March 6, 1956 G. H. POIRIER ET AL 2,737,075

CORD STRUCTURE

Filed Sept. 5, 1952

Fig. 1

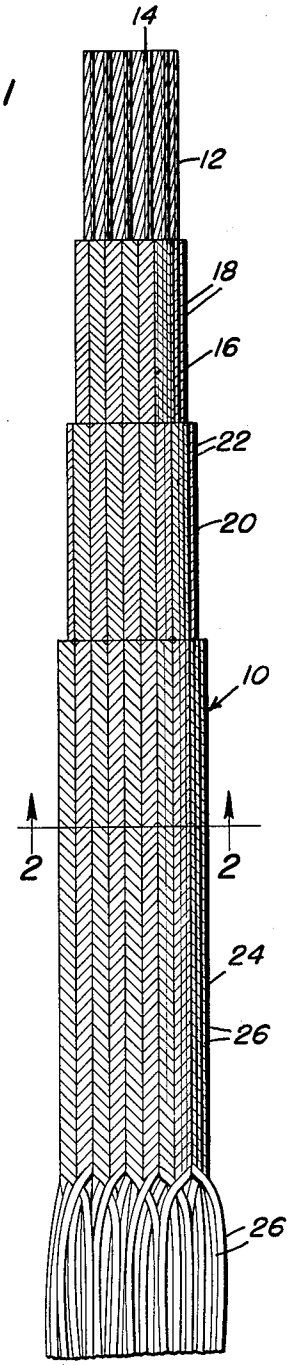


Fig. 2

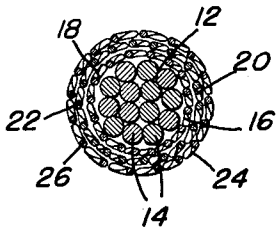
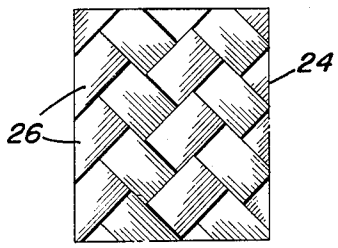


Fig. 3



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CORD STRUCTURE

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2 Claims. (Cl. 87—6)

This invention relates in general to cord structures, and more specifically to cords which include braided casings.

The primary object of this invention is to provide an improved cord structure which is formed of a core and a plurality of casings, said core and casings having equal elongations whereby the same break simultaneously to produce a cord having a maximum strength.

Another object of this invention is to provide an improved cord structure which includes a core having surrounded the same a plurality of casings, said casings being normally independent of said core whereby a maximum of flexibility is obtained.

Another object of this invention is to provide an improved cord structure which includes a core and a plurality of casings surrounding the same and extending coaxially therewith, said casings reducing in cross-section when tensioned so as to interlock with adjacent casings and the core.

A further object of this invention is to provide an improved cord structure which may be formed with existing braiding machines, said cord structure including a flexible core having surrounding the same a plurality of braided casings, said casings being normally independent of said core, and being adapted to form an integral unit therewith when placed under tension.

With these objects definitely in view, this invention resides in certain novel features of construction, combination and arrangement of elements and portions as will be hereinafter described in detail in the specification, particularly pointed out in the appended claims, and illustrated in the accompanying drawings which form a material part of this application and in which:

Figure 1 is a side elevational view of the cord structure which is the subject of this invention, the cord structure having one end thereof broken off and the other end thereof having the casings cut off at different points to show the relationship thereof.

Figure 2 is a transverse sectional view taken substantially upon the plane located by the section line 2—2 of Figure 1 and shows the general cross-section of the cord structure;

Figure 3 is an enlarged view of a section of one of the casings, and shows the construction of the braiding thereof.

Similar characters of reference designate similar or identical elements and portions throughout the specification and throughout the different views of the drawings.

