

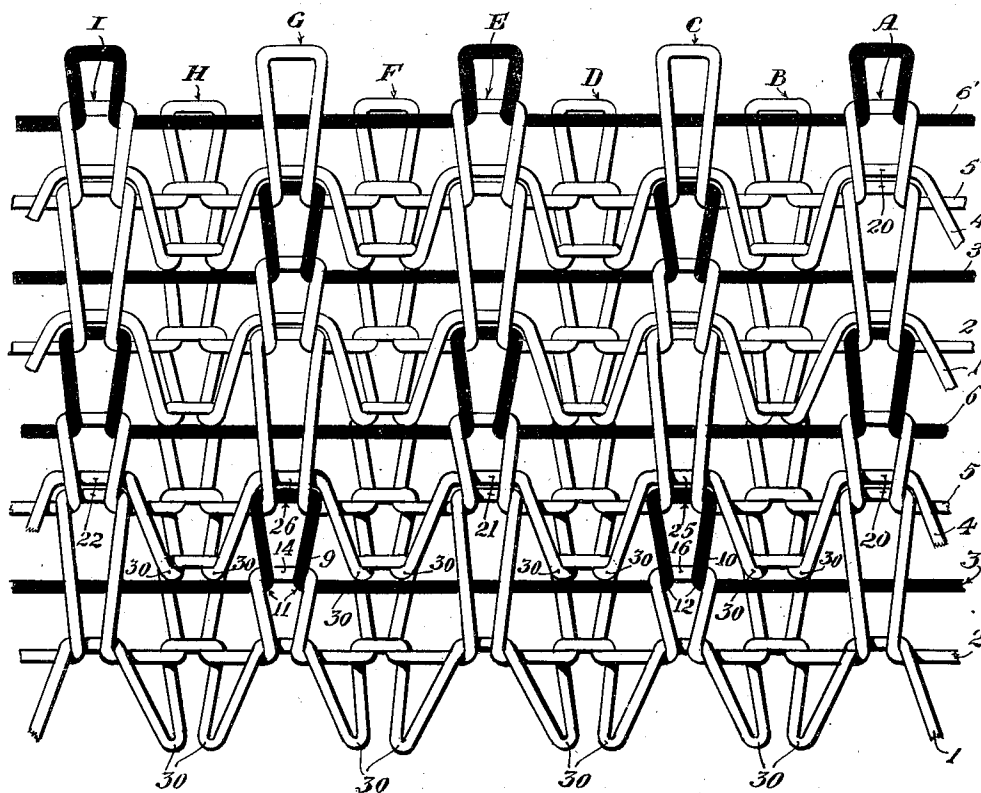
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ELASTIC FABRIC

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ELASTIC FABRIC

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The present invention relates to a two-way stretch elastic fabric and contemplates the provision of a knitted fabric in which by the combination of stitches with the use of elastic threads a greater two-way stretch of the fabric is provided than has heretofore been possible.

Heretofore in fabrics of this character two-way elastic stretch has been provided by laying elastic threads between certain courses of the fabric and by knitting into said fabric one or more courses of elastic material. In order to provide a lightweight garment, such fabrics have incorporated a fine thread which is knitted into the fabric in certain courses and a relatively heavy elastic thread which is laid into the fabric. The present invention contemplates the use of only a heavy type of elastic thread so arranged in the fabric as to provide for a substantial two-way elastic stretch. Fabrics of the character described here are frequently used for a girdle and similar confining garment. It is usually desired that such garment fit very snugly on the body and the wearer must exercise a great deal of stretching and pulling action before it can be arranged on the body. The fine knitting elastic thread heretofore used often cannot withstand the strain of such rough treatment and breaks. In addition, perspiration and exposure to the atmosphere result in the deterioration of the rubber so that fine elastic thread is likely to break after a short period of use, whereas a coarser thread having a greater area of cross sections is much less easily affected by these two factors. Therefore, the present invention contemplates the use of a comparatively heavy elastic thread.

