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(54) **Bowstring.**

(57) Bowstring comprising filaments having a tensile strength ≥ 2 GPa and a modulus ≥ 20 GPa on the basis of linear polyethylene having an M_w of ≥ 4×10^5 kg/Kmol.
Preferably the filaments are obtained by thermoreversible gelation of a polyethylene solution followed by stretching.

The bowstring obtained shows very low elongation, a high arrow velocity and an extremely long life.

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BOWSTRING

The invention relates to a bowstring made wholly or mainly of synthetic filaments, whether or not bundled into threads.

Synthetic bowstrings are known and are often applied in archery. Examples are bowstrings on the basis of polyesters, such as a polyethylene terephthalate marketed by Du Pont under the name Dacron, and bowstrings on the basis of aromatic polyamides, such as an aramide product marketed by Du Pont under the name Kevlar.

It has been found that bowstrings from Dacron have a long life, but exhibit the disadvantages of a high elongation and low arrow velocity. Bowstrings from Kevlar, on the contrary, are found to break rather quickly, for instance after 1000-1500 shots, while, on the other hand, the elongation still is substantial and the arrow velocity not yet really high.

The present invention provides a bowstring that, on the one hand, exhibits an extremely low elongation and a very high arrow velocity, while on the other hand, it has an extraordinarily long life.

The invention therefore relates to a bowstring comprising a number of synthetic filaments, whether or not bundled into threads, that is characterized in that use is made of filaments having a tensile strength of at least 2 GPa and a modulus of at least 20 GPa on the basis of polyethylene having a weight-average molecular weight of at least 4×10^5 kg/Kmol.

In the present invention use can be made in particular of filaments obtained by converting a solution of linear polyethylene having a weight-average molecular weight of at least 4×10^5 kg/Kmol by thermoreversible gelation into a homogeneous polyethylene gel of virtually the same composition as the solution started from, and stretching this gel at a stretch ratio of at least 10.

The preparation of such filaments is disclosed in, for instance, US-A-4,344,908; US-A-4,422,993; US-A-4,430,383; US-A-4,411,854 and US-A-4,436,689.

In the present invention a number of filaments is often bundled into threads, upon which a number of threads is wound into a string, for instance on a string board. The number of threads for the string is determined by the desired drawing force of the bow and generally amounts to 8-20, the number of filaments used generally being 1000-3000, depending on filament thickness. The length of the string is determined by the bow length and is generally chosen to be 5-10 cm smaller than the bow length.

The string is in the usual way provided with servings and a middle serving, for instance on a string board, and is often treated with a wax, such as beeswax, to keep the threads together.

Example

A bowstring on the basis of polyethylene filaments according to the invention was tested on a longbow during some months. After more than 5000 shots the string exhibited no deterioration in strength or increase in elongation, while the original, very high arrow velocity was fully retained.

Claims

1. Bowstring comprising a number of synthetic filaments, whether or not bundled into threads, characterized in that use is made of filaments having a tensile strength of at least 2 GPa and a modulus of at least 20 GPa on the basis of polyethylene having a weight-average molecular weight of at least 4×10^5 kg/Kmol.

2. Bowstring according to claim 1, characterized in that use is made of polyethylene filaments obtained by converting a solution of a linear polyethylene having a weight-average molecular weight of at least 4×10^5 kg/Kmol by thermoreversible gelation into a homogeneous polyethylene gel of virtually the same composition as the solution started from and stretching this gel at a stretch ratio of at least 10.

3. Bowstring substantially as described.

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EUROPEAN SEARCH REPORT

Application number

EP 86 20 2166

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
X	25. INTERNATIONALE CHEMIEFASERTAGUNG, Dornbirn, 24th-26th September 1986, pages 1-35, AT; R, KIRSCHBAUM et al.: "High strength/high modulus polyethylene fibers" * Page 5, last paragraph; figure 26 *	1-3	D 01 F 6/04 F 41 B 5/00
D,Y	GB-A-2 051 667 (STAMICARBON) * Claims *	1	
D,Y	EP-A-0 055 001 (STAMICARBON) * Claims *	1	
D,Y	EP-A-0 077 590 (STAMICARBON) * Claims *	1	
E,X	NL-A-8 501 775 (STAMICARBON)	1-3	TECHNICAL FIELDS SEARCHED (Int. Cl.4) D 01 F F 41 B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	05-08-1987	VAN GOETHEM G.A.J.M.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
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E : earlier patent document, but published on, or after the filing date
D : document cited in the application
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