and has for its principal object the production of an archery bow of a composite material which greatly improves its quality.

In the present state of the art it is usual to construct archery bows of solid pieces or laminae of natural wood such as hickory, lemon wood, yew and Osage wood. It has been proposed to add certain other materials to the back of the bow such, for example, as bamboo, sinew, rawhide, horn, steel, silk, etc. It is also known that due to inherent weakness of wood in compression, a bow loses its efficiency, that is, takes a permanent set and develops hysteresis due to the breakdown of the wood on the belly side or string side of the bow, and it has also been proposed to add to the belly side of a wood bow a pre-stressed plastic. However, it has been found that a pre-stressed plastic is not practical because it loses its initial stress and soon weakens to a point where it no longer functions as intended.

I have discovered that by adding a layer of flexible fibrous glass to the belly side of a wood bow, I can obtain a bow which does not take a permanent set, is very resistant to breakage and has at least 30% more efficiency than an ordinary wood bow.

I believe that the improved properties resulting from my invention are due to the fact that the plastic glass, which has the highest compression qualities, serves to anchor the compression stress at the extreme outer side of the belly, and shifts the neutral axis to the extreme outer side of the belly, thus permitting the wood of the bow to be placed entirely under tension instead of partly under compression.

By constructing a bow in accordance with the present invention, the cast of the bow is increased because the energy is derived almost entirely from the tensile stress of the wood portion of the bow. Since the cast of a bow has a definite relation to the weight of the material in the bow, the use of flexible glass is particularly advantageous because, due to high compression qualities, a very thin layer will suffice to transfer the neutral axis and add efficiency to the cast, while adding very little, if any, weight to the bow.

Flexible glass applied to the belly side of an archery bow improves the characteristics of the bow because it is light in weight, has a high modulus of elasticity, and exhibits little hysteresis, that is, the lag, slowness or failure to return to the original shape after removal of the distorting force, especially after continued use. A composite

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bow of wood and flexible glass when made according to my invention is more efficient, durable and serviceable than bows constructed according to the teachings of the prior art.

In the drawing:

Figure 1 is a longitudinal section through an archery bow embodying the invention; and

Figure 2 is a cross section on the line 2—2 of Figure 1.

Referring to the drawings, 10 represents the bow having a central hand grip 11 and tapered flexible limbs 12, connected together by the string 13. The bow is constructed of a suitable wood or other material, preferably of yew, hickory or other wood. Extending along the belly side only of the bow is a thin layer 14 of flexible fibrous glass.

In practicing my invention, the flexible fibrous glass may be adhesively secured to the bow by means of any adhesive suitable for joining glass fibers and wood. The flexible glass layer may also be constructed in various ways. One form suitable for an archery bow is glass cloth, made by weaving textile materials having glass fibers as their essential constituent. Such glass cloth is often treated with organic or inorganic materials and also formed into laminates by impregnating with suitable resins. My invention also contemplates a material which may be a plastic reinforced with glass fibers sufficiently to impart to the final product the important characteristics of the glass fibers such as high strength, high modulus of elasticity. The fibrous, flexible, glass compositions themselves are not the subject of this invention and are commercially available, but I believe that I am the first to construct an archery bow having a flexible glass layer adhesively secured thereto thereby obtaining the improved characteristics hereinbefore set forth.

What I claim as my invention is:

1. An archery bow having an elongated body and a layer adhesively secured to the belly side of said body comprising flexible glass extending for a substantial portion of the length of said bow.

2. An archery bow having an elongated body of wood and a layer adhesively secured to the belly side of said body comprising fibrous glass extending for a substantial portion of the length of said bow.

3. An archery bow having an elongated body of wood and a layer of material composed of multiple glass fibers adhesively secured to the belly side of said body and extending for a substantial portion of the length of said bow.

4. A wood archery bow having adhesively secured to its belly side a thin layer of flexible glass fiber material extending for a substantial portion of the length of said bow.

5. An archery bow having secured to the belly side thereof for a substantial portion of its length a layer of material containing a high proportion of glass fibers impregnated with a plastic resin.

6. An archery bow of wood having adhesively secured to its belly side for substantially the entire length thereof a thin layer of flexible glass material, said material having high compression qualities thereby permitting the wood of the bow to be subjected substantially entirely to tension stresses during its use for casting an arrow.

7. An archery bow of wood having adhesively secured to its belly side for substantially the entire length thereof a thin layer of glass fiber material, said glass fiber material having a high modulus of elasticity and having compression characteristics greatly in excess of the compression characteristics of wood thereby permitting the wood of the bow to be subjected substantially entirely to tension stresses during the use of the bow for casting an arrow.

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