As mentioned heretofore, heavy elastic thread has been used as an inlay. Due to the vigorous treatment to which a fabric of this character is subject, such inlaid thread is likely to shift and slip through the garment since it is not securely held in the fabric. It further tends to distort the form or shape of the garment because it is not held firmly in place. The present invention contemplates knitting the elastic fabric in certain wales so that the elastic thread will not slip and laying in the elastic thread in other wales to permit greater stretch of the garment and to economize on the amount of elastic used. By knitting in the elastic in certain wales, the elastic thread is prevented from slipping, and, in addition, if the elastic thread should break, it will be partly held in place by reason of the fact that it is knitted in certain wales. To further prevent the elastic thread from slipping or from unravelling after it breaks, the present invention

contemplates the provision, in a separate course of inelastic yarn, of tuck loops to lock said elastic thread in place. The locking action of the tuck loop materially prevents the slipping of the elastic thread and the consequential distortion of the garment. The knitting in of this thread is a further aid in this respect.

In a garment utilizing a fabric of the character here described, such as a girdle, while two-way elastic stretch is desirable and essential, it is most important that the garment be able to stretch considerably in width so that the wearer can pull such garment on without needless contortions. The present invention contemplates arranging the stitching and the elastic so that the garment will have a very substantial stretch in the direction of its width (in the direction of the courses or of the weft). In bending when wearing such a garment, considerable stretching occurs across the width of the garment, and, in order to prevent injury to the garment, the present invention contemplates that the inelastic thread be so arranged that it will give laterally and the strain of the pull thereon will be taken in the main by the elastic threads.

The present invention further contemplates the provision of means of shaping the fabric to form without any change in the stitch arrangement at the point where the material is to be made wider or narrower.

The present invention further contemplates the provision of a fabric in which the coarse elastic thread is concealed and on which designs may be shown distinctly.

The present invention further contemplates the provision of an elastic fabric having all the desirable qualities using the minimum of elastic thread.

The present invention further contemplates the provision of an economical method of producing an elastic fabric.

Other and further objects and advantages of the present invention will more fully appear from the following detailed description and from the accompanying drawing.

The drawing herewith is a schematic diagram of a portion of the fabric embodying the invention, such fabric being stretched substantially and being greatly enlarged.

The specific embodiment of my invention to be described here may be knitted on any of the well known circular dial and cylinder machines or on certain other types of knitting machines which are well known to those versed in this art and none of which, therefore, need be described.

The present invention contemplates the use of a comparatively heavy elastic thread. By such heavy elastic thread is meant a rubber cord which varies anywhere from one-sixtieth to one-thirty-sixth of an inch in cross section, and when covered the elastic thread varies from approximately eighteen hundred to eight hundred yards to the pound. As it is desirable in such a garment that these threads be covered, they are formed from an inner filament of rubber around which is wound non-elastic threads of any suitable character such as rayon, silk or cotton. The non-elastic yarn used in the fabric is a comparatively fine yarn.

The present invention contemplates combining the threads in the fabric in the following manner, the reference characters herein referring to the drawing.

In the following description, the term "tuck stitch" signifies a V-shaped loop with the point upward, together with a regular loop or a held loop from a lower course, through both of which a loop from the next higher course is drawn. The term "tuck loop" refers only to the V-shaped loop of thread with the point upward. The "held loop" refers to a long loop which has been held over a course.

The first course (1) uses inelastic yarn. The cylinder needles, which operate to produce wales A, C, E, G and I, are in this course in tuck position, that is they do not clear the preceding stitch, but take additional yarn in this course. The dial needles which operate to produce wales B, D, F and H are in regular knitting position, that is they take on yarn and clear the preceding stitches. Thus, the first course consists of alternate tuck and regular stitches.

The second course (2) consists of non-elastic yarn which is knitted on all dial and cylinder needles, that is the cylinder and dial needles take on yarn and clear the preceding stitch. All the stitched of this course are regular stitches.

The third course (3) uses only elastic thread. The elastic thread is knitted (looped) on selected cylinder needles only. It is preferred to select alternating cylinder needles and to produce knitted elastic stitches 9 and 10 in wales C and G, respectively, the sinking loops 11 and 12 of the elastic knit stitches 9 and 10 being held by the needle loops 14 and 16 of the preceding stitch in course 2. The dial needles in this course do not take on any yarn, that is they are held completely out of action. It is to be noted that the yarn taken on in the second course by the cylinder and dial needles is not cleared excepting by the two selected cylinder needles in wales C and G.

In the fourth course (4) which consists of inelastic yarn which is knitted on both the dial and cylinder needles, the cylinder needles operating along wales A, C, E, G and I are in tuck position, that is they do not clear the preceding stitch, but take on additional yarn, and continue to hold in wales A, E and I the inelastic thread picked up in course 2, and continue to hold in wales C and G the elastic thread picked up in course 3. The inelastic thread of the fourth course on these cylinder needles operating along wales C and G is superimposed on the elastic thread. The dial needles are in regular knitting position, that is they take on yarn and clear the preceding stitches picked up in course 2.

