Oct. 18, 1938. C. R. ANDERSON 2,133,840

KNITTED FABRIC

Filed Nov. 16, 1936 2 Sheets-Sheet 1

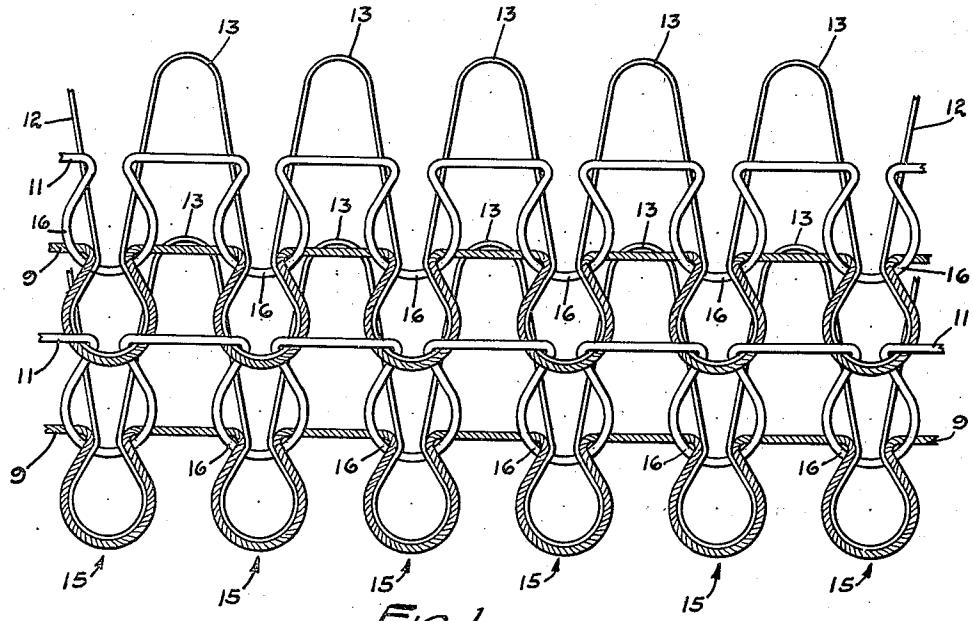


FIG. 1

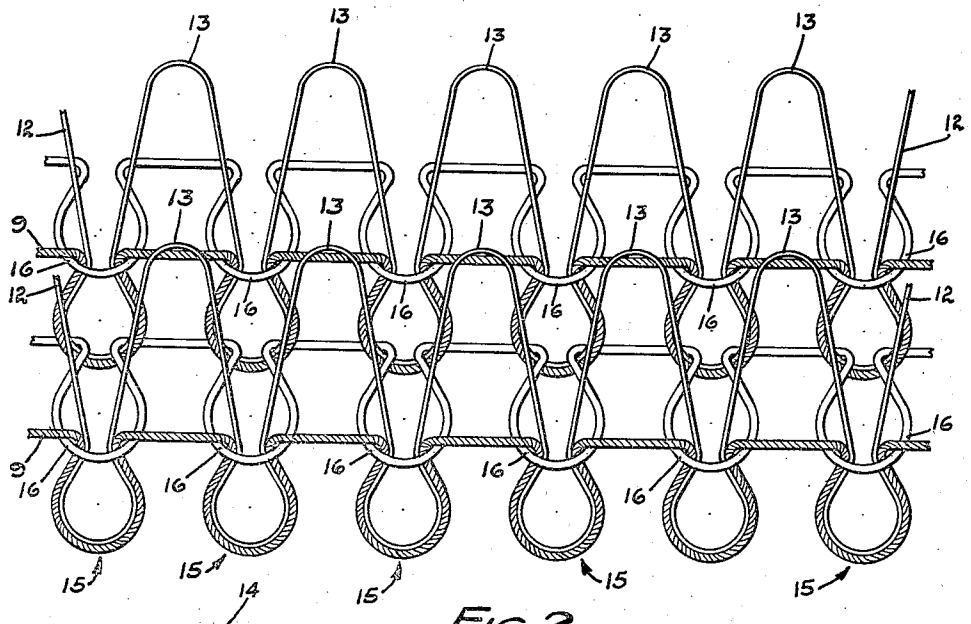


FIG. 2

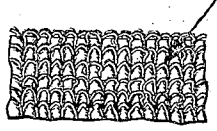


FIG. 3

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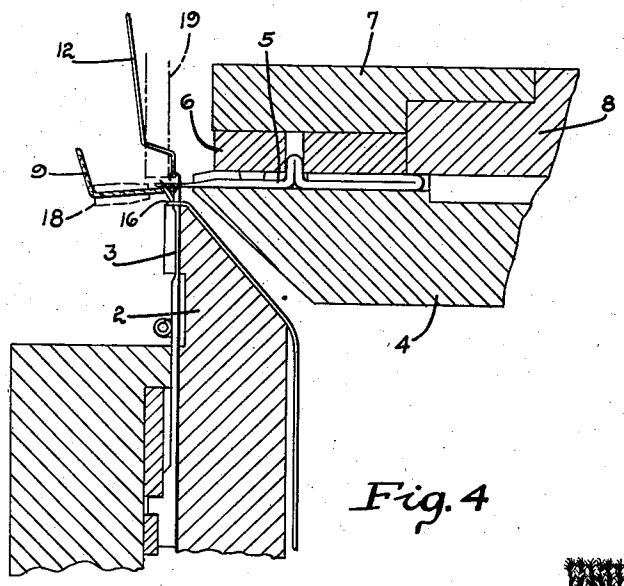


Fig. 4

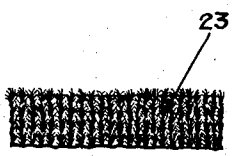


Fig. 7

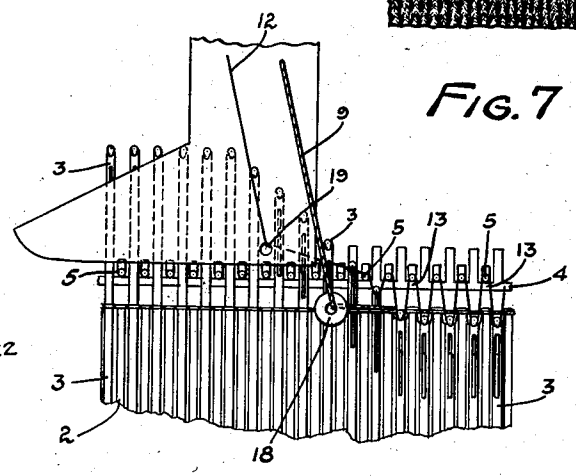


Fig. 5

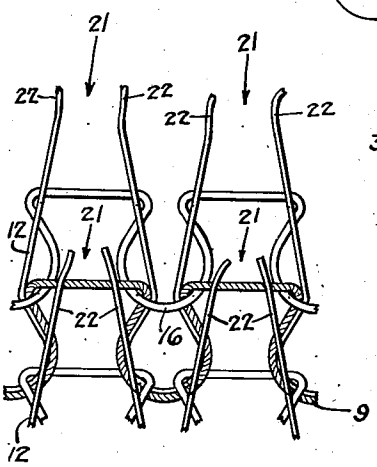


Fig. 6

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UNITED STATES PATENT OFFICE

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KNITTED FABRIC

Carroll R. Anderson, Minneapolis, Minn., assignor, by mesne assignments, to Munsingwear Inc., Minneapolis, Minn., a corporation of Delaware

Application November 16, 1936, Serial No. 111,106

9 Claims. (Cl. 66—194)

This invention relates to new and useful improvements in knitted fabrics, and more particularly to a two-way stretchable knitted fabric adapted for use in all types of foundation garments, such as corsets, girdles, and various other forms of knitted garments which are worn next to the body, whereby the fabric contacts directly with the skin.

