Nov. 6, 1956 C. L. LAYER 2,769,439

BOW STRING

Filed April 28, 1954

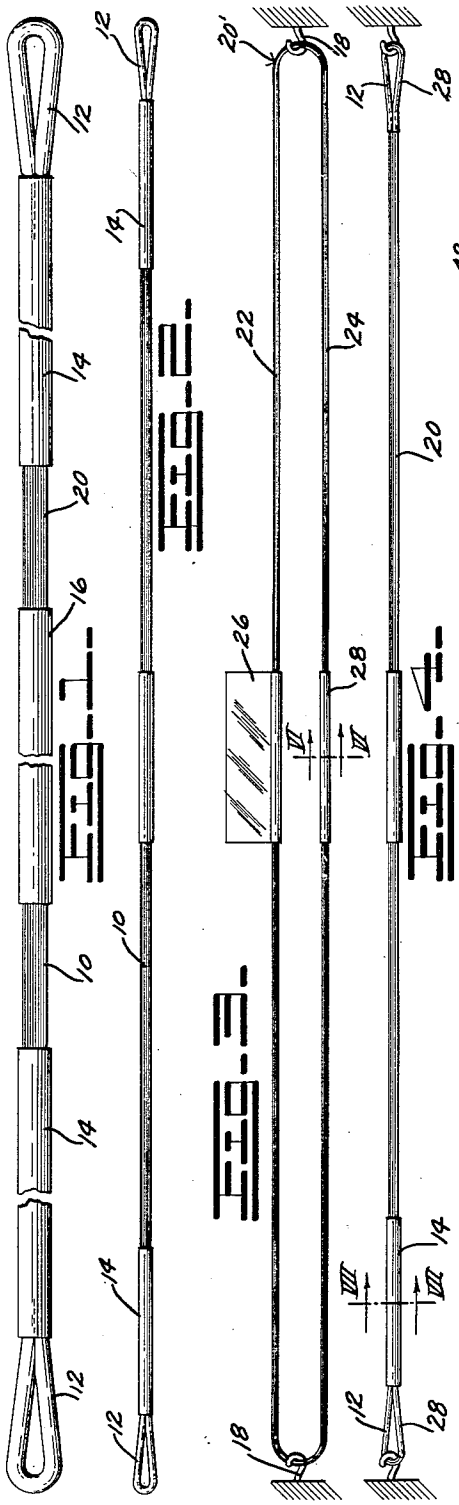

Fig. 1

Fig. 2

Fig. 3

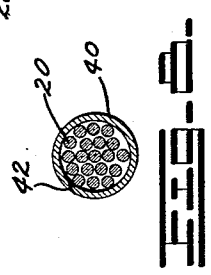

Fig. 4

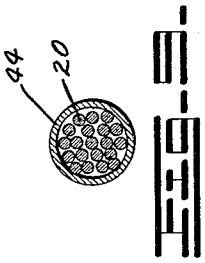

Fig. 5

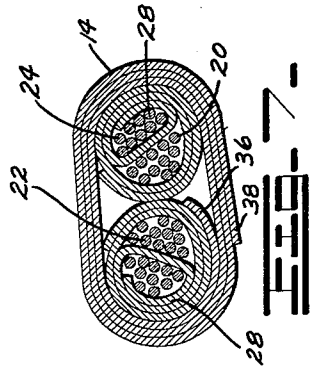

Fig. 7

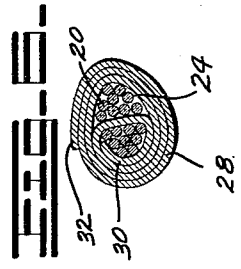

Fig. 6

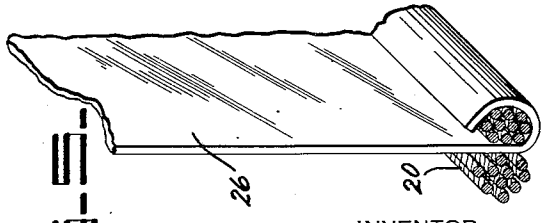

Fig. 8

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BOW STRING

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4 Claims. (Cl. 124—30)

The present invention relates to improvements in bow strings, being particularly concerned with endless strand bow strings and the reinforcement of the strand against abrasion and unequal stresses.

It has been the practice in the past to reinforce the end loops and service portions of the bow string by spirally winding a reinforcing strand upon the bundle of strand sections making up the bow string. This practice has certain disadvantages among them being the tendency for the reinforcing strand to be displaced to expose the endless strand of the bow string. Also, where reinforcement is provided by a spirally wound strand, the individual strand sections of the endless strand may not be able to adjust themselves to equally distribute the stresses upon the bow string to each individual strand section, with the result that certain strand sections may be over stressed and ruptured and progressive breakdown of the bow string will result.

It is the object of the invention to provide an improved endless strand type of bow string in which the reinforcement of the endless strand is provided by flexible material forming a tube within which the endless strand is protected from abrasion and has freedom of adjustment to equalize the stresses upon the individual strand sections. In one form, this tube is provided by wrapping a relatively wide band of thin sheet material upon itself. Another form of the invention contemplates a tube of a single ply of material either pre-formed or formed on the bow string at the time of assembly. A third form proposes to form the tube by coating or dipping the bow string in a suitable plastic followed by curing.