The fifth course (5) consists of inelastic yarn which is regularly knitted on all cylinder and dial needles. The cylinder and dial needles take

on additional yarn and clear the preceding stitches thereon. The cylinder needles in wales A, E and I each clear a held inelastic loop picked up in course 2 and a tuck inelastic loop picked up in course 4, the superimposed tuck loop locking the held loop of course 2, as shown at 20, 21 and 22. This is of material aid in preserving the shape of the garment made from this fabric as the held loop is not likely to slip under the strain of hard wear and distort the garment. The cylinder needles in wales C and G each clear a regular elastic loop picked up in course 3 and clear an inelastic tuck loop picked up in course 4. The inelastic loop is superimposed on the elastic loop, as shown at 25 and 26, and locks the elastic against slippage. Thus, the shape of the garment made from such fabric is preserved despite rough usage.

The sixth course (6) consists of elastic yarn only. This elastic yarn is knitted in a similar manner to that in the third course, but is knitted on the cylinder needles operating along wales A, E and I, which needles were not selected to knit (loop) in the third course.

The selection of the various needles is accomplished by mechanical devices which are well known and are on the commercial market, such as jacquards or pattern wheels, none of which are new and are known to anyone versed in the art.

The above six courses heretofore described and their relative arrangement are repeated with every revolution of the knitting machine as shown in courses 1', 2', 3', 4', 5' and 6'.

By examining the drawing, it will be seen that tuck loops of inelastic yarn are provided in every third course or in every alternate course of inelastic yarn. The tuck loops in these courses are located in alternate wales. As the sinking loops 30 of the tuck loops are not held together by the regular stitch preceding it in each wale, such tuck stitching renders the fabric more flexible.

In a fabric to be used for such garments as girdles, both flexibility and a certain degree of firmness are desirable. Therefore, tuck loops are arranged in alternate wales, the intervening regular stitches giving firmness. Similarly, tuck loops are provided in alternate courses of inelastic yarn, the tuck loops being provided in every third course when the courses of elastic yarn are included. The held loops further assist in adding to the flexibility of the fabric.

Thus, by means of the aforescribed stitch arrangement combined with the elastic yarn, we provide a highly flexible fabric.

The coarse elastic thread serves both as a knitting and as an inlay yarn. The knitting is done on a comparatively fine gauge machine by selecting alternating needles so that there is enough space on the cylinder for the needle to take a heavy yarn. The non-selected needles are held below the edge of the cylinder so that they will not in any way interfere with the selected needles. The coarse elastic thread is looped on one needle and laid across the other needle. The elastic thread is secured firmly by the non-elastic yarn so as to prevent slippage should the elastic thread break in any pulling during the wearing of the garment or should the fabric be cut.

Since it is desirable to have the stretch firm, which is important in fabrics used for girdles, two courses of elastic thread are separated from one another by two courses of non-elastic thread so

as to allow the combination of non-elastic stitches to lend firmness to this fabric.

It is important also to have at least two courses of elastic threads since one course is knitted on the selected needles and the other course of elastic thread is knitted on the needles which are not selected in the preceding course of knitting of the elastic yarn. This, therefore, gives a loop on each cylinder needle for each revolution of the machine, since each revolution of the machine has six courses of yarn.

On garments utilizing such fabric, it is difficult to show designs distinctly due to the distortion of the design by the fine elastic thread when the fabric is constructed. By the method of knitting indicated above, the coarse elastic thread is entirely in the back of the fabric which permits showing of the design clearly and distinctly no matter how small or fine the design is and due to the fact that the rubber thread is placed in the fabric in the present manner it cannot disfigure the design by its shrinkage and stretching action when the fabric is constructed.

It will be seen from a study of the figure that by the utilization of such tuck stitches the garment will stretch laterally much more readily than it would if only knitted stitches were employed. It will also be apparent that because of the comparative looseness of the tuck stitch that when the fabric is pulled laterally the tuck stitch will give, thus preventing strain upon the knitted stitches and instead placing the burden of strain upon the elastic.

This fabric can be automatically shaped to form without any change in the stitch arrangement at the point where the material is to be made wider or narrower. The method employed to obtain this fashioning or shaping of the garment is by feeding the elastic thread to the needle under a constant variable tension, the tension to be less upon the elastic thread when the material is to be made wider, and the tension to be greater when the material is to be made narrower.