Foundation, or form-shaping garments, are usually knitted of elastic and non-elastic yarns, with sufficient tension applied to the elastic yarn, when feeding it to the knitting machine needles, to cause the knitted fabric, as it discharges from the knitting machine, to contract to a considerable degree, which is necessary in order to give to the resultant fabric, the required stretchability essential in garments of the form-shaping and fitting type, of the class herein referred to. Such tensioning of the yarn causes the wales of the fabric to be drawn into close contact with one another, and, as a result, gives the fabric a rather hard, firm finish, which, when pressed firmly against the surface of the skin by the inherent tension in the fabric, may be more or less uncomfortable to the wearer.

It is now common practice to knit foundation garments, girdles, and various other types of garments, of elastic yarn, such as commonly known to the trade as "Lastex", or "cut rubber yarn", and rayon yarn, which may be substantially non-elastic. Other yarns may, at times, be inter-knitted with the elastic and non-elastic yarns to produce certain results, or effects as, for example, reinforcing the fabric, but the two latter yarns constitute the main body of the fabric. For the sake of convenience, I shall hereinafter refer to the elastic yarn as "Lastex", but it is to be understood that other elastic yarns or threads suitable for the purpose may be utilized without departing from the scope of the invention.

Because of the tension applied to the "Lastex", when fed to the knitting machine needles, the outer surfaces of the fabric, as hereinbefore stated, acquires a more or less hard finish which, in close fitting garments, is sometimes undesirable, in that it often tends to form impressions or small grooves and ridges in the skin, simulating the rows of stitches and wales of the fabric, because of the pressure exerted against the body by the inherent tension in the fabric. The hard surface of the fabric may also chafe the surface of the skin of some individuals, if the garment is permitted to relatively move upon the body when worn.

It is therefore desirable that knitted fabrics to be used in the construction of foundation and other garments of a similar character, be so knitted that the side thereof which is to be fitted against the skin of the body, will have a soft, hairy-like, or velvety finish which, in addition to making the garment far more comfortable to the wearer, will also make it considerably easier to slip onto and off the body.

An object of the present invention, therefore, is to provide a knitted fabric comprising alternately arranged elastic and non-elastic yarns having inter-knitted therewith, a fine yarn or thread having relatively long free loops formed therein and disposed at one side of the fabric, which loops cooperate to provide a soft, hairy-like nap, or velvety finish which, when fitted against the body, will be extremely comfortable, and cannot chafe, or otherwise mark or injure the surface of the skin of the wearer.

A further object is to provide a terry cloth fabric comprising a combination of elastic and non-elastic yarns or threads which are so tensioned, during the knitting of the fabric, that the resultant fabric is rendered stretchable both horizontally and vertically, and wherein the free terry loops formed on the one side of the fabric are of sufficient length to permit the garment to be stretched over the body without destroying the soft, hairy-like nap, or velvety finish, provided on the inner surface of the fabric by the terry loops.

Other objects of the invention reside in the provision of a two-way stretch, plain knitted fabric of the terry type, composed of elastic and non-elastic yarns, which fabric is particularly well adapted for use in the construction of foundation and other form-shaping garments; in the provision of a fabric of the character disclosed, having a soft, hairy-like nap on one side which, when fitted against the body, permits greater absorption of perspiration than does ordinary two-way stretch fabrics now commonly used in the construction of foundation and similar garments; and in the provision of such a fabric which may be knitted on conventional knitting machines without materially altering the construction thereof.

Other objects of the invention will appear from the following description and accompanying drawings and will be pointed out in the annexed claims.

In the accompanying drawings there has been disclosed a structure designed to carry out the various objects of the invention, but it is to be understood that the invention is not confined to

the exact features shown as various changes may be made within the scope of the claims which follow.

