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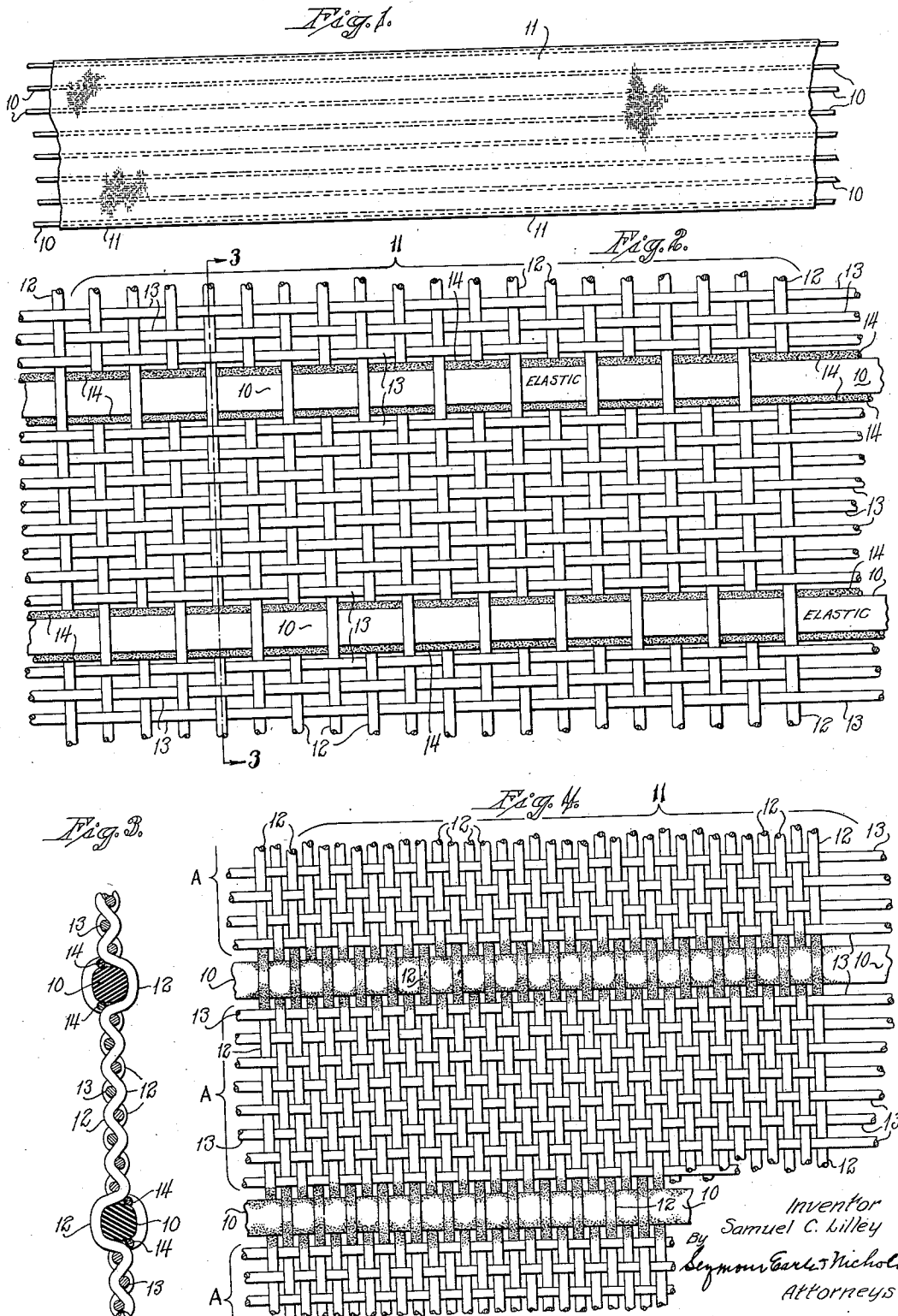
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2,197,188

ELASTIC FABRIC AND METHOD OF PRODUCTION

Filed Oct. 20, 1936

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Fig. 5.

