

March 28, 1939.

M. WEBER

2,151,879

KNITTED FABRIC AND METHOD OF MAKING THE SAME

Filed Dec. 14, 1937

2 Sheets-Sheet 1

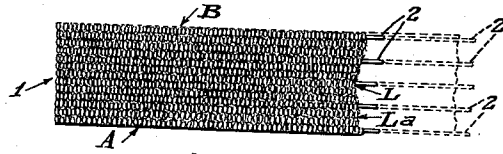


Fig. 1

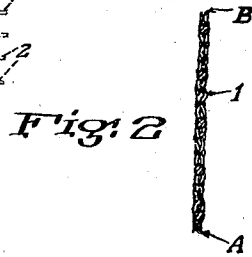


Fig. 2

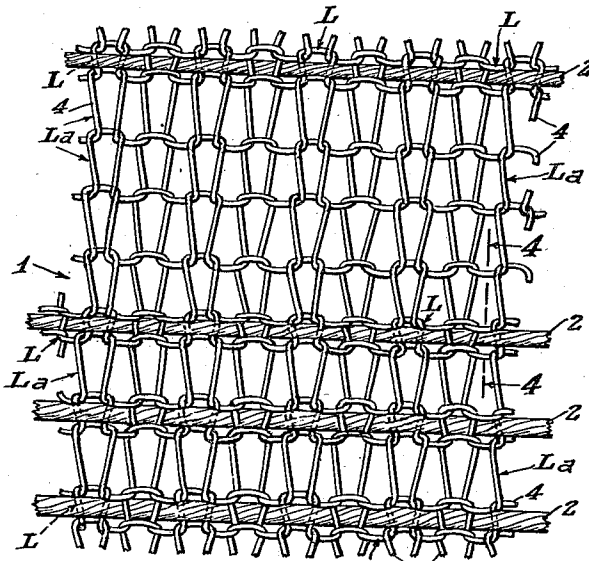


Fig. 3

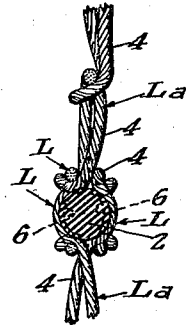


Fig. 4

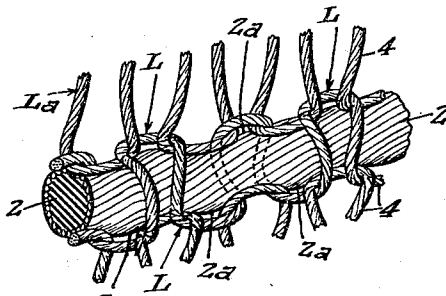


Fig. 5

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2 Sheets-Sheet 2

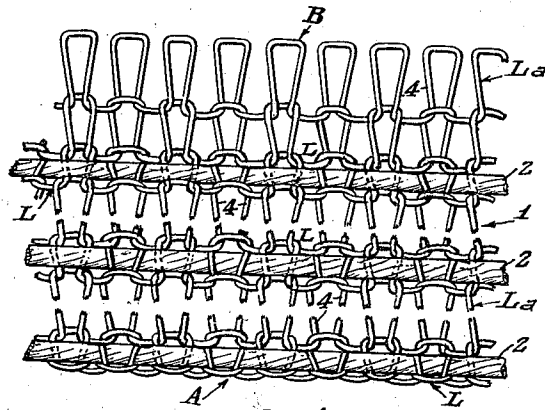


Fig. 6

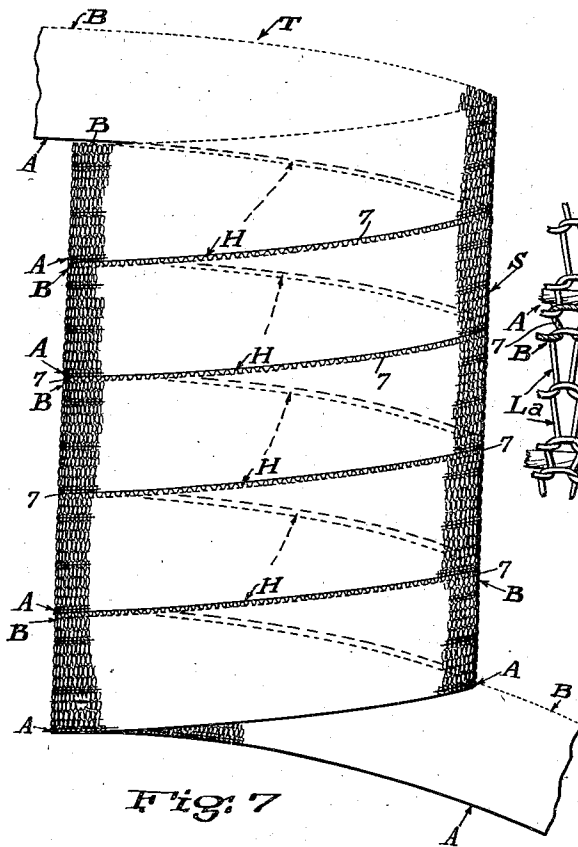


Fig. 7

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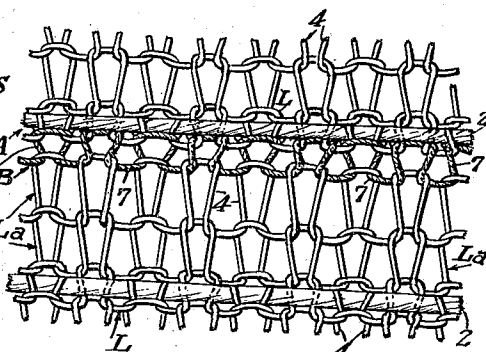


Fig. 8

UNITED STATES PATENT OFFICE

2,151,879

KNITTED FABRIC AND METHOD OF MAKING THE SAME

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3 Claims. (Cl. 66—190)

My invention relates to a new and improved fabric and a method of making the same. The invention relates to an elastic fabric, and also to a non-elastic or non-stretchable fabric.

5 One of the objects of my invention is to provide a narrow fabric which can be made of any desired width and in any desired length, so that a continuous length of the material can be provided, this continuous length being of any suitable width.

10 Another object of my invention is to provide a knitted material of this kind having a single finished longitudinal edge, the other edge of the material being unfinished, so that said unfinished edge can be sewed to a garment or the like so as to provide a cuff or the waist portion of a garment or the edging of a garment or the like.

15 Another object of the invention is to provide a ribbed fabric which is knitted so as to provide a face layer and a back layer, by means of the ordinary cylinder and dial machine (for example), said knitted fabric having spaced yarns laid in between the loops of the face layer and the back layer thereof. Said yarns may be elastic or non-elastic and some of them may be elastic and others may be non-elastic. Said yarns are laid in between said loops in such manner as to prevent creeping of said laid-in yarns relative to the loops. In a fabric of this kind, the ribs are transverse to the length of the fabric.