In the drawings:

Figure 1 is a greatly enlarged view showing one side of the fabric and the yarns under tension as when knitting the fabric, whereby the wales are separated from one another;

Figure 2 is a similar view showing the opposite side of the fabric with the relatively long terry loops formed therein;

Figure 3 is a view on a relatively smaller scale, showing the soft, velvety nap provided on one side of the finished fabric by the relatively long terry loops;

Figure 4 is a view diagrammatically illustrating a portion of a knitting machine and showing the manner of forming the terry loops which provide the soft finish on one side of the fabric;

Figure 5 is a view diagrammatically illustrating the manner of feeding to the knitting machine needles, the yarn which forms the terry loops;

Figure 6 is an enlarged view similar to Figure 2, showing the terry loops sheared at their free ends; and

Figure 7 is a view similar to Figure 5, showing the soft-hairy-like nap provided by shearing the ends of the loops, as shown in Figure 6.

To afford a clearer explanation of the invention, there is illustrated in Figure 4, a portion of a conventional knitting machine comprising a cylinder 2, having the usual vertically disposed knitting needles 3 mounted therein, which are operated vertically in the usual manner by suitable cams, not shown in the drawings. The usual dial plate 4 is shown mounted above the cylinder 2, and carries the dial blanks 5, mounted for radial movement by suitable cams 6, diagrammatically illustrated in Figure 4. The cams 6 are removably mounted in a suitable cam ring 7 which, in turn, is secured to a fixed support, generally indicated by the numeral 8. The cylinder and dial rotate synchronously, as is well known in machines of this general type.

An important feature of the present invention resides in the construction of a knitted fabric comprising a plurality of courses of elastic and non-elastic yarns 9 and 11, respectively, having inter-knitted therewith, another yarn or thread 12, preferably of relatively smaller diameter which, during the knitting operation, is formed with relatively long loops 13 on one side of the fabric and with anchoring loops between the long loops knit with loops of certain of the courses, as best shown in Figures 1 and 2. These relatively long loops, which will hereinafter be referred to as terry loops, cooperate to provide a soft, hairy-like, and velvety finish for one side of the fabric, as clearly shown at 14 in Figure 3.

The particular method of inter-knitting the yarns is clearly illustrated in Figures 1 and 2, wherein the wales, generally indicated by the numeral 15, are shown spaced apart horizontally in substantially the position in which they are supported on the knitting machine cylinder. The novel fabric herein disclosed is particularly well suited for foundation garments, girdles, and various other garments of the form-shaping and fitting type, which are worn next to the skin of the wearer.

During the knitting operation, the "Lastex" and the relatively finer terry yarn 12 are fed to the cylinder needles 3 simultaneously, and each needle 3 will engage both threads and pull them downwardly through the loops 16 of the preceding row of stitches. The "Lastex" yarn 9, as best shown in Figure 4, is fed to the cylinder needles 3 at an elevation below the dial blanks 5, and the terry thread or yarn 12 is fed to the cylinder needles at an elevation above the dial blanks, and is pulled downwardly between said blanks by the cylinder needles 3, as best illustrated in Figure 5, thereby to provide the relatively long terry loops 13, shown in Figures 1 and 2. Suitable guides 18 and 19, diagrammatically illustrated in Figure 5, are provided to guide the yarns 9 and 12, respectively, to the knitting machine needles, as hereinbefore described. The length of the loops 13 may be varied to obtain the desired effect, by vertically adjusting the dial plate and the dial blanks 5 with respect to the cylinder needles 3, as is well known in machines of this general character.

Spaced from the guides 18 and 19 in the direction of travel of the cylinder, is located a third guide, not shown, which feeds the non-elastic or rayon yarn to the cylinder needles 3 in the usual manner. This operation is well-known to the trade, and it is therefore thought unnecessary to herein show the same in detail.

The "Lastex" and rayon yarns 9 and 11 are alternately arranged in the fabric, as shown in Figures 1 and 2, so that alternate courses of stitches will be knitted with elastic yarn, while the intervening courses will be knitted with rayon or non-elastic yarn.

