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FABRIC AND RUBBER BELT

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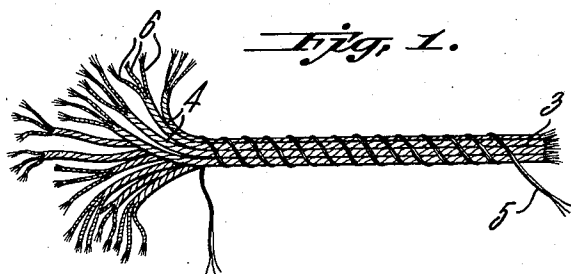


Fig. 4.

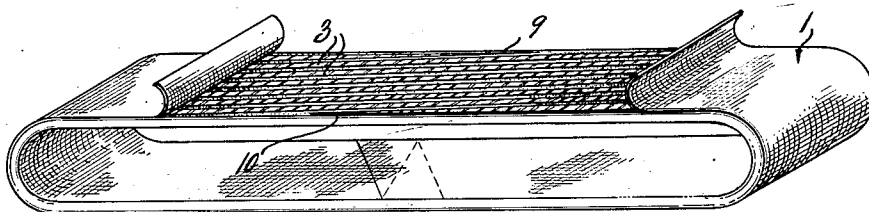


Fig. 2.

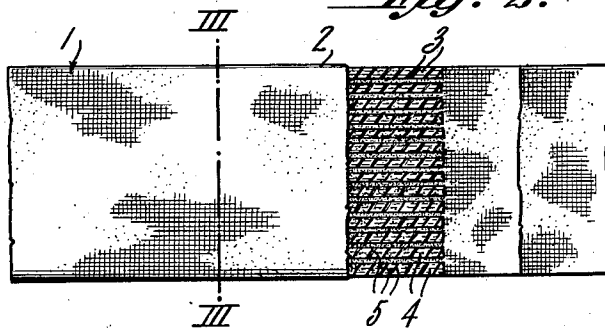


Fig. 3.

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FABRIC AND RUBBER BELT

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6 Claims. (Cl. 74—231)

My invention relates to fabric and rubber belts, and more particularly to that class of belts in which longitudinally extending cords are utilized as strain resisting elements.

Attempts have heretofore been made to make cord belts, particularly endless belts, in which the cord plies consist of a plurality of convolutions of relatively large cords extending longitudinally of the belts. Such cords have heretofore been made by the successive doubling or twisting together of a plurality of yarns, plied yarns, and cords, respectively, each doubling involving a twisting operation.

Such twisted cords have a helical twist of which the cumulative effect in a considerable number of such parallel cords is to give the belt containing them an unbalanced condition which tends to throw the belt off center with respect to the pulley on which it is riding. Attempts have been made to overcome this defect by balancing the belt by selectively disposing cords with opposite helical inclinations throughout the body of the belt. This is an expensive and troublesome operation. The usual twisted plied cord also has a considerable inherent capacity to stretch by virtue of the numerous twisting operations used in building the cord up to the desired size. Each twisting operation contributes to the total stretch, hence the amount of stretch increases with the number of twisting operations or as the diameter of the cord increases.

I provide a belt in which there are incorporated bundles of strands or cords, each bundle comprising a plurality of strands of plied yarn or cords arranged in substantially parallel relation; that is, the final twisting and doubling step of prior practice is replaced by a step in which the component strands or cords are laid side by side in a bundle without any substantial twist. The component strands or cords are held together in such parallel relation by a helical wrapping of a relatively fine yarn and, if desired, by an impregnation or coating of the individual strands or cords with an adhesive bonding material. A fluid rubber composition, such as a cement or an aqueous dispersion, is suitable for this purpose. Since the cord bundle construction does not have the pronounced final twist of the cords heretofore used, the tendency for the belt to travel off center is eliminated, and the belt also has less stretch for a given load.

A belt embodying such a cord construction may be made truly endless by winding the cord bundles in known manner in a desired number of parallel convolutions in one or more layers on a

suitable pulley, forming belt, or other known means. The cord bundles constitute the main stress resisting elements of the belt. The cord plies are embedded in rubber, and the body of the belt is preferably enclosed in a suitable cover or envelope of fabric or fabric and rubber.

The accompanying drawing illustrates a present preferred embodiment of my invention, in which:—

Fig. 1 is a side view of a portion of a cord bundle embodying my invention;

Fig. 2 is a broken plan view of a portion of a belt embodying my invention;

Fig. 3 is a transverse view thereof taken on the section line III—III of Fig. 2; and

Fig. 4 is a diagrammatic view of an endless belt embodying my invention.

