J. W. SUTTON.
Archery-Bows.

No. 218,199. Patented Aug. 5, 1879.

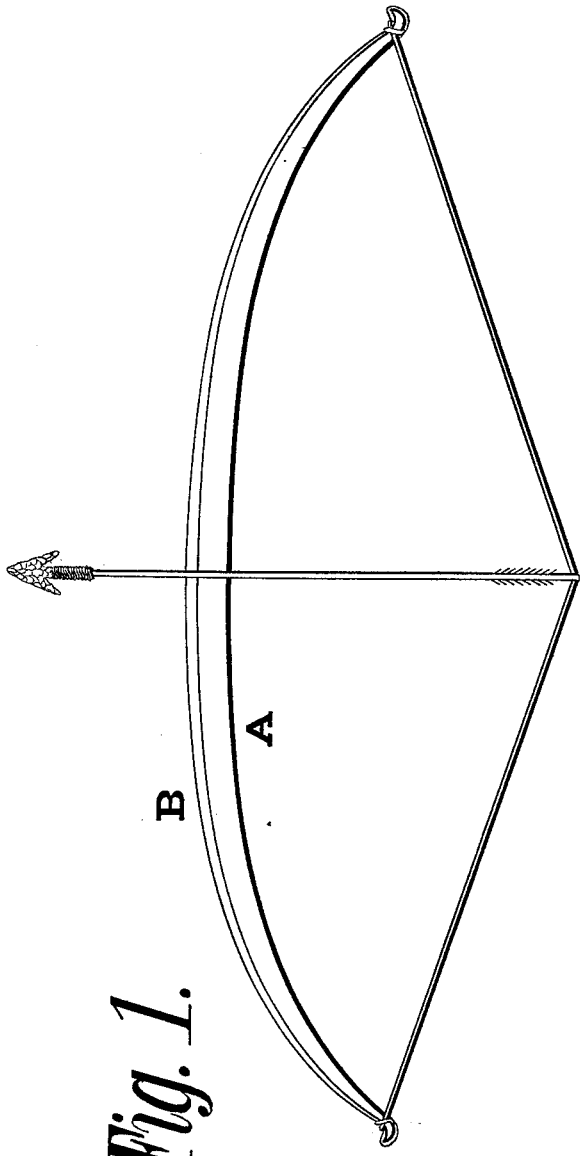

Fig. 1.

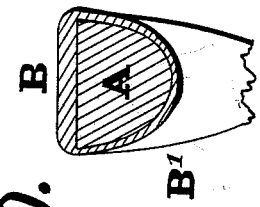

Fig. 3.

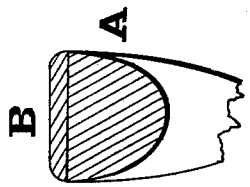

Fig. 2.

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JOHN W. SUTTON, OF NEW YORK, N. Y.

IMPROVEMENT IN ARCHERY-BOWS.

Specification forming part of Letters Patent No. **218,199**, dated August 5, 1879; application filed April 18, 1879.

To all whom it may concern:

Be it known that I, JOHN W. SUTTON, of the city, county, and State of New York, have invented a new and useful Improvement in Archery-Bows; and I do declare the following to be a correct description thereof, reference being had to the accompanying drawings, making a part of this specification.

The object of my invention is to make an archery-bow which will be more elastic, less liable to break, and will shoot harder than any bow of equal length and weight heretofore used.

My invention consists in covering the back of an archery-bow with raw or untanned hide or skin, glued, cemented, or otherwise permanently secured thereto, said rawhide or skin being put on in one piece, under tension and pressure.

Figure 1 represents my improved bow, Fig. 2 being a cross-section of same. Fig. 3 is a cross-section of the bow, representing said bow as being entirely covered with rawhide or skin.

Like letters designate corresponding parts in the figures.

In the several figures, A represents a bow, made of any suitable material; B, the rawhide back, and B′ a rawhide covering enveloping the bow.

In order to back a bow with rawhide, I proceed in the following manner: I take a skin which is prepared in the usual way, and cut it into strips of a desired width and at right angles to the back, thus causing the thinnest parts of the hide to be at the ends of the strips, while the thick part is in the middle of said strips. These strips are now thoroughly soaked in water, and then stretched to their full extent. A form of wood is provided, which should be within two or three inches of the length of the bow to be covered, and with a semicircular or other desired curve of from two to four inches, as may be desired, for determining the backward bend of said bow. If the back of the bow is flat, then the curved form must be made flat across its upper surface; but if the back of the bow is convex, then the form must be made concave its entire length, in order to receive the convex surface.