20 Another object of the invention is to provide an elastic fabric which can be cut at any point without causing separation between the elastic yarns and the looped yarns.

25 Another object of the invention is to provide a fabric of this type which will be of substantially uniform thickness and which will have the same surface appearance as an ordinary knit fabric, and which will have smooth front and back surfaces, like ordinary ribbed knit fabric, by eliminating the bulge of the laid-in yarns.

30 Other objects of the invention will be set forth in the annexed description and drawings which illustrate a preferred embodiment thereof, it being understood that the above statement of the objects of my invention is intended generally to explain the same without limiting it in any manner.

35 Fig. 1 is a front elevation of the improved fabric.

40 Fig. 2 is an end view of the fabric shown in Fig. 1.

45 Fig. 3 is an enlarged diagrammatic view showing the construction of the fabric.

Fig. 4 is a sectional view on the line 4—4 of Fig. 3.

Fig. 5 is an enlarged view showing how the elastic yarns are gripped in the knitted loops.

Fig. 6 is an enlarged view showing how the fabric can be provided with one continuous longitudinal finished edge, the other edge being unfinished.

Fig. 7 is a perspective view showing how a tubular piece of fabric can be knitted with a removable yarn, so that said tubular piece can be used for making a strip of the fabric.

Fig. 8 shows the location of the removable yarn in the tubular piece illustrated in Fig. 7.

15 It has been well known for many years to make a fabric from non-elastic yarn such as yarn made of cotton or silk or rayon or the like, and to lay in elastic yarns made of rubber or the like in said fabric. Such fabrics have been unsatisfactory for many reasons. The elastic yarns formed ridges or bulges so that the fabric was of unequal thickness. Likewise the elastic yarns separated readily from the fabric base, especially when the fabric base was cut or stretched.

