Aug. 23, 1932. H. C. WINTON 1,873,094

ELASTIC FABRIC

Filed Jan. 2, 1932

Fig. 1.

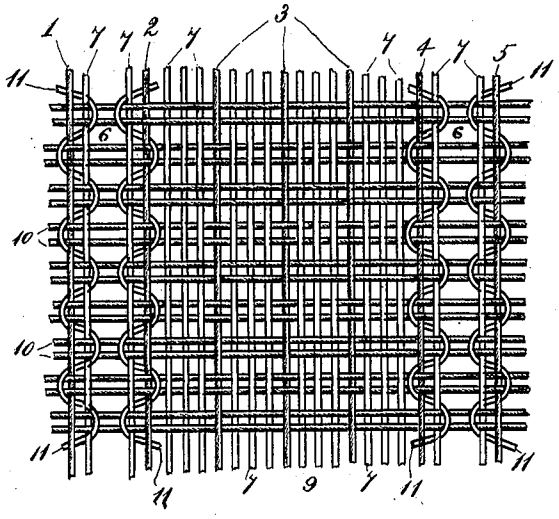


Fig. 2.

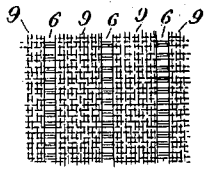


Fig. 3.

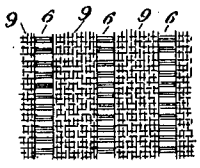


Fig. 4.

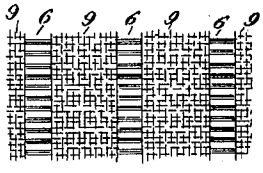
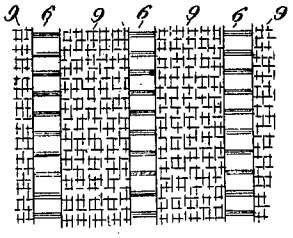


Fig. 5.



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UNITED STATES PATENT OFFICE

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ELASTIC FABRIC

Application filed January 2, 1932. Serial No. 584,337.

The invention relates to an improvement in elastic fabrics.

The essential object of the invention is to provide a fabric having two stretch actions, one in which the fabric will initially stretch or yield under very slight tension, the other in which the fabric will stretch or yield only as the tension becomes materially increased.

Much elastic fabric is used under circumstances where it has immediate contact with the body of the wearer and it is necessary that the fabric seat itself or snugly conform to that portion of the body against which it bears, and this without subjecting the fabric to any considerable degree of tension. The present fabric permits of this inasmuch as it will initially stretch or yield under very little tension. Afterward the fabric will stretch in the usual manner as the tension becomes materially increased.

A further object of the invention is to provide a ventilated fabric.

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

Figure 1 is a conventional plan in enlarged detail of a woven elastic fabric embodying the invention, the web being shown stretched as when woven.

Figs. 2, 3, 4 and 5 are plans representing diagrammatically changes in the form of the web when the web is subjected to different stretch actions.

Referring to the drawing:—

1, 2, 3, 4 and 5 indicate a number of elastic warp strands representative of those in the woven fabric. These strands are all preferably wound or covered elastic strands like those customarily employed in woven elastic fabrics. Certain of these elastic warps at recurring intervals throughout the fabric are spaced relatively far apart as for example the respective warps 1, 2 and 4, 5; 6 indicating the space or opening between these warps. 7 represents inelastic binder warp threads representative of those in the woven structure. These binder warp threads are preferably so arranged that each of the elastic warps adjacent an opening 6, as for example the warps 1, 2, and 4, 5, shall have associated with them a binder warp thread 7 on the side thereof facing the opening. Others of the binder warp threads 7 will lie interposed between those of the elastic warps lying between or outside the respective openings 6. In other words, a number of binder warps are interposed between the elastic warps 2, 3,—3, 3,—3, 3, and 3, 4, as shown in the drawing. I prefer that a number of inelastic binder threads be interposed between each set of these elastic warps in order that a rather closely woven structure may be obtained in that portion 9 of the fabric lying between or outside the respective openings 6 in it thus distinguishing from said openings.

10 represents the weft threads in the woven structure all of which are elastic and provided, preferably, with the customary covering.