From the foregoing, it will be seen that there has been provided a two-way stretch fabric, suitable for use in girdles and similar confining garments, having a greater stretch than has heretofore been possible, that this fabric is light in weight and despite its stretch is strong in construction and durable.

It will be further evident that there has been provided a fabric that may be shaped to form without any change in the stitch arrangement and in which the elastic will not distort the shape of the fabric.

It will be further seen that we have provided a fabric in which the elastic is concealed in the back of the fabric and on which designs may be shown distinctly without likelihood of distortion.

It will also be seen that this fabric is economical in its use of elastic without sacrifice of any desirable qualities in such a fabric.

It will still further be noted that there has been provided a method of making a fabric that utilizes to the full the capacity of the knitting machine thereby resulting in more efficient and more economical production.

For our invention, we claim:

1. In a knitted elastic fabric for a girdle or similar confining garment, the combination of courses of inelastic thread, certain of said courses having regular loops and certain of said courses

having both regular and tuck loops, the tuck loops in the latter courses being in alternate wales, with courses of elastic thread interposed between courses of inelastic thread and knitted as single yarn stitches only in spaced wales in one course and next knitted only in intervening wales in a following course a tuck loop of inelastic thread being superimposed on each loop of the stitches of elastic thread.

2. In a knitted elastic fabric of a girdle or similar confining garment, the combination of spaced tuck loops of inelastic thread in a course superimposed on loops of inelastic thread in another course with intervening tuck loops of inelastic thread in the first-mentioned course superimposed on loops of elastic thread in a third course.

3. A knitted two-way stretch elastic fabric for girdles or similar confining garments having wales consisting of the following order of stitches: a tuck stitch consisting of a tuck loop of inelastic thread superimposed on a held loop of inelastic thread, a regular stitch of inelastic thread, a tuck stitch consisting of a tuck loop of inelastic thread superimposed on a regular loop of elastic thread, and a laid-in thread of elastic yarn.

4. A knitted two-way stretch elastic fabric for girdles or similar confining garments having spaced wales consisting of the following order of stitches: a tuck stitch consisting of a tuck loop of inelastic thread superimposed on a held loop of inelastic thread, a regular stitch of inelastic thread, a tuck stitch consisting of a tuck loop of inelastic thread superimposed on a regular loop of elastic thread, and a laid-in thread of elastic yarn, said first-mentioned spaced wales being separated by other wales consisting of regular stitches of inelastic thread, the course of elastic thread between said regular loops thereof being a laid-in course of thread in the wales between the wales in which said regular loops of said elastic thread are arranged.

5. A knitted two-way stretch elastic fabric for girdles or similar confining garments having certain courses of inelastic thread and other courses of elastic thread, one of said courses of inelastic thread comprising alternate regular loops and tuck loops, another of said courses of inelastic thread comprising held regular loops and regular loops, certain tuck loops of the first-mentioned course of inelastic thread being superimposed on the held regular loops of the second-mentioned course of inelastic thread, said elastic courses comprising spaced-apart regular loops, the other tuck loops of said first-mentioned courses of inelastic thread being superimposed on the regular loops of the adjacent course of elastic thread.

6. The fabric of claim 5, the course of elastic thread between the regular loops thereof being laid in in the fabric.

7. In a knitted elastic fabric for a girdle, the combination of courses of inelastic thread, certain of said courses being comprised of regular and held loops and certain of said courses being comprised of both regular and tuck loops with courses of elastic threads having spaced regular loops, each regular loop of elastic thread having superimposed thereon a tuck loop of inelastic thread and each held loop of inelastic thread having superimposed thereon a tuck loop of inelastic thread.

8. In a knitted elastic fabric for a girdle or similar confining garment, the combination of spaced tuck loops in a course of inelastic thread superimposed on held loops in another course of

inelastic thread with intervening tuck loops in the first mentioned course of inelastic thread superimposed on regular loops of elastic thread in a third course.

9. In a knitted elastic fabric for a girdle, the combination of spaced tuck loops in a course superimposed on held loops of inelastic thread in another course with intervening tuck loops in

the first mentioned course superimposed on regular loops of elastic thread, said regular loops of elastic thread in said course being arranged in spaced-apart wales of the fabric and said elastic thread between said regular loops being laid in the fabric as a floater.

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