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CONVEYOR BELT AND WIRE FABRIC THEREFOR

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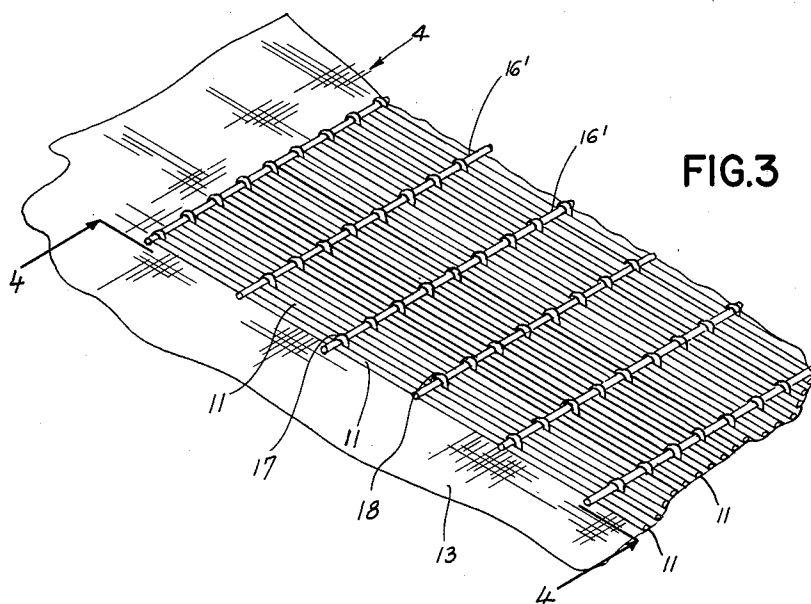


FIG. 3

FIG. 4

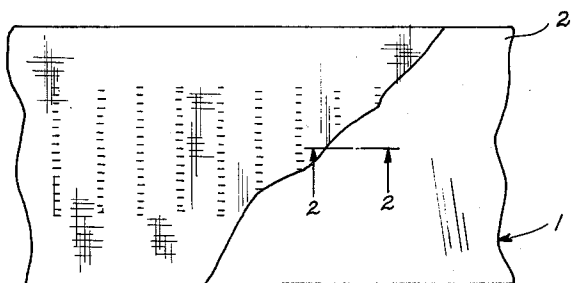
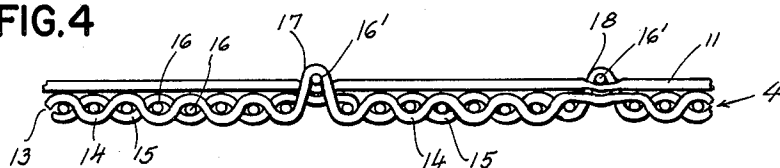


FIG. 1

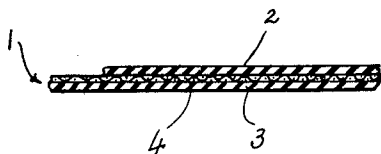


FIG. 2

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CONVEYOR BELT AND WIRE FABRIC THEREFOR
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2 Claims. (Cl. 161-91)

This invention relates to an improved fabric which is substantially inextensible in the longitudinal or warp direction but is flexible in the transverse direction and to an improved conveyor belt incorporating such fabric.

This improved fabric finds its greatest applications in large size hose, conveyor belts, heat resisting belts, expansion joints, handrails and other constructions where it is necessary to import extremely high strength in one direction with high flexibility in all other directions.

Other objects and advantages will be comprehended from the following description and accompanying drawing in which:

FIG. 1 is a partial cutaway view of a conveyor belt having incorporated therein the improved fabric of this invention.

FIG. 2 is a cross-section along the line 2—2 of FIG. 1.

FIG. 3 is a cutaway top view along the warp of the improved fabric.

FIG. 4 is a cross-section along the line 4—4 of FIG. 3.

Referring now to FIGS. 1 and 2, there is shown a conveyor belt 1 having outer rubber layers 2 and 3 and an inner fabric layer 4 as a tension member. Layer 4 is securely bonded to rubber layers 2 and 3 since the rubber not only adheres to the fabric surfaces but also penetrates into the interstices of the fabric forming an interlock.

As shown more fully in FIG. 3, the fabric 4 comprises a plurality of parallel straight metallic wires 11 positioned in a single layer and extending in the warp direction. Below the layer of wires 11 is arranged a layer 13 of yarn material composed of a plurality of interlacing warp yarns 14 and 15 and weft yarns 16. Arranged above the layer of wires 11 are weft yarns 16' which are substantially planar, i.e. they do not penetrate the layer of wires 11, parallel to weft yarns 16, and spaced relatively widely from one another lengthwise of wires 11, the number of lower weft yarns 16 thus greatly exceeding the number of upper weft yarns 16'.