In the drawings,

Fig. 1 is an enlarged side elevational view, shown broken, of a bow string embodying the present invention,

Fig. 2 is a view similar to Fig. 1 of the entire bow string upon a smaller scale,

Fig. 3 is a diagrammatic elevational view showing the the method of manufacture,

Fig. 4 is a side view similar to Fig. 3 of a later stage of manufacture,

Fig. 5 is a fragmentary perspective view showing the manner in which the end of the sheet material is applied,

Fig. 6 is a cross-sectional view taken on section line VI—VI of Fig. 3,

Fig. 7 is a view similar to Fig. 6 taken on section line VII—VII of Fig. 4, and

Figs. 8 and 9 are views similar to Fig. 6 of modified forms of the invention.

Referring to Figs. 1 and 2, the finished bow string **10** is shown having tubular encased end loops **12** formed from unbundled portions of the endless strand, tubular reinforcements overlapping portions of the end loops **12** and encasing portions of the bundled endless strand adjacent the end loops **12** and a tubular encased service portion **16** which reacts against the end of the arrow.

The method of making my improved bow string comprises the steps of coiling a single strand of suitable material back and forth between the hooks **18** a plurality of

times and then connecting the ends of the strand as indicated by the knot **20'** to provide an endless strand having individual strand sections **20** collectively forming multistrand unbundled portions **22** and **24**.

In Fig. 3, a relatively wide sheet **26** of extremely thin material is shown in the process of being coiled upon itself over the strand portion **22** to form a tube of reinforcement. The completed tube **28** is shown in Fig. 6 with the inner end of the sheet **26** being at **30** and the outer end at **32**. In practice, the end **30** is preferably started between the individual strand sections and then coiled upon the strand group of the portion **22** with the end **32** being heat sealed, or otherwise secured, in position to the outermost ply of the tube **28** upon which it is disposed.

Upon completion of the tube fabricated as shown in Fig. 3, the partially formed bow string is shifted upon the hooks **18** to dispose the tubes **28** at the ends of the bow string to form the reinforced end loops **12**, as shown in Fig. 4. At the right end of Fig. 4, the looped tube **28** is shown before the tubular reinforcement **14** on the left end has been applied.

In Fig. 7 the tubular reinforcement **14** is shown in section with the juxtaposed ends of the tube **28** being shown wrapped together with a sheet of material preferably corresponding to the sheet **26**, one end of the sheet being at **36** and the other and outer end being at **38** and heat sealed, or otherwise attached to the outer ply of the resulting tubular reinforcement in the manner of the end **32**.

To complete the fabrication of the bow string **10**, all the strand elements **20** are bundled and wrapped together as a single group of strands to form the servicing portion **16** by coiling the thin sheet, preferably corresponding to the sheet **26**, to form a reinforcing tubular construction upon that portion of the bow string with which the arrows engage. In cross-section the portion **16** will appear as shown in Fig. 6 with the exception that twice the number of strand elements **20** will be disposed within the coiled sheet material.

In practice, the same sheet material is preferably used to provide the tubular reinforcements **14**, **16** and **28**. The strand elements **20** are free to adjust themselves withing these tubular reinforcements so that the stresses placed upon the bow string **10** are equally distributed between the strand elements **20**. Each tubular reinforcement is formed by wrapping a sheet of material, from 3" to 6" in width and in the order of .003" thick, around the gathered strand elements **20** from eight to ten times. The sheet material should be pliable and resistant to abrasion. It may be of numerous compositions. Polyethylene is suitable and has the desired property of head sealing. Polyvinyl chloride is another of the thermoplastics of the vinyl resins group of which many may be employed to form the sheet material **26**.

As shown in Fig. 8, in lieu of a tubular reinforcement made up from many plies of material, a single ply encasement **40** is shown as a sleeve longitudinally split at **42** and heat sealed, or otherwise cemented, to form a solid tube having a substantially greater thickness than the sheet **26** but which may be of similar composition and function. In Fig. 9, the reinforcing tubular structure **44** is applied to the strand elements **20** as a plastic coating and then cured into an encasing sleeve corresponding to the structure **14**, **16** and **28** of the form of the invention of Figs. 1 and 7, inclusive. The plastic employed would be selected and so applied as to avoid binding with the strand elements **20** as this would restrict their individual action and their ability to equalize the stresses.

Having thus described my invention what I claim is new and desire to protect by Letters Patent is:

1. An archery bow string having a multistrand endless string body with a portion of the body subjected to abra-

sion in use and having a reinforcing tubular structure encasing the same without interference with the relative longitudinal movement of the strands to equally distribute stresses to which the bow string is subjected in use.

2. An archery bow string as defined in claim 1 wherein said tubular structure is in the form of thin sheet material of substantial width wrapped upon itself to form a multiply tube.

3. An archery bow string as defined in claim 1 wherein said tubular structure is in the form of a thin sheet material of substantial width wrapped upon itself to form a multiply tube, the composition of said sheet material being a thermoplastic having heat sealing characteristics.

4. An archery bow string having an endless string body, the body being divided at the ends of the bow

string to form loops, elongated tubular reinforcements encasing said loops as well as the undivided string body adjacent said loops and in the area of the servicing portion of said bow string, the string portions making up said body having individual longitudinal movement within said reinforcement to equalize the stresses.

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