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2,500,332

COVERED AND COATED CORD AND FABRIC

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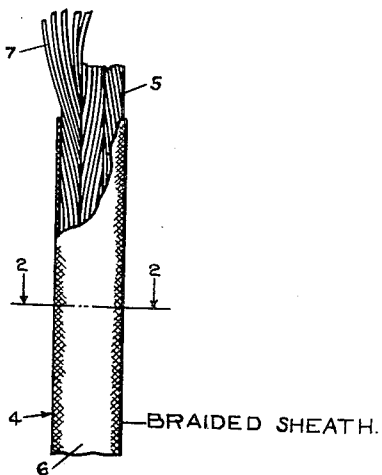


Fig- 1

ADHESIVE-TREATED THREADS.

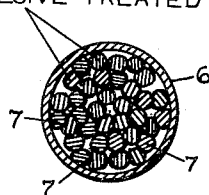


Fig- 2

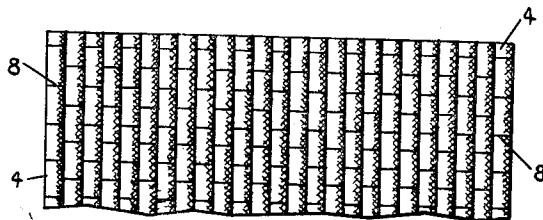


Fig- 3

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COVERED AND COATED CORD AND FABRIC

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12 Claims. (Cl. 87—1)

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This invention relates to fabrics for use as conveyor belts and power transmission belts, and relates more particularly to the cords employed in the warp for the preparation of such fabrics. Conveyor belts and power transmission belts have been made by securing together several layers of fabric, woven or otherwise processed, by means of rubber or other flexible adhesive and then providing the laminate with a covering of rubber or other flexible material to give the belts a smooth durable surface. The fabrics employed must have high tensile strength along the length of the belt and must be resistant to stretch particularly. Advantageous results were obtained by using in the belting, fabrics having at least a warp of cords made of continuous artificial filaments, for example, filaments of high tensile strength made of cellulose acetate or other organic acid ester of cellulose stretched in the presence of wet steam or other agent adapted to facilitate stretching. Where the stretched filaments of cellulose acetate or other organic acid ester of cellulose were saponified after the stretching operation, cords were made from such filamentary materials by cable twisting the same into a hard, round cord or by braiding around the core of a plurality of ends of filamentary materials, a sheath of the same filamentary material or of other material such as cotton, for example.

Where the cords were cable twisted, however, the high twist required to produce a hard, round cord lowered the strength of the filamentary materials, increased the elongation and lowered the resistance to stretch.

When a core of said threads of high tensile filamentary materials was covered with a braided sheath, it was found that there was slippage between the core and the sheath. The application of rubber or other adhesive to the core to overcome slippage did not prove satisfactory since the adhesives did not stand up to the constant bending and flexing action of the belting in use. Moreover, due to the uneven penetration or lack of penetration of the adhesive, too much friction occurred between the threads comprising the core. Furthermore, it was not possible to form around such a core a braid sufficiently solidly round to resist crushing during the belt-making operation.

It is, accordingly, an important object of my invention to provide an improved core for use at least in the warp of fabrics to be used as belting material which will be free from the foregoing and other disadvantages and which will be especially simple to prepare.

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Another object of my invention is the provision of a novel method of preparing cords for the use in the preparation of fabrics for conveyor belts, transmission belts and the like.

A further object of my invention is to provide an improved cord for the use in the preparation of conveyor belts, transmission belts and the like, having a core and sheath construction wherein there is no slippage between the core and sheath and wherein the sheath is solid and resistant to crushing during the belting operation.

Other objects and advantages of my invention will appear from the following detailed description.

In accordance with my invention, high tensile strength filamentary materials such as stretched, and preferably stretched and saponified, cellulose acetate or other organic acid ester of cellulose continuous filaments, are formed into threads having at most a slight twist, i. e. on the order of 2 turns per inch, and a denier of 1000, 1500 or more. These threads are then treated by supplying thereto latex, natural or synthetic, or other suitable adhesive. The application of the adhesive may be effected by dipping the threads in a bath containing the latex or other adhesive or in any other convenient manner. From 3 to 7 of the adhesive-treated threads are twisted together with a twist of say 1.5 turns per inch and a plurality of these twisted threads, namely from 5 to 10, are then run parallel and form the core threads which are then supplied to a suitable braiding machine where a tubular sheath of cotton yarns, stretched artificial yarns, stretched and saponified organic acid ester of cellulose yarns or other yarns, is formed by braiding said yarns around the core threads. In the cords so produced, the core threads are anchored to each other thus substantially eliminating friction therebetween, the sheath being anchored to the core threads will not slip relative thereto. The sheath is so round and solid that it resists crushing during the belt-forming operations. The cords of my invention may be formed into a fabric, the cords being preferably used in the warp only. The cords have a denier of about 85,000 or more and run about 50 yards to the pound.

The following is given as an example of a belting fabric made in accordance with this invention.

Example

The fabric is made with a warp of braided cords, each consisting of core threads made of continuous filaments of cellulose acetate stretched

in the presence of wet steam to ten times their original length and then saponifying the stretched filaments, and a sheath of cotton yarns braided over said core threads. Each core thread comprises five ends of a yarn twisted together with 1.5 turns per inch Z twist, each yarn being 1350 denier, 1800 filament twisted together with two turns per inch S twist. Seven ends of this thread are then run parallel to each other to a braiding machine and a tubular sheath is braided thereover. The sheath is made by braiding together thirty-two ends of four ends of 25 count cotton plied 3 turns per inch, sixteen ends being applied clockwise and sixteen ends being applied counter-clockwise. The cord formed weighs about 52.3 yards per pound and breaks at over 600 pounds, having a stretch at the break of 10 to 11%.