Referring now to the drawings in detail, it will be seen that there is illustrated in Figure 1 the cord construction which is the subject of this invention, the cord construction being referred to in general by the reference numeral **10**. The cord construction **10** includes a flexible core **12** which is formed of a plurality of twisted strands **14**. Surrounding the core **12** and extending coaxially therewith is a first casing **16**. The casing **16** is formed of a plurality of strands **18** which are braided together.

Surrounding both the casing **16** and the core **12** is a second casing **20**. The second casing **20** is of a similar construction to the casing **16** and extends coaxially therewith. The casing **20** is formed of a plurality of strands **22** which are braided together.

Surrounding both the casing **16** and **20** and the core **12** is an outer casing **24**. The outer casing **24** extends coaxially with the casings **16** and **20**, and is also similarly formed. The casing **24** is formed of a plurality of strands **26** which are braided together.

While there has been illustrated three separate casings surrounding the core **12**, it will be understood that the number of casings may be varied as desired to produce the desired strength and size of cord.

Each of the strands which are utilized for forming the core **12** and the casings **16**, **20** and **24**, is of a similar construction and is formed of a plurality of threads twisted together. The number of strands required to form the core and the casings may vary as desired in order to provide the desired cord structure.

In order that a maximum of flexibility may be obtained, the casings **16**, **20** and **24** loosely surround the next inner portion of the cord structure and are freely slidable thereon. Due to this novel arrangement, each of the casings is independent from the other casings and from the core **12**.

The relationship of the casings to the core and the other casings is such when they are placed under tension they act in the same manner as the conventional Chinese finger-trap to tightly grip and to interlock with the next inner portion of the cord structure. The gripping and interlocking action of the casings is simultaneous so that the casings and the core function as a unit to equally resist tensional forces exerted thereon.

In order that maximum strength may be obtained from the cord structure **10**, it is desired that the casings and the core will break simultaneously. In order that this may be possible, the casings and the core are so formed that the elongations are equal and the load on the cord structure is properly divided between the core and the casings. By forming a cord structure which includes a core and a plurality of casings which when relaxed act independently of each other so as to permit maximum flexibility and when under tension, interlock and function as an integral unit, it will be seen that the cord structure having maximum flexibility as well as maximum strength per unit of weight may be produced.

A typical cord conforming to the spirit of this invention would have the following construction:

Core yarn, 210/5/3
Ends, 7
Inner cover:
32, carrier
26 picks/inch
Yarn, 210/3
Outside cover:
36, carrier
26 picks/inch
Yarn, 210/3

The above cord when formed of nylon was tested under test procedures set forth in the Federal Specification CCC–T–191b, Textile Test Methods, 15 May 1951. The test samples were conditioned at 65±2% relative humidity and 70±2° F. for 6 hours prior to the test.

The results obtained in the test were as follows:

Breaking strength ..... —925 lbs.
Elongation ..... 53.0 yds./lb. (35%)

Other experiments were made with cords of similar construction in which the elongation of the various casings and the core were not identical. In such cases

the breaking strength was much less than that set forth above.

In view of the foregoing, it will be seen that by providing a cord structure which includes a core having a plurality of casings loosely disposed thereon when relaxed and being adapted to tightly interlock with the same to form an integral unit when under tension, a cord structure of maximum strength may be produced when the elongation of the core and the casings are equal.

Minor modifications of the cord structure vary in minor details from the embodiment of the cord structure illustrated and described here, may be resorted to without departure from the spirit and scope of this invention, as defined in the independent claims.

Having described the invention, what is claimed as new is:

1. A cord construction comprising a core, a plurality of successive casings surrounding said core and coaxial therewith, said casings being slidable with respect to each other and to said core when in a relaxed state and tightly interlocked therewith and with each other when under tension, said core being formed of a plurality of strands, each of said casings being formed of a plurality of strands braided together, all of said strands being formed of identical material.

2. A cord construction comprising a core, a plurality of casings surrounding said core and coaxial therewith, said casings being slidable with respect to each other and to said core when in a relaxed state and tightly interlocked therewith when under tension, the elongation of said core and said casings being equal.

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