In the operation of knitting the fabric, sufficient tension is applied to the yarns, particularly the "Lastex", to cause the resultant fabric, when discharging from the knitting machine cylinder, to contract to the extent that the wales 15 and terry loops 13 are drawn close together, as best shown in Figure 3, and whereby the fabric is rendered stretchable both horizontally and vertically, the greatest degree of stretch, however, being lengthwise of the row of stitches, or circumferentially of the garment.

The terry yarn or thread 12 is preferably inter-knitted in the fabric in the courses of the "Lastex" yarn 9, although, if desired, it may be inter-knitted together with the courses of non-elastic yarn 11. In actual practice, however, I have found that when the terry yarn is knitted into the fabric together with the "Lastex", a relatively fine fuzz or nap is also provided on the outer surface of the fabric, which tends to improve the appearance of the fabric and gives it a relatively softer finish. The terry loops 13 on the opposite side of the fabric, because of their length and because of being drawn into close contact with one another, as shown in Figure 3, provide a soft nap or velvety-like finish on the opposite or inner side of the fabric, which completely covers said surface and provides a very soft and comfortable surface to be fitted against the body of the wearer. The terry loops 13 are made sufficiently long to permit free stretching of the fabric, when fitting it onto the body, and whereby the soft, velvety finish provided thereby is not destroyed, even when the fabric is placed under considerable tension on the body.

When the terry yarn is knitted in to the fabric together with the non-elastic rayon yarn 11, the one side of the fabric will have a relatively harder finish, while the opposite side thereof will have a very soft, velvety finish because of the provision of the terry loops thereon.

In the drawings, I have shown the "Lastex" or elastic yarn and the non-elastic rayon yarn

inter-knitted in the fabric in alternately disposed relation, and the terry yarn or thread 12 interknitted in the fabric together with the "Lastex". It is to be understood, however, that if desired, a terry yarn may be knitted into the fabric in each course of stitches or together with both the "Lastex" and rayon yarns 9 and 11, respectively, without departing from the scope of the invention. When thus knitting a terry yarn into each course of stitches, the additional material added to the fabric by the terry yarn 13, materially increases the weight of the fabric and tends to make it slightly heavier and less pliable which, in some cases, may be undesirable. For all practical purposes, I have found that when the terry yarn is inter-knitted into the fabric in alternate courses of stitches only, that the resultant soft, velvety finish provided by the terry loops 13 will be ample for all practical purposes and, at the same time, a saving in material is effected.

In Figures 6 and 7, there is shown a fabric in which the terry loops 13 are sheared at their outer or free ends, as shown at 21 in Figure 6. When the loops 13 are thus sheared, a plurality of free yarn ends 22 are provided in lieu of the small loops shown at 14 in Figure 3. The small strands or fibers of the terry yarn 12 may then readily separate or fray out at the terminals of the yarn ends 21, as clearly illustrated in Figure 7, whereby a very soft, hairy-like nap is provided, which completely covers the surface of the fabric and provides a finish which offers the utmost in comfort, even to the most delicate skin.

As previously stated, the novel fabric herein disclosed has been found very well adapted for foundation garments, girdles and the like, in that it provides a garment which is very comfortable and one which may readily be pulled onto and off the body with very little effort. This results because of the soft, hairy-like nap, or velvety finish, provided on the inner surface of the fabric, which reduces frictional contact with the body, by completely concealing the small grooves and ridges present between adjacent courses of stitches and between adjacent wales of the fabric of the garment. The nap 14 formed on the inside of the fabric by the terry loops also prevents the fabric from chafing the body, when the garment relatively moves thereon, which is more or less common in garments constructed of a stretchable fabric whose inner surface has a relatively hard finish.

In the foregoing, I have described the fabric as being knitted in alternately arranged elastic and non-elastic yarns, having a relatively finer yarn or thread inter-knitted therewith to provide the terry loops. In some instances, it might be found desirable to knit the fabric of Lastex or elastic yarn only, with which a relatively finer yarn or thread of a suitable material such, for example, as rayon, is interknitted to provide the soft, velvety nap required on one side of the fabric. From actual experience, however, I have found that a fabric knitted of a combination of elastic and non-elastic yarns, as herein disclosed, provides a very practical and satisfactory garment.