A warp is made up of the required number of cords and then given a friction coating of rubber and then as many other coatings of rubber as desired by passing the same through a calendaring machine. Where it is desired to bind several layers of the fabric made up of the cords together in a multi-ply belt, the coating or coatings of rubber thus imparted serve to bind the several layers of fabric together.

As illustrative of my invention, reference is had to the accompanying drawing wherein,

Fig. 1 is a view, on an enlarged scale, of a cord prepared in accordance with my invention,

Fig. 2 is a cross-sectional view taken on line 2-2 in Fig. 1 but on a larger scale, and

Fig. 3 is a view showing a fabric having a warp of cords of the present invention.

In the drawing, the reference numeral 3 indicates generally a cord comprising a plurality of core threads 5 which core threads are covered by a sheath 6 made by braiding suitable threads thereover. Each of the core threads comprises a plurality of ends 7 twisted together with very slight twist. These ends 7 are treated with adhesive prior to being twisted. The ends 7 are preferably prepared from stretched and saponified cellulose acetate or other organic acid ester of cellulose continuous filaments which are formed into threads having at most a slight twist and a denier of 1,000 or more.

Fig. 3 shows the cords 4 as the warp of fabric, the weft 8 being any suitable yarns or threads.

It is to be understood that the foregoing detailed description is given merely by way of illustration and that many variations may be made therein without departing from the spirit of my invention.

Having described my invention, what I desire to secure by Letters Patent is:

1. Cords for use in preparing fabrics, comprising substantially parallel core threads, each composed of adhesive-treated threads slightly twisted together and containing a plurality of continuous stretched and saponified organic acid ester of cellulose filaments having at most a slight twist, and a sheath of threads braided over said core threads.

2. Cords for use in preparing fabrics, comprising substantially parallel core threads, each composed of adhesive-treated threads slightly twisted together and containing a plurality of continuous stretched and saponified cellulose acetate filaments having at most a slight twist, and a sheath of threads braided over said core threads.

3. Cords for use in preparing fabrics, comprising substantially parallel core threads, each composed of adhesive-treated threads slightly twisted together and containing a plurality of continu-

ous stretched and saponified organic acid ester of cellulose filaments having at most a slight twist, and a sheath of threads having a basis of stretched and saponified organic acid ester of cellulose filaments braided over said core threads.

4. Cords for use in preparing fabrics, comprising substantially parallel core threads, each composed of adhesive-treated threads slightly twisted together and containing a plurality of continuous stretched and saponified cellulose acetate filaments having at most a slight twist, and a sheath of threads having a basis of stretched and saponified cellulose acetate filaments braided over said core threads.

5. Fabrics characterized by having at least a warp of cords comprising substantially parallel core threads, each composed of adhesive-treated threads slightly twisted together and containing a plurality of continuous stretched and saponified organic acid ester of cellulose filaments having at most a slight twist, and a sheath of threads braided over said core threads, and a coating of rubber over said warp.

6. Fabrics characterized by having at least a warp of cords comprising substantially parallel core threads, each composed of adhesive-treated threads slightly twisted together and containing a plurality of continuous stretched and saponified cellulose acetate filaments having at most a slight twist, and a sheath of threads braided over said core threads, and a coating of rubber over said warp.

7. Fabrics characterized by having at least a warp of cords comprising substantially parallel core threads, each composed of adhesive-treated threads slightly twisted together and containing a plurality of continuous stretched and saponified organic acid ester of cellulose filaments having at most a slight twist, and a sheath of threads having a basis of stretched and saponified organic acid ester of cellulose filaments braided over said core threads, and a coating of rubber over said warp.

8. Fabrics characterized by having at least a warp of cords comprising substantially parallel core threads, each composed of adhesive-treated threads slightly twisted together and containing a plurality of continuous stretched and saponified cellulose acetate filaments having at most a slight twist, and a sheath of threads having a basis of stretched and saponified cellulose acetate filaments braided over said core threads, and a coating of rubber over said warp.

9. Process for preparing cords for use in fabrics, which comprises twisting together into a thread with at most a slight twist a plurality of stretched artificial filamentary materials, applying latex to the thread, forming a core thread from a plurality of said latex-treated threads, arranging a plurality of said core threads in substantially parallel relation and braiding a plurality of threads into a sheath around said parallel core threads.

10. Process for preparing cords for use in fabrics, which comprises twisting together into a thread with at most a slight twist a plurality of stretched and saponified organic acid ester of cellulose filaments, applying latex to the thread, forming a core thread from a plurality of said latex-treated threads, arranging a plurality of said core threads in substantially parallel relation and braiding a plurality of threads into a sheath around said parallel core threads.

11. Process for preparing cords for use in fabrics, which comprises twisting together into a

thread with at most a slight twist a plurality of stretched and saponified cellulose acetate filaments, applying latex to the thread, forming a core thread from a plurality of said latex-treated threads, arranging a plurality of said core threads in substantially parallel relation and braiding a plurality of threads into a sheath around said parallel core threads.

12. Process for preparing cords for use in fabrics, which comprises twisting together into a thread with at most a slight twist a plurality of stretched and saponified cellulose acetate filaments, applying latex to the thread, forming a core thread from a plurality of said latex-treated threads, arranging a plurality of said core threads in substantially parallel relation and braiding a plurality of threads having a basis of continuous stretched and saponified cellulose acetate filaments into a sheath around said parallel core threads.

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