July 3, 1934. T. F. MOORE 1,965,248

ELASTIC FABRIC

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Fig. 2.

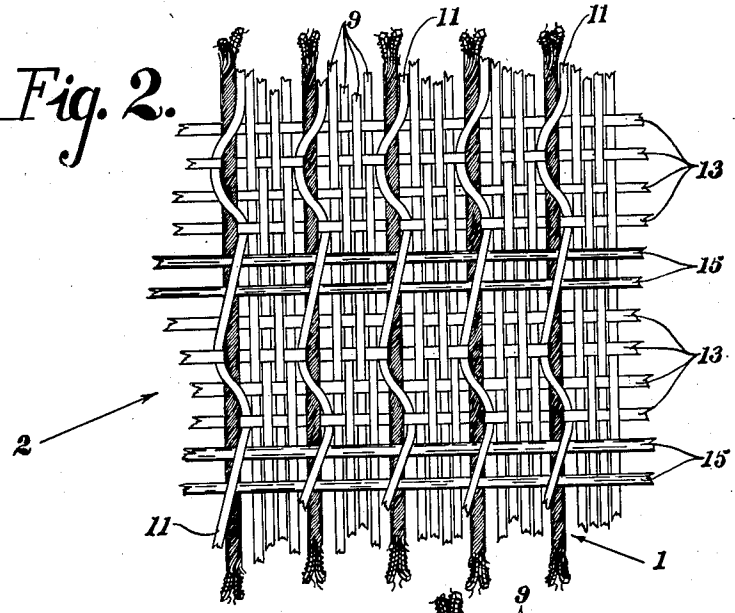


Fig. 1.

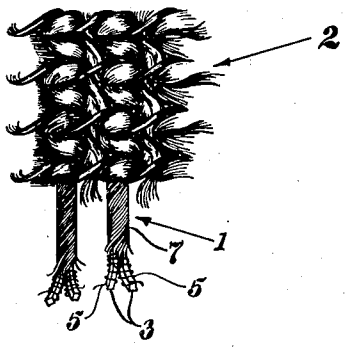
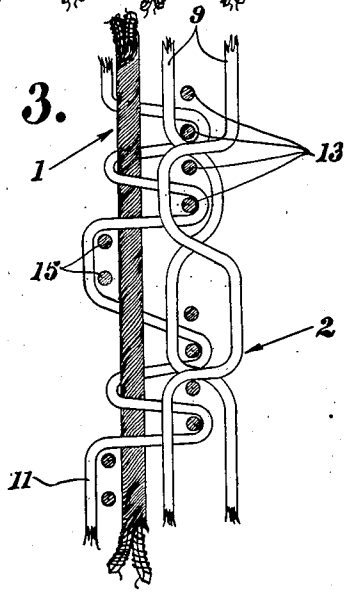


Fig. 3.



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ELASTIC FABRIC

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Fig. 5.

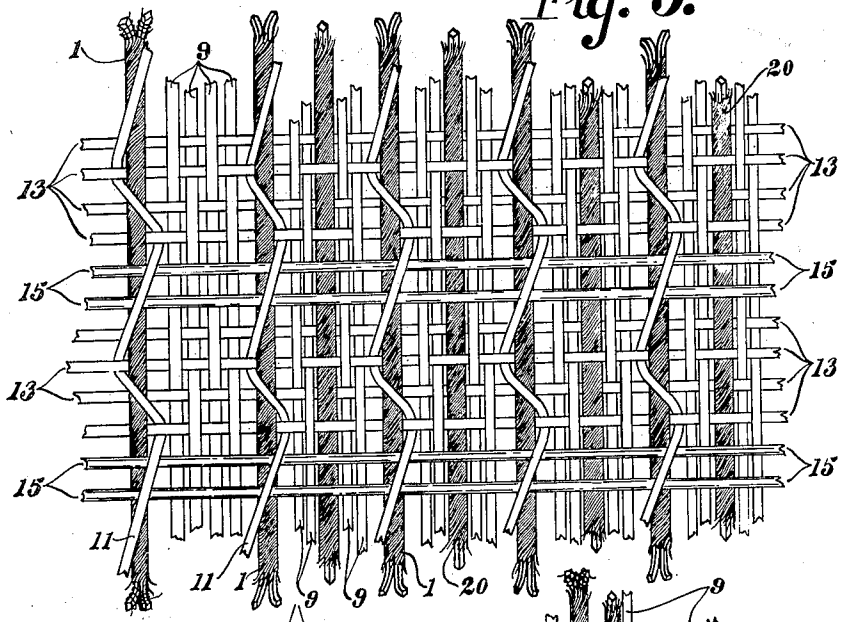


Fig. 4.