The weave of the warp and weft threads thus far referred to is of no especial importance as it may be accomplished in the ordinary manner. It is preferred, however, that the weave be such that the warp threads shall pass through the weft threads alternately front and back in sets of two instead of through single weft threads. It is preferred, also, that the binder warp threads associated with the elastic warps adjacent the respective openings shall be woven to pass over that side of the elastic wefts opposite the side over which the associated elastic warps are passed. For example, where the elastic warp is passing over a set of elastic weft threads on the front the associated binder thread will pass over the same set of elastic wefts on the back, and vice versa.

Those of the elastic warps together with their associated binder threads lying adjacent the openings 6 in the woven structure are combined and both bound securely to the elastic wefts, the associated binder warps assisting in such anchorage. This effect is obtained by leno threads 11 which cross the combined warps at the back and lap over successive sets of wefts alternately on opposite sides of said combined warps. Thus fixed, each elastic warp and its associated binder thread will maintain its position on the wefts with relation to the adjacent open-

ing in the fabric and will not slip and close said openings as the fabric is stretched.

The properties of the fabric in point of utility can best be seen and understood by reference to Figs. 2 to 5, inclusive. In Fig. 2 is represented the normal unstretched fabric. Here it will be seen that while the wefts pass freely through the openings 6 in the fabric they are bound by the interwoven warps in that portion 9 of the fabric lying between or outside said openings. Inasmuch as the elastic wefts pass freely through the openings and are unbound they will yield or stretch when the fabric is subjected to a relatively light stretch action or a stretch action which, while causing stretching of the wefts at the points of the openings, will not cause stretching of the wefts in that portion of the fabric lying between or outside said openings owing to the frictional impedance imparted by the warps to those portions of the wefts lying outside the openings. This is shown in Fig. 3 where those portions of the wefts lying within the openings are shown stretched, while those portions of the wefts lying in that part of the fabric outside said openings remain unstretched. As the fabric is subjected to a more intense stretch action the stretch of those portions of the wefts lying within the openings will be increased, and the fabric will also stretch in those portions of the wefts lying outside said openings as shown in Fig. 4.

The openings 6 in the fabric give a ventilated fabric under all conditions, the size of the openings and consequent ventilating property of the fabric being increased as the wefts within the respective openings become stretched, thereby increasing the size of the openings. This increase in the size of the openings in the fabric is obtained to the maximum when the fabric is stretched in both directions, laterally and longitudinally, as shown in Fig. 5. While the fabric possesses a high degree of utility even when the warp threads are all inelastic, yet its utility is materially increased, especially with relation to the ventilating properties of the fabric, through increase in the size of the openings in it, when the fabric possesses elastic warp threads thereby enabling it to stretch in two directions.

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

1. An elastic fabric comprising elastic warp threads and elastic weft threads, certain of the elastic warp threads being spaced from one another to form openings between them occurring at intervals in the fabric and which openings are crossed by the elastic weft threads left unbound within said openings, and means for tying the spaced elastic warp threads lying adjacent said openings to the elastic weft threads whereby the initial fixed position of said elastic warp threads with relation to the elastic weft threads will be maintained as the fabric is stretched.

2. An elastic fabric comprising elastic warp threads and elastic weft threads, certain of the elastic warp threads being spaced from one another to form openings between them occurring at intervals in the fabric and which openings are crossed by the elastic weft threads left unbound within said openings, those portions of the weft threads running between said openings in the fabric being bound by warp threads interwoven therewith, and means for tying the spaced elastic warp threads lying adjacent said openings to the elastic weft threads whereby the initial fixed position of said spaced elastic warp threads with relation to the elastic weft threads will be maintained as the fabric is stretched.

3. An elastic fabric comprising warp threads and elastic weft threads, certain of the warp threads being spaced from one another to form openings between them occurring at intervals in the fabric and which openings are crossed by the elastic weft threads left unbound within said openings, and means for tying the spaced warp threads lying adjacent said openings to the elastic weft threads whereby the initial fixed position of said warp threads with relation to the elastic weft threads will be maintained as the fabric is stretched.

4. An elastic fabric comprising warp threads and elastic weft threads, certain of the warp threads being spaced from one another to form openings between them occurring at intervals in the fabric and which openings are crossed by the elastic weft threads left unbound within said openings, those portions of the weft threads running between said openings in the fabric being bound by warp threads interwoven therewith, and means for tying the spaced warp threads lying adjacent said openings to the elastic weft threads whereby the initial fixed position of said spaced warp threads with relation to the elastic weft threads will be maintained as the fabric is stretched.

HARRY C. WINTON.