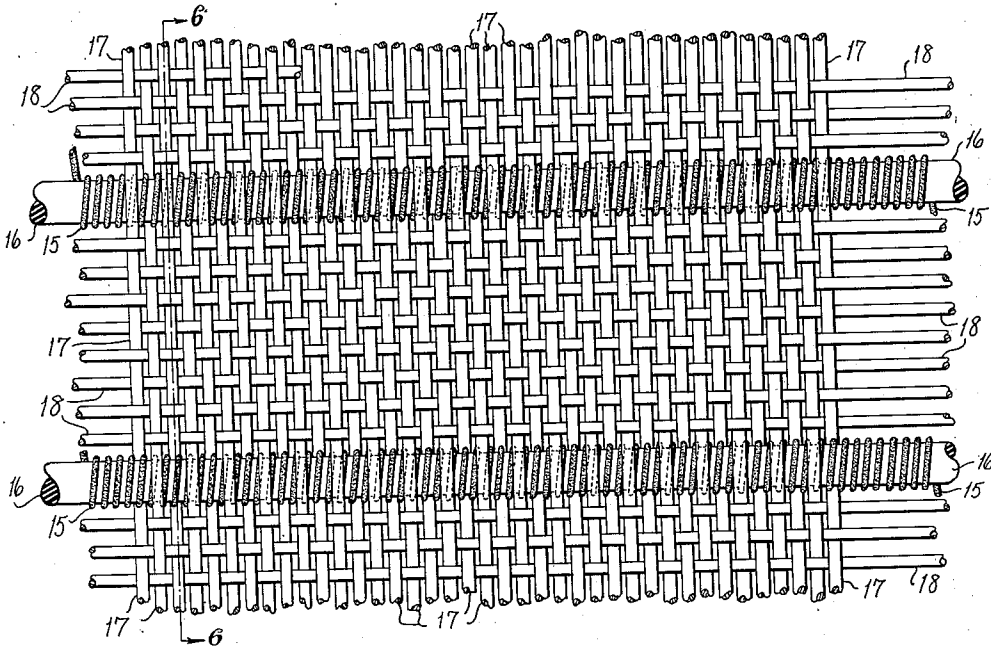


Fig. 6.

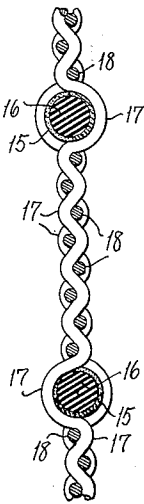
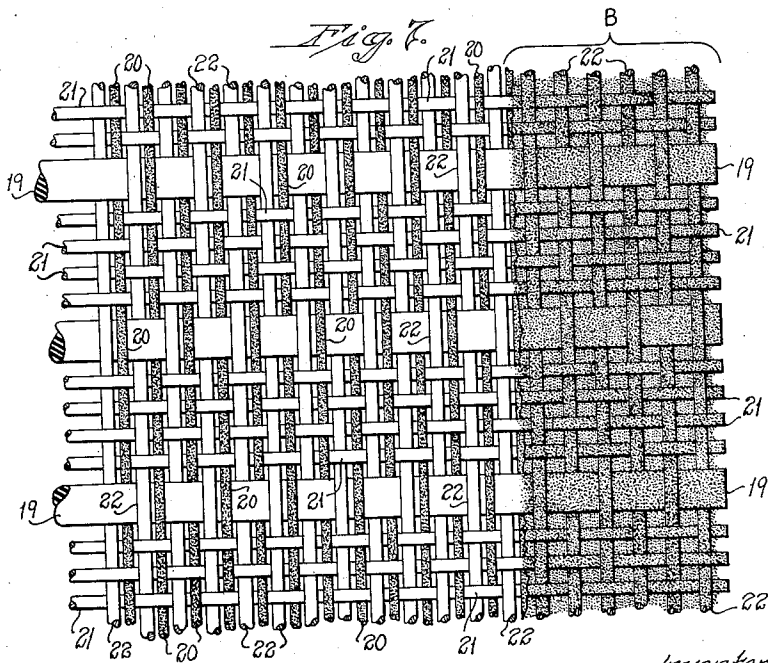


Fig. 7.