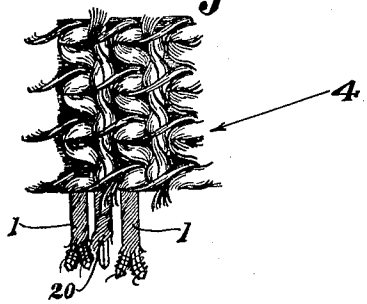
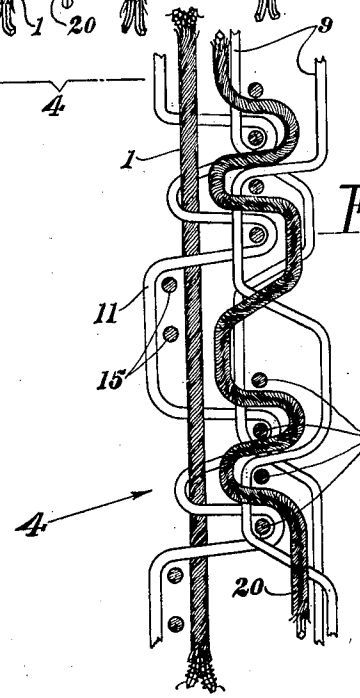


Fig. 6.



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UNITED STATES PATENT OFFICE

1,965,248

ELASTIC FABRIC

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Application June 19, 1931, Serial No. 545,401

11 Claims. (Cl. 139—423)

The object of the invention is to provide a novel elastic woven fabric of attractive and decorative appearance and improved structural characteristics, suitable for use in corsets, brassières, girdles, and the like undergarments, and for other purposes.

Fabrics embodying the invention include some or all of the following principal features:

Elastic warp strands are combined, arranged or associated with warp threads including leno warp threads, and weft threads, in a manner to provide a face of novel and beautiful design, resembling knitted fabric, and a soft, smooth back, and with or without a cuff (i.e., a marginal portion or portions) of increased strength. The cuff portion, or portions, which may be integral parts of the elastic fabric, also represent a fabric which may be independently woven. In the main fabric the warp threads (exclusive of the leno warps) are preferably of soft-twisted cotton, and lie below the elastic warp strands, forming the whole back surface of the material, with corresponding economy of cost, as well as attaining special advantages referred to later; the weft or filling threads include back weft picks, which preferably are also of soft cotton, and lie below the elastic strands, being interwoven with the cotton warps to form a smooth, soft back; other weft threads are preferably of silk, and overlie the elastic strands and the cotton warps, while leno warp threads, also preferably of silk, cross to and fro over the elastic warps and over the silk wefts, and also lie above some of the cotton wefts being retained by passing certain of the latter over the leno warps; in a preferred instance, as here shown, only two of the cotton weft picks in each "repeat" overlie the leno warp, one at each side of the elastic strand.

By this arrangement, practically the entire face of the fabric consists of the silk weft and silk leno warp threads, although these actually form only a small portion of the component materials, and the fabric also has a novel, decorative reticulated or ribbed texture, closely resembling a much more costly knitted fabric, and further has the sheen and lustre of a full silk elastic web, while possessing the superiority of cotton web in matters of softness, absorption, long wear, and lower cost.

The elastic warp strands may be single or multiple, covered or uncovered, although they are preferably covered; and also preferably (although not necessarily) they are, as here shown, of the character disclosed in U. S. Patent No. 1,849,025, granted on March 8, 1932, to Oscar F. Neidel, consisting of two individually-covered rubber strands both enclosed in an outer "wrap" or covering.