20 According to the invention, the fabric base is a ribbed knit fabric which can be made with the use of substantially non-elastic yarn, such as yarn made of cotton or wool or silk or rayon or the like. While such yarns have a certain amount of stretch or elasticity they may be considered as being non-elastic for the purposes of the invention, in comparison with the elastic yarns 2. These elastic yarns 2 can be made of rubber and said yarns can be covered with one or more outer helical layers of protective thread made of silk or cotton or the like.

25 Covered elastic yarns of this type under the name of "Lastex" are well known so that they require no specific description.

30 The thickness or the diameter of the laid-in yarn is preferably greater than the thickness of the non-elastic base yarn. This is especially desirable when the laid-in yarn is elastic. This elastic yarn may have a rough surface and if it is a covered elastic yarn, the covering of the rubber core may have a rough surface instead of the usual smooth surface. The roughened surface of the yarn facilitates the gripping thereof between the loops of the base fabric.

35 The knitted fabric may be varied without departing from the spirit of the invention and in Fig. 3 I have shown one conventional form of knitted fabric by way of illustration. The relatively non-elastic yarn 4 is knitted in courses shown as extending horizontally in Fig. 3 and in

wales shown as extending vertically in said Figure 3.

The cost of manufacture of the material is greatly lessened by using spaced elastic yarns 2 which are held in longitudinal rows of loops which are composed of the relatively non-elastic yarn 4.

In previously-manufactured materials of this kind, the elastic yarns 2 moved relative to the loops in which they were located, especially if the fabric was cut, so that the fabric lost its elasticity.

As shown in Fig. 5, the holding loops L are made sufficiently tight so as to imbed the non-elastic yarn 4 into the resilient material of the elastic yarn 2. The periphery of the elastic yarn 2 is usually cylindrical, and this form is preferred although the elastic yarn 2 could have a non-circular cross section. Since the holding loops L are imbedded in the respective elastic yarn 2, the material of the elastic yarn 2 is bulged outwardly so as to form yarn portions having longitudinal convex elements 2a. The holding loops are sufficiently tight to compress the additional yarn 2, so as to diminish its thickness throughout and eliminate bulges.

Likewise, and as shown in Fig. 3, the holding loops L may be made smaller than the intermediate loops La, as clearly shown in Fig. 3.

Fig. 4 shows by means of broken lines 6, how the sinker loops have been tightened so as to be imbedded in the elastic yarn 2.

The elastic yarns 2 may be laterally spaced in any suitable manner. This varying spacing is shown in Fig. 3.

There may be one or more rows of loops between adjacent elastic yarns. For example, the top of Fig. 3 shows four rows or courses of loops between the two top elastic yarns 2. The remainder of Fig. 3 shows only a single row of loops between spaced elastic yarns 2. The holding loops L may be made smaller than the intermediate loops La, by suitably setting the knitting machine.

The fabric is knit so that it is freely stretchable in the direction of its length, as indicated by the broken lines in Fig. 1. This direction of stretch is parallel to the elastic yarns 2. However, the loops La would not impart the desired elasticity to the fabric, and this is secured by including the elastic yarns 2.

When the elastic yarns 2 are incorporated into the fabric, said yarns 2 are preferably not under tension.

By making the holding loops L sufficiently tight, thus making allowance for the extra thickness of the yarn 2, the fabric is made of substantially uniform thickness, as shown in Fig. 2.

The grip of the loops L upon the elastic yarn 2 is so tight as to prevent any creeping or relative movement between the elastic yarns and said loops, when the improved fabric is cut.

The improved material can be used for making narrow fabrics as well as wide fabrics of various kinds. Likewise the improvements can be incorporated into any desired part or parts of a garment, such as the edge of a cuff, the waist portion of a garment as a belt, and the like.

The improved material can also be used for making complete garments and for numerous other purposes.

The invention is not limited to the use of straight elastic yarns as the holding loops which hold an elastic yarn may follow a line of any shape.

Likewise, by laying in non-elastic yarns, the

stretch of the material can be eliminated or limited so as to provide edging material which can be used instead of ordinary woven tape or the like.

When the improvement herein is used for finishing the edge of a garment or the like, the unfinished edge is sewed to the garment so that the finished edge forms the edge portion of the garment.

The thickness of the additional yarn, such as the "Lastex" yarn, may be twice the thickness of the non-elastic yarn which is made of cotton or silk or rayon or the like. This relation may vary depending upon the effect and weight which it is desired to secure.