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ELASTIC FABRIC AND METHOD OF PRODUCTION

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5 Claims. (Cl. 28—1)

This invention relates to improved fabrics and methods of production, and more particularly to elastic fabrics and methods of production in which elastic strands are anchored against creeping or slippage as a result of the fabric being unduly stretched, or when such elastic strands are cut by sewing or the like.

One of the objects of the present invention is to provide a superior method whereby elastic strands may be anchored in elastic fabrics.

A further object is to provide a superior method by means of which elastic strands may be anchored in elastic fabrics without marring the appearance of the latter.

Another object is to provide a superior method of manufacture whereby elastic strands are anchored in elastic fabrics without depriving the fabric of desirable flexibility.

A still further object is to provide a superior method by means of which spaced-apart elastic strands may be anchored throughout their length in an elastic fabric without harmfully affecting the areas of the fabric lying intermediate such spaced-apart elastic strands.

Still another object is to provide a superior elastic fabric in which a series of spaced-apart elastic strands are anchored or adhered only to the immediately-adjacent portions of the remainder of the fabric, thus leaving substantially free the fabric-areas lying intermediate the said spaced-apart elastic strands.

With the above and other objects in view, as will appear to those skilled in the art from the present disclosure, this invention includes all features in the said disclosure which are novel over the prior art and which are not claimed by me in a separate application.

In the accompanying drawings:

Fig. 1 is a broken face view of a section of elastic fabric embodying the present invention;

Fig. 2 is a broken schematic face view of a section of elastic fabric showing the same stretched in the direction of its elastic strands and showing the adhesive-forming material in place preparatory to being subjected to the action of a solvent to adhere the elastic strands in place;

Fig. 3 is a sectional view taken on the line 3—3 of Fig. 2;

Fig. 4 is a face view corresponding to Fig. 2, but showing the fabric substantially relaxed and after the adhesive-forming material has been subjected to the action of a solvent to anchor the elastic strands in place;

Fig. 5 is a face view schematically showing another mode of incorporating adhesive-forming material in an elastic fabric;

Fig. 6 is a sectional view taken on the line 6—6 of Fig. 5; and

Fig. 7 is a broken face view schematically showing another mode of incorporating adhesive-forming material in an elastic fabric to enable end-ports of elastic strands to be anchored thereto.

In carrying out the present invention, as illustrated in Figs. 1 to 4 inclusive, a plurality of elastic strands 10 are incorporated into a woven, knitted, netted or the like elastic fabric which latter is generally designated by the numeral 11. The said elastic strands 10 are laterally spaced apart in parallelism and are intermeshed with a series of relatively-inelastic filling or weft strands 12 extending crosswise of the said strands 10. Also intermeshed with the filling or weft strands are a series of relatively-inelastic warp strands 13 which, like the said weft strands 12, may be formed of any suitable textile materials such, for instance, as cotton, silk, wool, regenerated cellulose, or the like.

The elastic strands 10 are formed of rubber or equivalent elastic material and may be of rectangular, round or other cross-sectional form, and may, if desired, be provided with covering materials such, for instance, as those shown in United States Patent No. 2,031,375 or United States Patent No. 1,627,255

As shown schematically in Figs. 2 and 3, one or more strands 14 may be incorporated in the fabric adjacent each of the elastic strands 10, with which latter the said strands 14 extend substantially parallel and preferably in intimate contact. The strands 14 are formed of a suitable material (specific examples of which are hereinafter recited) which will become tacky or adhesive under the action of a suitable softening material, which latter may for convenience of description be referred to as "solvent" material or fluid, examples of which will also be hereinafter given. The strands 14, also for the purpose of convenience of description, may be properly designated as "adhesive-forming" material or strands, inasmuch as, though substantially dry and non-tacky, when incorporated into fabric, the said strands 14 may be viewed as potential adhesives which do not become fully effective until treated with a solvent material, as will more fully hereinafter appear.