Referring to the drawing, a belt 1 comprises an envelope 2 enclosing a plurality of cord bundles 3, which, as shown in Fig. 4, may constitute a plurality of convolutions of the same cord bundle, which constitute the main stress resisting elements of the belt. In the form of belt illustrated in Figs. 2 and 3, the envelope 2 is given a double lap on one side of the belt, preferably the inner or pulley-engaging face. However, it is to be understood that other forms of envelopes and/or covering plies may be used within the spirit of the invention.

Referring particularly to Fig. 1, the cord bundle 3 comprises an untwisted bundle of substantially parallel and individually twisted or plied yarns or cords 4 which are held together by one or more light, helically disposed binding yarns 5, the turns of which may have any desired pitch and spacing. Preferably the direction in which the binder yarns are wrapped around the bundle is opposite to the direction of twist of the component cords of the bundle, as illustrated. Each of the plied yarns or cords is, in turn, made by twisting a plurality of yarns 6, in a well known manner. It is to be understood that the yarns or cords 4, illustrated, are representative of various types of constructions, either plied yarns, cable or hawser cords, which may be grouped in untwisted and parallel relation to form cord bundles, and all constructions of such types are contemplated within the spirit of this invention.

In the preparation of the cord bundle 3, the individual strands or cords 4 are brought together and held under tension while the binding yarn 5 is applied. It is preferable to first pass the individual strands or cords through a wetting solution and then through a rubber or rubber-like dispersion so that they are impregnated with a

rubber coating; or a rubber coating may be applied by passing the cord bundle 3 axially through an extruding machine. Thereafter they are bundled by the application of the binder yarn

5 5. The rubber coating on the individual strands or cords assists the yarn 5 in preserving the form of bundle and in preventing friction between the component strands of the bundle. A cord bundle so prepared has substantially 17 percent less
10 stretch than a corresponding cord of the same size in which the component strands have been doubled together by a final twisting operation as in ordinary cord constructions.

In incorporating the cord bundles 3 into a belt, 15 the envelope 2, on which has previously been suitably disposed a relatively thick layer of rubber or other binding composition, is preferably mounted on a forming belt or drum with the rubber coating outward. Thereafter the cord
20 bundles 3, either as separate parallel bundles, or as a plurality of successive convolutions of the same cord bundle or of a plurality of such bundles, as illustrated in Fig. 4, are applied.

After a desired number of bundles or convolutions of bundles have been laid on the envelope, the side 8 of the envelope is folded over the body of the belt and the side 7 is then lapped over the side 8 and smoothed down. Thereafter the belt may be vulcanized. Before or during
30 vulcanization, the assembled belt is subjected to pressure to force part of the rubber into the spaces between adjacent cord bundles, thus forming a unified structure.

Referring to Fig. 4, a truly endless belt may 35 be made by using a plurality of convolutions of the cord bundles 3, since the bundle is continuous between its ends 9 and 10 regardless of the number of convolutions used.

A belt made in accordance with the present invention is substantially balanced because of the 40 absence of any material outer twist in the stress-resisting elements. By eliminating the final twist

in the cord bundle construction, the tendency for the belt to ride off center on a pulley is thus eliminated. Also the belt is materially less extensible, than is an equivalent belt utilizing cord constructions having the usual outer twist.

While I have shown and described a present preferred embodiment of my invention, it is to be understood that the invention may be otherwise embodied within the spirit thereof and the scope of the appended claims.

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

1. A flat belt having for its major stress-resisting element a plurality of parallel plied cords each of which comprises an untwisted bundle of 15 parallel cords.

2. A flat endless fabric belt having for its major stress-resisting elements a plurality of convolutions of a plied cord comprising an untwisted bundle of parallel strands or cords and helical 20 binding means.

3. A flat endless rubberized fabric belt having for its major stress-resisting elements a plurality of convolutions of a cord comprising an untwisted bundle of parallel plied yarns or cords and helical 25 binding means.

4. A flat belt having for its major stress-resisting elements a plurality of convolutions of a composite yarn or cord comprising a non-twisted bundle of parallel plied cords and a binder of 30 spaced convolutions of fine yarns.

5. A belt having for its major stress-resisting elements a plurality of parallel plied cords each of which comprises an untwisted bundle of parallel cords and helical binding means.

6. A rubberized belt having for its major stress-resisting elements a plurality of parallel plied cords each of which comprises an untwisted bundle of parallel cords and helical binding 40 means.

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