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L. B. CHISHOLM

FABRIC

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Fig. 1.

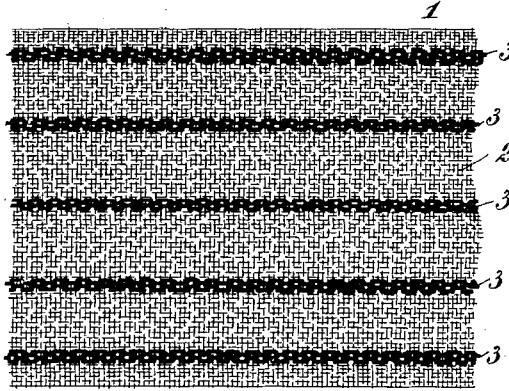


Fig. 2.

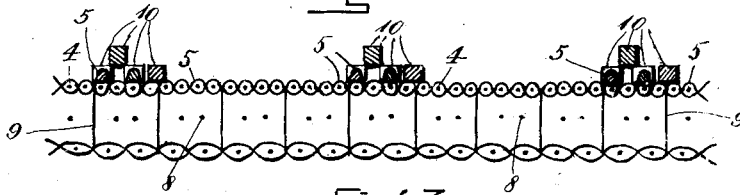


Fig. 3.

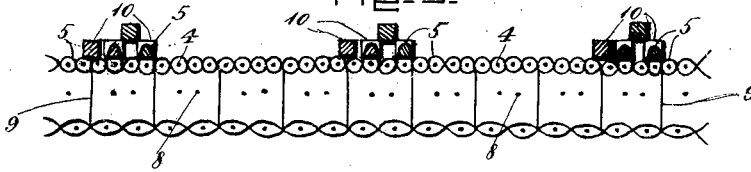
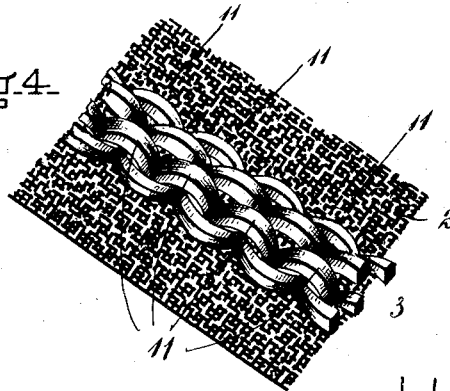


Fig. 4.



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FABRIC.

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The invention relates to that known class of non-slipping fabrics in which the resistance to slipping is secured by floating strands, ends or loops of rubber attached to the fabric usually by interweaving.

The present application is in part a continuation of my prior application Serial No. 14,640, filed March 11, 1925.

The purpose of the invention is to improve such fabrics and render them practical in that the resistance to slipping is secured by certain improvements in the arrangement and mode of attaching the rubber to form certain protuberances or non-slipping elements above the face of the fabric, and in the form, general characteristics and arrangement of such protuberances or elements.

The invention can best be seen and understood by reference to the drawings in which—

Figure 1 is a plan of the fabric,

Figs. 2 and 3 cross sections thereof in enlarged detail, and

Fig. 4 is a perspective in enlarged detail of a small piece of the fabric showing especially the non-slipping area.

Referring to the drawings:—

1 represents the fabric of which 2 is the body or backing of the fabric and 3 the isolated non-slipping areas with which the body is provided and which appear on the surface of the body as a raised slip-resisting structure having a rough surface texture and preferably a rib structure.

The body or backing 2 of the fabric consists of any suitable woven structure either of elastic or non-elastic material. A two-ply body is preferably employed as shown in the drawings, presenting a flat face, and it may be woven in any desired widths. In Figs. 2 and 3 of the drawings the fabric is shown in enlarged detail where 4 represents warp threads and 5 represents pick of one of the plies forming the back of the body of the fabric. 8 is stuffing warp between the two plies and 9 binder warp connecting the two plies.

The raised slip-resisting structure 3 is composed of an assemblage of rubber bights 11 produced from a plurality of rubber strands 10, for example four strands when in rib structure as shown. These strands are of rubber or other non-slipping material preferably square in cross section. The strands

run parallel with the warp and each round is bound down or attached to the body of the fabric or backing at regular longitudinal intervals which are such that the strand is given a bowed conformation between the binding points to form the respective bights 11. The strands are arranged snugly adjacent one another in juxtaposed relation and the attachment or binding points of the strands are such that the assembled rubber bights will be crowded together. In other words, the binding points of the combined strands will occupy a space laterally less than the width of the slip-resisting structure formed by the assembled bights. The attachment of the individual strands forming the slip-resisting structure or non-slipping area is also such that adjacent strands will be attached at binding points occupying a staggered relation to one another by which a resulting staggered arrangement will be imparted to the assembled bights which form the raised slip-resisting structure giving it when in rib form a rough, chainlike texture.

As the fabric is woven alternate ones of the rubber strands 10 are bound down by one line or run of pick and alternate others of the strands are bound down by a succeeding line or run of pick. For example, in Fig. 2, the first and third in a collection of four rubber strands in one of the ribs 3 or non-slipping areas are bound down by one line or run of pick 5 of the upper ply forming the face of the body of the fabric, and in Fig. 3, the remaining rubber strands are bound down by a succeeding line or run of pick 5 in the upper ply. Thus woven each of the rubber strands will extend over and under succeeding lines of picks, the continuity of each strand being broken longitudinally at regular intervals by the binding down of the strand, those portions of the strand extending over picks lying raised above the face of the body of the fabric to form the protuberances or bights 11. Besides this, the binding down points of adjacent strands will occupy a staggered relation to one another and consequently the bights occurring between the binding down points will also occupy a similar staggered relation to one another by which the chainlike effect or texture is imparted to the rib structure or non-slipping area.