After the strands 10, 12, 13 and 14 or their equivalent have been incorporated into a fabric, the partly-finished fabric, preferably when sub-

stantially fully relaxed, may be immersed in, or otherwise subjected throughout its length, to the action of a suitable solvent, which will render the adhesive-forming strands 14 sufficiently soft or tacky to adhere the elastic strands 10 to the immediately-adjacent portions of the weft or filling strands 12 (Fig. 4), thus leaving the major portion of the fabric-areas A lying intermediate the elastic strands 10 with their component elements 12 and 13 substantially free of inter-adhesions.

The adhesive-forming strands such as 14 may be caused to substantially lose their identity as strands by employing a sufficiently-strong solvent over a short period of time, or a relatively-weaker solvent over a longer period of time, and be caused to penetrate portions of the transverse strands such as 12, as is indicated in Fig. 4.

By interlocking the elastic strands to only the immediately-adjacent portions of the fabric, said elastic strands are firmly anchored in place against creeping, without, however, materially reducing the flexibility or pliability of the fabric as a whole, and without imparting to the said fabric an undesirable finish.

The material from which the adhesive-forming material or strands may be formed in accordance with the present invention, as well as the solvents therefor, may vary widely, and the following is given by way of illustration:

Solvent-softenable adhesive-forming materials	Solvents
35 Methyl-polyacrylate.....	Acetone, ether, acetone and alcohol, other and alcohol, etc.
Cellulose acetate.....	Acetone, acetone and alcohol, etc.
Cellulose nitrate.....	Butyl-acetate, acetone, ether, acetone and alcohol, ether and alcohol, etc.

If it is desired to limit the softening or solvent action of the so-called solvent, the said solvent may be diluted to such a degree that the adhesive-forming strands will not entirely lose their identity as such, but will serve their purpose of adhering the elastic strands to the immediately-adjacent portions of the fabric.

Furthermore, if it is desired to render the cementing resulting from the softening of the adhesive-forming material more plastic, such material may be treated with a suitable plasticizer such, for instance, as diethyl-phthalate. The adhesive-forming material chosen should be (as are those before listed) insoluble in water after having been treated with a solvent, in order to permit the fabrics to be laundered. As before indicated, the elastic strands, the relatively-inelastic strands, the adhesive-forming material and the solvents may vary widely, and in selecting them for combination, care should be taken to insure that neither the relatively-inelastic strands or the elastic strands will be deleteriously affected by the adhesive-forming material or by the solvent employed for softening the latter. All of the solvent-softenable adhesive-forming materials and all of the solvents above referred to may be freely used without harmful results in connection with elastic strands of vulcanized rubber and with warp or weft strands or their equivalent of cotton, silk, wool and regenerated cellulose.

If desired and as shown in Figs. 5 and 6, one or more strands 15 of solvent-softenable adhesive-forming material may be helically applied directly over elastic strands 16 prior to the incorporation of the latter strands into a fabric

comprising relatively-inelastic weft or filler strands 17 and warp strands 18.

The partly-completed fabric of Figs. 5 and 6 may be subjected to the action of a suitable solvent which will effect the softening of the strands 15 so as to cause the same to adhere the elastic strands 16 to the immediately-adjacent portions of the weft or filling strands 17.

The fabrics of the present invention, whether woven, knitted, netted or otherwise fabricated, may obviously assume a wide variety of patterns or designs.

If desired and as shown in Fig. 7, elastic strands 19 may be anchored to the remainder of the fabric only at localized points. In the fabric of this figure, a suitable number of solvent-softenable adhesive-forming weft strands 20 may be extended crosswise with respect to the elastic strands 19 and the relatively-inelastic warp strands 21, in alternation with relatively-inelastic textile weft strands 22.