The stretched strip, while wet, is placed with the grain side to the form, again stretched, and properly fastened thereto. Its upper side is now glued, and the bow carefully laid thereon and pressed down firmly to the curved form by clamp-screws or other means, where it is allowed to remain until the glue and rawhide become thoroughly dried. After the screws or pressure are removed and the bow taken from the form, it will be found that the bow will retain the backward-curved shape by virtue of the shrinking tension or contractile force of the rawhide. Thus, when the ends of the bow are bent forward by the string, it has the tension of the backward bend on a constantly-increasing longitudinal contracting force of the rawhide. I find, however, by practical experiments that this tension or contractile force depends almost entirely upon the degree of stretch which the rawhide is subjected to while in a wet or soaked state or condition. If the prepared rawhide is applied in its natural state, or without stretching, and glued to the back of a backward-curved bow, said bow will, when relieved of its pressure, assume its normal condition, or very nearly so. Consequently, no benefit would be derived from rawhide when applied in such a manner, and, also, if the rawhide is applied without previous stretching to a straight bow or one with a forward curve, it will render the bow useless, for the reason that there is no tension or contractile force, and, consequently, not a sufficient degree of elasticity to make the bow of service; and, still further, it retards the normal action of the natural elasticity of the material to which it is applied, rendering it useless. Consequently, it will be observed that the value of my improvement in archery-bows consists in the contractile force of the rawhide; and it will also be observed that this force depends entirely upon my improvement in the method or system, process, and means of treating and applying rawhide to archery-bows.

The process of said system consists in cutting the rawhide into requisite strips, and then soaking said strips to saturation, which will cause them to expand to nearly three times their normal thickness.

I have adopted the plan of soaking them in various-colored dyes, which imparts to them

brilliant colors, and when secured to the bow in proper contrast the effect is highly ornamental. They are now taken and stretched longitudinally, and secured, while in the extended condition, to the form, and then treated with glue or other cement, after which the bow is placed thereon and brought to its backward-curved position by pressure, and allowed to remain until the bow, glue, and hide have become thoroughly dried, after which the pressure is removed and the bow trimmed of the surplus rawhide, which will project beyond the surface to which it is glued. The ends of the bow which project beyond the form are covered by turning the ends of the strips, which are left longer than the bow, over and fitting them to the necks to which the bow-string is attached; or the covered ends may be covered by the usual tips.

I claim the following advantages over all other bows heretofore known: By virtue of the contractile force existing in the rawhide when on a bow and while under tension, or while bent in the act of shooting, said bow will shoot with a greater penetrative force than it would were it not backed with said rawhide according to my system, as above described. Said backed bow is less liable to break than the ordinary bow; and, also, the bow cannot check or split while the bow is backed with one entire piece.

My rawhide-backed bow is much lighter than an ordinary bow when their powers are equal.

I am aware that archery-bows have been backed with wood, and that before applying said wood backing the bow was bent backward. The backing is then covered with glue or otherwise, and held in its backward-curved position until said glue becomes dried. To this method and means of backing I lay no claim; but I am aware that a bow when backed with wood cannot be an equivalent to a bow backed with rawhide when applied as set forth in the foregoing specification. But if the wood were susceptible of being stretched longitudinally without pulling asunder, and then applied to the bow-back and still retain a tendency to contract to its normal condition, then, and not till then, could it be considered an equivalent to my invention.

The gist of my invention is in expanding the rawhide by moisture, and then stretching it to a requisite amount, and then applying it while so stretched and wet to the back of a bow, where it is confined by pressure until it becomes thoroughly dry, thereby obtaining and retaining a constant contractile force which cannot be obtained in any wood that I am cognizant of.

I am also aware that bows have been backed by the Indians with sinews taken from the legs of buffalo and deer. These sinews are stripped into small or narrow strips, and then laid onto the back of the bow without any previous backward bending. Said strips are laid and glued on one at a time, and also without any previous stretching. The sinews are in some cases hammered out quite flat. Said operation cracks and breaks the surface, and when glued to the bow and rubbed down it presents the appearance of being broken and cracked, as I have myself witnessed. With sinews applied in the manner described there can be no contractile force derived from said sinews, such as is due to my system of preparing and applying rawhide. I lay no claim to a bow backed with sinews; but

What I do claim, and desire to secure by Letters Patent, is—

1. In combination with an archery-bow, a rawhide backing, constructed and applied substantially as described, whereby the contractile force of said rawhide is obtained, substantially as described.

2. In combination with a backward-bent archery-bow, a rawhide backing, said rawhide being previously wet and stretched, and then glued and applied to the back of said bow while in the above-described condition, substantially as described, and for the purpose set forth.

3. In combination with an archery-bow, a backing composed of a single strip of rawhide, prepared and applied under tension while in a wet and expanded condition, in the manner and for the purpose set forth.

4. As a new article of manufacture, the herein-described rawhide-backed archery-bow, constructed as described, and for the purpose set forth.

JOHN W. SUTTON.

Witnesses:
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