The general efficiency of the bights as

non-slipping elements is materially increased and the characteristic chainlike texture of the non-slipping area or ribs enhanced by the manner in which the bights are combined. The warp and weft threads of the fabric body are much smaller than the rubber strands and in any determinate non-slipping area or rib the warp threads occupy relatively less space laterally than the rubber strands. In consequence the binding points of the respective strands are brought snugly together and this together with the staggered arrangement of the bights, as previously described, results in bringing the binding points of one strand to lie at least in part beneath the bights of the next succeeding strand, thereby accentuating the bights and giving them material support. It results also in crowding the bights together, the crowding of the bights being such that the outer bights or those on the outer strands are deflected or canted in the direction of the face of the fabric and thereby made to better withstand wear and disrupting influences.

In order to obtain the full benefit of the bights as non-slipping elements, it is desirable that the bights, or those portions of the strands which form the bights, shall be under no substantial tension, a very slight tension being preferably desired but no such tension as will cause the bights to hug the face of the body of the fabric too snugly. On the other hand, the tension should be such as will not permit the bights lying loose and flaccid on the face of the fabric body. If the tension be such that the bight hugs the face of the fabric too tightly its value as a non-slipping element is materially lessened or may even become negligible. On the contrary, if that portion of the strand forming the bight be too loose it detracts from the finish of the fabric, easily becomes worn or disrupted and is altogether undesirable. In any event it is better that the strand along those portions thereof forming the respective bights shall be too loose rather than too tight. To the end therefore that the bights of the rubber strands may appear on the surface of the body of the fabric under substantially no tension the rubber strands are woven under the minimum tension possible or in any event under no such tension as will impart any substantial curling tendency to the fabric. The purpose is to take care that the bends in the rubber strands caused by the binding in of the picks or filling, or by the threads which attach the rubber strands to the body of the fabric, will be compensated for, at the same time taking into consideration the fact that the rubber strands can only be properly handled when under at least some slight tension. The amount taken up by the bends or binding-in points of the strands and which

would otherwise cause tension in the bights if care is not taken, will depend upon the nature of the weave, the size of the yarns used and other factors obvious to those skilled in the art. In practice, it is found that excellent results are obtained if for a determinate length of warp thread there be employed a slightly longer length of strand woven under a minimum tension possible for weaving.

Not only does a non-slipping area or raised slip-resisting structure composed of assembled bights thus formed, arranged and retained prove exceedingly efficacious for preventing slipping, but it possesses great wearing quality and cannot easily be broken or disrupted. The fact that the bights are crowded together, reinforcing one another, assists in maintaining their integrity and causes them to display a certain solidity even though the individual bights are under little or no tension. In case any of the bights become broken or disrupted the fact that they are maintained bound to the body of the fabric under little or no tension permits of their still continuing to properly function as non-slipping elements.

Where the fabric is made in narrow widths one or better, two lines of spaced ribs or isolated non-slipping areas are preferably provided, more ribs being provided on increasing widths of the fabric. The isolation of the ribs or non-slipping areas may be as desired although it is preferred that they be separated as far as possible without losing their combined effect.

While strands of rubber are preferably used to form the non-slipping element or bights, yet other materials having rubber-like characteristics are known and in some cases might be substituted. Accordingly the term "rubber" is used throughout in a descriptive rather than in a limiting sense.

Having thus fully described my invention, I claim and desire to secure by Letters Patent of the United States:—

1. A slip-resisting fabric, comprising in combination a textile backing and a raised slip-resisting structure thereon having a rough surface texture, including contacting rubber bights produced by binding juxtaposed rubber strands to the backing at intervals, said binding points being so spaced that the bights are crowded together reinforcing one another and certain of the bights are laterally deflected.

2. A slip-resisting fabric comprising in combination a textile backing; an overlying non-slipping structure thereon having a rough surface texture, said structure comprising closely contacting rubber strands connecting at intervals with the backing and each engaged and deflected by another between successive points of connection.

3. A slip-resisting fabric comprising in

combination a fabric backing and a raised slip-resisting structure thereon having a rough surface texture composed of an assemblage of rubber bights produced by interweaving juxtaposed rubber strands at intervals with threads of the backing, the intervals at which each strand is bound to the backing being such that the strand is given a bowed conformation between the binding points to form said bights and the lines of points at which said interweaving occurs for the respective strands occupying a space laterally less than the width of said slip-resisting structure whereby the rubber bights composing the same as aforesaid are crowded together reinforcing one another.

4. A slip-resisting fabric comprising in combination a fabric backing and a raised slip-resisting structure thereon having a rough surface texture composed of an assemblage of rubber bights in staggered relation to one another, produced by interweaving juxtaposed rubber strands with threads of the backing at binding points occurring at intervals, the binding points for all the strands having a staggered relation to one

another and occupying a space laterally less than the width of said slip-resisting structure whereby the rubber bights composing the same will be crowded together and the bights along the sides of the structure will be laterally deflected.

5. A slip-resisting fabric comprising in combination a fabric backing and a raised slip-resisting structure thereon having a rough surface texture composed of an assemblage of rubber bights in staggered relation to one another, produced by interweaving juxtaposed rubber strands with threads of the backing at binding points occurring at intervals, the lay of the rubber strands being such that the rubber bights will lie substantially unstretched between the binding points of the respective strands, the binding points for all the strands having a staggered relation to one another and occupying a space laterally less than the width of said slip-resisting structure with the binding points of one rubber strand lying substantially beneath the bights of the next adjacent rubber strand.

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