Warp yarns 14 and 15 alternate with the wires 11 as warps and are generally below the plane of the wires except that they pass in staggered relationship over alternate ones of the upper weft yarns 16'. Thus, at the intersections of any one of the wires 11 with any two consecutive weft yarns 16', by way of example the ones shown in FIG. 4, the warp yarn 14 adjacent one side of the said wire penetrates the plane of the wires to loop over the first weft yarn 16' (as shown at 17), while the warp yarn 15 adjacent the other side of the same wire remains under the plane of the wires and thus passes below the said first weft yarn 16'. At the second weft yarn 16', this condition is reversed, with the warp yarn 15 looping over the second weft yarn 16' (as shown at 18) while the warp yarn 14 remains below the plane of the wires and thus below the weft yarn 16'. Considered weftwise of the fabric, therefore, only the various yarns 14 loop over the aforesaid first weft yarn 16' and only the various yarns 15 loop over the second weft yarn 16'. These conditions then repeat in alternating sequence at the succeeding upper weft yarns 16'.

This looping arrangement can be seen to lock warp wires 11 in place inasmuch as, at each locking location (17 or 18), each warp 11 has a transverse weft 16' positioned above it. Weft 16' is held in place at any such

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location either by the looped over warp 14 on the top side, and on the bottom side by warp 15, or by the reversed arrangement of these warps.

Throughout the entire fabric, the warp wires 11 are uncrimped and are held in position only by the looping arrangement heretofore described. It is particularly desirable that wires 11 should not be crimped to prevent the belt from stretching under tension (as it would if the crimps were straightened).

As a more specific example of the above construction the warp may comprise fifteen warp wires 11 which alternate with fifteen warp yarns 14 and 15 of cotton, with a repeating alternation of one wire and one cotton. Thus there may be thirty warps to the inch and twenty-four wefts to the inch. The wefts 16 may be made of nylon.

The fifteen cotton warp yarns 14 and 15 and twenty-four nylon weft yarns 16 are interwoven in a plain weave. Wires 11 do not interlace in this weave. One wire 11 may float on one surface of the fabric for approximately one-half inch (over approximately twelve weft yarns) and may be brass plated to increase the adhesion to the rubber of the belt. The thirteenth weft yarn 16' may, for example, be woven over the wires 11 and under the intermediate cotton warp yarns 14 and 15 (as at 17 or 18). As a result, this thirteenth weft yarn in the area of the wires appears to be almost straight and entirely on the side of the fabric which contains wires 11. These weft yarns 16' are tied down on either side of the two wire warp yarns by cotton warp yarns which pass over the wefts. Considering any given inch length of two adjacent wire yarns, it will be noted that on one end of this inch length, a weft yarn floats over their tops and this weft yarn is tied down by a cotton warp yarn on either side of the two wire yarns. At the other side of this inch length the same arrangement appears. Intermediate this inch length, there is another weft yarn which floats over these two wire warp yarns.

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

1. A fabric having a repeating pattern of warp and weft elements, said pattern being formed of a first layer comprising a plurality of coplanar parallel wire warp yarns, said wire warp yarns being substantially entirely uncrimped, a single textile layer comprising a series of textile warp yarns positioned below the plane of said wire warp yarns and in alternating relationship with said wire warp yarns, said single textile layer also comprising a plurality of textile weft elements interlacing with said textile warp yarns and being positioned below the plane of said wire warp yarns, a plurality of widely spaced weft yarns positioned substantially entirely above the wire warp yarns, adjacent ones of said textile warp yarns being looped, in staggered relationship to one another, over alternate ones of said widely spaced weft yarns, whereby each looped textile warp yarn is effective to lock said wire warp yarns and said widely spaced weft yarns against the adjacent and unlooped one of said textile warp yarns.

2. A conveyor belt comprising a fabric tension member having a repeating pattern of warp and weft elements, said pattern being formed of a first layer comprising a plurality of coplanar parallel brass-plated wire warp yarns, said wire warp yarns being substantially entirely uncrimped, a single textile layer comprising a series of textile warp yarns positioned below the plane of said wire warp yarns and in alternating relationship with one another, said single textile layer also comprising a plurality of textile weft elements interlacing with said textile warp yarns and being positioned below the plane of said wire warp yarns, a plurality of widely spaced weft yarns positioned substantially entirely above the

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wire warp yarns, adjacent ones of said textile warp yarns being looped, in staggered relationship to one another, over alternate ones of said widely spaced weft yarns, whereby each looped textile warp yarn is effective to lock said wire warp yarns and said widely spaced weft yarns against the adjacent and unlooped one of said textile warp yarns, and elastomeric covering layers adherent to said fabric through the interstices thereof and adherent to said brass-plated wire warp yarns.

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