The additionally reenforced structure, considered as a separate fabric, or as a marginal or cuff portion or portions woven integrally with the main fabric, may have the same characteristics as the main fabric, with additional elastic warp strands in generally underlying and interspaced relation to the main elastic warps described hereinbefore, interwoven with the cotton weft picks, and underlying the silk wefts, whereby the cuff portion (or separate fabric) has increased thickness, durability, and elastic quality, while preserving practically the same face appearance and finish as the other, or main fabric.

The additional elastic warp strands in the cuff portions (or separate fabric) may vary in character, as stated in connection with the first-mentioned, or main, elastic warps; in a preferred example, as here shown, they are single, covered, rubber strands.

The coverings of any or all of the rubber warps may be of cotton, with marked cost-reduction, and without impairing the face appearance of the fabric; and additional economy is realized by the use of a much greater number of cotton than of silk warp and weft threads, while providing a practically completely silk-faced fabric; thus, as shown, aside from the rubber strands, all the warp threads except the leno warps are of cotton, in the proportion of four cotton to one (single or double) silk warp, and the cotton wefts are in the ratio of two to each one silk weft thread.

The soft, smooth, pliable, absorbent cotton back attained in both portions is advantageous in absorbing perspiration, body-oils, etc., and protecting the rubber strands to a marked degree from deterioration by access of such harmful substances, and in also having an agreeable "feel" and avoiding chafing, etc. Additionally, it is notably flat and smooth, in contrast to the reticulated or ribbed face of the fabric, so that there is little or no tendency to print the texture upon the skin of the wearer.

In the drawings,—

Fig. 1 is a magnified face view of a piece of elastic fabric, embodying the invention in one form.

Fig. 2 is a diagrammatic face view of the same, the threads being widely separated, to show the weave.

Fig. 3 is a longitudinal section, also of diagrammatic character.

Fig. 4 is a view, similar to Fig. 1, of a modified

fabric, representing also a marginal or cuff portion which may be woven integrally with the main fabric of the latter figure.

Fig. 5 is a diagrammatic expanded face view of the modified structure.

Fig. 6 is a longitudinal section of the same.

The fabric 2 of Figs. 1, 2 and 3 may be referred to as the "main" or body fabric, principally in distinction from the form of Figs. 4, 5 and 6, which includes also an integral, modified marginal or cuff portion 4; this portion also represents a fabric which may be woven independently of the other portion 2; that is, either form, or variations thereof, may be woven independently. With reference, first, to the main fabric, or form shown in Figs. 1, 2 and 3:

The elastic warp strands 1 may be of various character, as sufficiently stated above; as shown, and preferred in some cases, each comprises two rubber strands 3; each strand is independently covered with one or more ends 5; the two covered strands are laid side by side, and jointly covered by a suitable number of ends 7. While the material of either or both the inner and outer coverings may be of silk, this is unnecessary for the invention-purposes, and both of these coverings preferably consist of cotton ends.

A plurality of cotton back warp threads 9 are located between each two elastic warps 1; the number of these cotton warps may vary, being sufficient to provide (in conjunction with the cotton wefts) a backing of desired strength, smoothness, etc., and a fabric of required body, as above and hereafter referred to. As here shown, and as preferred in some cases, there are four cotton warps between each two adjacent elastic strands. There are also a suitable number of leno warp threads 11, usually of silk, since silk face finish is most desirable. As shown, and as usually preferred, there is only one silk leno thread for each elastic warp; by referring to one thread, it is not intended necessarily to designate a single end, but this thread may if desired contain a plurality of ends.