I claim as my invention:

1. A knitted fabric including an elastic body thread and an inelastic body thread interknit to form separate but interconnected elastic and inelastic knitted body loops, and auxiliary threads having anchoring loops interknit with certain of the body loops, and having fleecing portions intervening between said anchoring loops formed free of the body loops of the elastic and inelastic threads and projecting from the face of the fabric so as to provide a soft, hairy-like nap or velvety finish.

2. A knitted fabric including an elastic body thread and an inelastic body thread interknit to form separate but interconnected elastic and inelastic knitted body loops, and auxiliary threads having anchoring loops interknit with certain of the body loops, and having terry loops intervening between said anchoring loops formed free of the body loops of the elastic and inelastic threads and projecting from the face of the fabric so as to provide a soft, hairy-like nap or velvety finish.

3. A knitted fabric comprising courses containing knit loops of elastic thread and separate alternate courses of inelastic thread interknit with the courses of elastic thread, and auxiliary threads at alternate only of said courses having enchoring loops interknit with the loops thereof, and having terry loops intervening between said anchoring loops projecting from the face of the fabric so as to provide a soft, hairy-like nap or velvety finish.

4. A knitted fabric comprising courses containing knit loops of elastic thread and separate courses of inelastic thread interknit with said elastic courses, and auxiliary threads in only the courses containing the elastic thread having anchoring loops knit with the loops of the elastic thread and spaced from each other by the courses of inelastic thread, and having terry loops intervening between said anchoring loops and projecting from the face of the fabric so as to provide a soft, hairy-like nap or velvety finish.

5. A two-way stretch fabric comprising successive interknit courses of body loops, at least certain of said courses containing knit loops of elastic thread so as to render the fabric stretchable in two directions, and auxiliary threads at only spaced courses of the fabric having anchoring loops interknit with body loops of said courses, and having terry loops intervening between said anchoring loops and projecting from the face of the fabric, the terry loops of the auxiliary thread in one course being free of direct knitted connection with the terry loops of the auxiliary thread in another course.

6. A two-way stretch fabric comprising successive interknit courses of body loops, at least certain of said courses containing knit loops of elastic thread so as to render the fabric stretchable in two directions, and auxiliary threads at only spaced courses of the fabric having anchoring loops interknit with body loops of said spaced courses, and having terry loops intervening between the anchoring loops, said terry loops being longer than the anchoring loops and projecting from the face of the fabric so as to provide a soft, hairy-like nap or velvety finish.

7. A two-way stretch fabric comprising successive interknit courses of body loops at least certain of said courses containing knit loops of elastic threads so as to render the fabric stretchable in two directions, and auxiliary threads at only spaced courses knit with the body loops of said courses, and having long terry loops intervening between said anchoring loops and projecting waleswise at the face of the fabric to overlie the intervening courses of the fabric from which said auxiliary threads are omitted.

8. A two-way stretch fabric comprising successive interknit courses of body loops, at least

certain of said courses containing knit loops of elastic threads so as to render the fabric stretchable in two directions, and auxiliary threads or yarns of smaller diameter than the elastic threads at only certain recurrent spaced courses of the fabric, said auxiliary threads having anchoring loops interknit with the body loops of said courses, and having terry loops of greater length than the anchoring loops intervening between the anchoring loops and projecting from the face of the fabric so as to provide a soft, hairy-like nap or velvety finish.

9. A knitted fabric including an elastic body thread and an inelastic body thread interknit to form separate but interconnected elastic and inelastic body loops, and auxiliary threads of smaller diameter than the elastic threads having anchoring loops knitted with certain only of the body loops, and having terry loops of greater length than the anchoring loops projecting from the face of the fabric and overlying body loops of the fabric other than those with which the anchoring loops are knit.

CARROLL R. ANDERSON.