When the end-zone B of the elastic fabric of Fig. 7 is dipped or otherwise subjected to the action of a suitable solvent, the adhesive-forming strands 20 may be caused to adhere the strands 19, 21 and 22 together throughout the said zone. After the solvent has dried from the fabric of Fig. 7, it will be found that the portion of the fabric lying within the zone B may be conveniently sewn to garments, for the reason that when stitches are passed through this zone, even though the elastic strands may be severed by this action, the said elastic strands will remain firmly anchored in place and will not creep through the untreated section of the fabric, to thus mar its appearance, or lessen or destroy its elasticity.

From the foregoing, it will be seen that by means of the present invention, elastic strands may be anchored in place in a simple, reliable and effective manner, and without rendering the completed fabric unsightly. Furthermore, the adhesive-forming material may be of such character as not to occasion the "gumming up," so to speak, of looms, knitting machines or other apparatus employed for producing fabrics of the present invention.

As before noted, a very superior elastic fabric may be obtained by means of the present invention by causing the elastic strands to be cemented to only the immediately-adjacent portions of the fabric, to thus leave the strands in the fabric-areas intervening between said elastic strands free for relative movement.

The invention may be carried out in other specific ways than those herein set forth without departing from the spirit and essential characteristics of the invention, and the present embodiments are, therefore, to be considered in all respects as illustrative and not restrictive, and all changes coming within the meaning and equivalency range of the appended claims are intended to be embraced therein.

I claim:

1. As a new article of manufacture, an elastic fabric having a plurality of laterally-spaced-apart elastic strands incorporated therein with areas of interlaced relatively non-elastic strands therebetween; the said elastic strands being adhered to only the immediately-adjacent portions of the fabric and the major portion of the interlaced relatively non-elastic strands in the fabric-areas intermediate the said elastic strands being substantially free of adhesions.

2. As a new article of manufacture, an elastic fabric having a plurality of laterally-spaced-apart

elastic strands incorporated therein with areas of interlaced relatively non-elastic strands therebetween; the said elastic strands being adhered substantially only to the strands of the fabric in contact therewith and the interlaced relatively non-elastic strands in the major portion of the fabric-areas intermediate the said elastic strands being substantially free of inter-adhesions.

3. A method for anchoring elastic strands in elastic fabrics comprising: incorporating a plurality of laterally-spaced-apart elastic strands in an elastic fabric with areas of interlaced relatively non-elastic strands therebetween and locating adhesive-forming material only immediately adjacent the said elastic strands and excluding the said adhesive-forming material from the major portion of the interlaced relatively non-elastic strands in the fabric-areas intermediate the said spaced-apart elastic strands; then subjecting the said adhesive-forming material to the action of a solvent to effect the softening of the said adhesive-forming material to cause the same to adhere the said elastic strands to only the immediately-adjacent portions of the interlaced relatively non-elastic strands in the fabric.

4. A method for anchoring elastic strands in elastic fabrics comprising: incorporating a plurality of laterally-spaced-apart elastic strands in an elastic fabric with areas of interlaced relatively non-elastic strands therebetween and locating adhesive-forming material in strand form

only immediately adjacent the said elastic strands and excluding the said adhesive-forming material from the major portion of the interlaced relatively non-elastic strands in the fabric-areas intermediate the said spaced-apart elastic strands; then subjecting the said adhesive-forming material while in strand form to the action of a solvent to effect the softening of the said adhesive-forming material to cause the same to adhere the said elastic strands to only the immediately-adjacent portions of the interlaced relatively non-elastic strands in the fabric.

5. A method for anchoring elastic strands in elastic fabrics comprising: incorporating a plurality of laterally-spaced-apart elastic strands in an elastic fabric with areas of interlaced relatively non-elastic strands therebetween and locating adhesive-forming strand-material contiguous to the said elastic strands and excluding the said adhesive-forming strand-material from the major portion of the interlaced relatively non-elastic strands in the fabric-areas lying intermediate the said spaced-apart elastic strands; then subjecting the said adhesive-forming strand material to the action of a solvent to effect the softening thereof to cause the same to adhere the said elastic strands to only the immediately-adjacent portions of the interlaced relatively non-elastic strands in the fabric.

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