Figs. 2 and 3 show two repeats of the weft pattern. Each repeat includes a suitable number of cotton back weft threads 13, inserted in pairs in the same shed and woven plain with the cotton warps, but wholly below the elastic warps, and sufficient, in connection with the cotton warps, to provide a fabric and a back of desired character; and there are, as shown, four back weft picks in each repeat, corresponding to the number of the back warps. Each repeat also includes a suitable number of silk face weft picks 15 superposed above the elastic warps 1, each of which wefts may also be either single or multiple ply, as in the case of the leno warp threads, the number of picks and the number of ends to each pick being chosen to give the desired amount of silk cover to the face. As shown, the silk weft picks are inserted in pairs, being fixed by the leno warps 11, which go under every other pick of cotton warp at alternate sides of each elastic warp. In addition to crossing the silk wefts at their intersection with the elastic warps to unite both these warps and wefts to the fabric, the leno makes a second crossing of the elastic warp in each repeat, which results in completely covering the elastic warp with a face of leno silk. The crossings of the leno which go over the silk wefts are higher than the alternate plain crossings thereof, and have a different slant, and are left slack when the fabric is stretched slightly and the consequent reduction of diameter of the elastic warps lowers the plain crossings. Hence the fabric, having an aspect of parallel ribs overlying the several elastic warps when contracted, assumes a different appearance when slightly stretched, as the high crossings of the lenos come into prominence to define lines at right angles to the elastic warps, producing a reticulated aspect closely simulating knitted fabric. Also, the silk wefts in passing under the leno where it slants to the left in crossing are all given a twist in the same direction out of their normal straight line of extent when the elastic warps contract, as plainly seen in Figs. 1 and 4, which breaks up the otherwise rectangular aspect of the face and imparts an obliquity to the reticulations which further simulates a knitted fabric, and gives a slight twill-like aspect to the face.

The leno warps perform their usual useful function of holding cut or broken elastic warps against creeping in the fabric.

There is thus provided a practically continuous silk facing, consisting of the silk leno warp threads and silk weft picks, completely covering and concealing the elastic strands and their cotton coverings, and also overlying and concealing practically all of the cotton warp and weft threads, the small number of weft picks crossing above the leno warps being in the plane of the back and concealed and unobservable in the completed fabric. The interwoven cotton warp and weft threads form a complete, continuous, soft and smooth cotton base or backing, underlying the rubber and silk strands, with the advantages sufficiently explained above.

The cotton back or binder warps 9 serve principally to strengthen the fabric, and to resist or limit longitudinal strain and stretching of the rubber strands, as well as to bind securely together the cotton backing weft, and provide the desired back-finish, as just above referred to.

Fig. 5 shows the same main or body fabric 2, with an integrally-woven marginal or cuff portion 4 of somewhat modified structure, the elastic warp 1 at the right of Fig. 1 being the same as that at the left of Fig. 5. Figs. 4 and 6 show the modified structure only, which may evidently be woven independently of the other part 2, if desired. The modified portion 4 differs from the fabric portion 2, principally in added elastic warps 20 in generally interspaced and underlying relation to warps 1. The additional, or reenforcing warps 20 may be of the same character as warps 1; otherwise, as here shown, and as preferred in some cases, they are single covered rubber strands. Since these warps 20 lie in the back plane of the fabric, the use of the single-strand warps avoids giving a conspicuous ribbed effect to the back, or greatly increasing the thickness. They are located midway between the main or face elastic warps 1, and also at the center of each group of cotton warp threads 9; thus the order of warps in one lateral repeat (in the specific form shown) is, a double covered rubber strand 1, with a silk leno warp 11 generally superposed thereon, two cotton back or binder warps 9, a single covered rubber strand 20, and two back or binder cotton warps 9. The weave is the same as before, except that the additional rubber strands 20 are interwoven plain with each separate cotton weft pick, instead of under two and over two, as is done with the elastic warps 1, as clearly shown in Figs. 5 and 6. By this arrangement the additional warps 20 are caused to lie in a plane below that of the main or upper elastic warps 1, and in laterally interspaced re-

lation, and belong more particularly to the back, while strands 1 are in the upper, or facing layer, as before in the fabric of Figs. 1, 2 and 3, so that the aspect of the face is not noticeably changed from that of the face and of the fabric of such Figs. 1 to 3. Desired additional contracting strength, elasticity, and other qualities, as above referred to, are obtained, whether this modified fabric is an independent weave, or a marginal part of the main fabric 2 of Figs. 1, 2 and 3. In the latter case, the reenforced cuff is of great utility and value in fabrics for girdles, through preventing wear and tear and the undesirable rolling-over of the top and bottom edges, well-known defects in this type of garment. It will now be understood that the weft threads 13 and 15 of Fig. 2 may be continuous with those of Fig. 5, in the integral "cuffed" fabric.

Also, while the spacing of the main elastic warps 1 in Fig. 5 is greater than that of Fig. 2, this is mainly for the sake of illustrative clearness; actually, when desired, the spacing may be the same in both cases since the additional elastic warps 20 are located in a plane below the main warps 1, and no greater separation of the latter is necessary than in the fabric of Fig. 2. This is well shown in Figs. 1 and 4, in each of which two adjacent elastic warps 1 are shown projecting, and spaced apart the same distance, since these figures are in the same scale, and in Fig. 4 one of the additional or intermediate warps 20 is also shown projecting, midway between warps 1, but in a lower plane of the fabric.

While the elastic warp 20 is shown in bent and undulant form in Fig. 6 for purposes of clarity, this showing is diagrammatic only and not a representation of the actual fabric, because of course when the fabric is in its normal contracted condition the contraction of the elastic warps 1 and 20 brings them into straight relation, and the other elements shift out of their positions in Fig. 6 to conform.

While I have illustrated and described certain forms in which the invention may be embodied, I am aware that many modifications may be made therein by any person skilled in the art, without departing from the scope of the invention as expressed in the claims. Therefore, I do not wish to be limited to the particular forms shown, or to the details of construction thereof, but

What I do claim is:—

1. In an elastic fabric, in combination, back warps, back wefts, elastic warps superposed on the back warps and wefts, face wefts superposed on the elastic warps, and leno warps engaged with the back warps and crossing the elastic warps and the face wefts in going from one side of the elastic warps to the other, and crossing the elastic warps alone in returning.

2. In an elastic fabric, in combination, elastic and inelastic back warps, back wefts, leno warps, and face wefts and elastic face warps both united with the back wefts through the leno warps alone.

3. In an elastic fabric, in combination, grouped back warps, grouped back wefts interwoven with the individual back warps, elastic warps superposed on the fabric thus woven intermediate adjacent back warp groups, face wefts superposed on the elastic warps intermediate adjacent groups of back wefts, and leno warps engaging alternate back wefts and crossing over the elastic warps and the face wefts.

4. In an elastic fabric, in combination, back warps, back wefts interwoven therewith, superposed elastic warps, leno warps uniting the elastic warps with the back wefts, and other elastic warps, interwoven with the back warps.

5. An elastic fabric having in combination elastic warps, a silk facing enclosing and concealing the elastic warps and composed of leno warps and silk wefts, and a smooth, soft cotton backing.

6. In an elastic fabric, in combination, a back made of soft absorbent yarns, elastic elements superposed thereon, and a face covering the elastic elements and composed of leno warps and face wefts.

7. In an elastic fabric comprising a backing of interwoven warp and weft yarns, elastic elements superposed thereon, and leno warps combining the elastic elements with the backing, the combination therewith of additional elastic elements incorporated in the backing to give increased resistance to stretching.

8. In an elastic fabric, in combination, a back made of soft absorbent cotton yarns, a face of silk yarns, and interposed elastic elements, with certain of the silk face yarns woven as lenos to unite the elastic elements and face wefts to the back, whereby substantially all of the material comprising the face yarns appears at the face, and the elastic elements are completely covered.

9. A fabric having in combination a body portion comprising warp and weft yarns constituting substantially a smooth and continuous backing layer, elastic warps overlying said weft yarns, and leno warp yarns substantially overlying the elastic warps and caught below certain of the weft yarns at opposite sides of the elastic warps and an integral marginal portion of similar structure and including additional elastic warp strands interwoven with the wefts.

10. A fabric having in combination a body portion comprising warp and weft yarns constituting substantially a backing layer, elastic warps overlying said weft yarns, and leno warp yarns substantially overlying the elastic warps and caught below certain of the weft yarns at opposite sides of the elastic warps, and an integral marginal portion of similar structure and including additional elastic warps in underlying and interspaced relation to the main elastic warps.

11. An elastic fabric having in combination interwoven warps and wefts including elastic warps, leno warps, and other elastic warps combined with a surface of the fabric above the plane of the said wefts by means of the leno warps.

THOMAS F. MOORE.