Fig. 6 shows a strip of the improved fabric 1, having an elastic yarn or thread 2 at the finished edge thereof. This longitudinal finished edge is the bottom edge illustrated in Fig. 6. There may be four rows of loops or any desired number of rows of loops, between adjacent elastic yarns 2.

Fig. 6 shows the unfinished longitudinal edge B, in addition to the finished edge A. The finished or welt edge A may be of any standard design or construction.

Fig. 7 illustrates a tubular piece T of ribbed fabric which can be knitted by means of a knitting machine of the cylinder and dial type, modified to produce the type of work herein stated. This tubular fabric can be made of any desired length in the direction of its vertical or longitudinal axis.

This tubular piece of knitted fabric is cut so as to provide a single continuous length of the fabric illustrated in Fig. 6. For this purpose sleeve or tube of fabric has a helically disposed yarn 7 removed therefrom along the helical line H. In order to facilitate the removal of the yarn along the helical line H, said yarn may be cut and it may be removed in pieces. The sleeve or tube T which is shown in Fig. 7 is therefore knitted specially so as to provide the yarn 7 along the helical line H, and said yarn can be distinguished from the other yarns, as by means of color or the like, if this is desired. By cutting and pulling the yarn 7 out of the tube T, along the helical line H, the piece of fabric which is thus formed has one continuous longitudinal finished edge A and another continuous unfinished edge B. In effect, the yarn 7 along the line H connects the unfinished edge B to the adjacent finished edge A. Assume that a vertical cut is made in tubular piece T, equal to the height of helical strip S in Fig. 7, and that said tubular piece is then cut helically along line H. This will result in producing a flat strip of material, whose width is equal to the height of helical strip S. Fig. 8 shows the yarn 7, which is pulled out or removed along the helical line H. As shown in Fig. 8, the removable yarn 7 is interconnected with the loops of the fabric along a line which is parallel to the parallel elastic yarns 2. Since yarn 7 is helically arranged, as shown in Fig. 7, the elastic yarns 2 are also helically arranged. Hence, when the yarn 7 is removed so as to change helical strip S to a flat strip, it is not necessary to cut the elastic yarns 2, save perhaps at the top or bottom end of helical strip S. Since the helical strip S can be made of any desired height, a very long flat strip, which is elastic in the direction of its length, can be made with little or no cutting of the elastic yarn, by removing yarn 7. The width of said flat strip depends on the pitch of yarn 7. Assuming that the longitudinal axis of the helical strip S is vertical, the ribs run in the vertical direction.

However, since the strip is formed by separating the helical strip along a helical line which is necessarily not perpendicular to the vertical axis of the helical strip, the resultant strip has ribs which are lateral relative to the longitudinal axis of said strip, but said ribs make an angle other than ninety degrees with the longitudinal axis of the strip.

The ends of the strip which is thus formed are unfinished, instead of being self-finished as when a strip is knitted on a flat machine.

The loops which are formed by means of said yarn 7 may be smaller than the loops which are formed by the yarn 4.

It is preferred to have one of the longitudinal yarns 2 directly adjacent the finished edge A.

The strip of material which is shown in Fig. 6 can be cut transversely to said longitudinal yarns 2. The ribs are perpendicular to said edges A and B, in Fig. 6.

In effect, Fig. 7 shows a tubular blank of knit fabric. Said blank has transverse yarns 2 (elastic or non-elastic) which are held by the loops of said knit fabric. These yarns 2 may be omitted without departing from the broader aspects of the invention. The blank may be knitted from any desired number of yarns, elastic or non-elastic, and some of said yarns may be elastic and others may be non-elastic, so that said blank can be elastic either along its axis, or transverse to said axis, or in both directions so that said knitted material has one-way stretch or two-way stretch. Said blank has loops forming a finished edge and loops forming an unfinished edge arranged continuously along the helical line H and each row of finished loops is directly adjacent a row of unfinished loops. Said adjacent finished loops and unfinished loops are connected by the removable yarn 7.

The knit fabric is composed of series of courses each of which comprises a plurality of helical courses. Each series consists of a number of courses and may be the line of loops formed from a single one of the threads. When the removable yarn 7 is taken out the strip formed consists of the series of courses running longitudinally of the strip and side by side of each other.

I do not wish to be limited to forming the finished edge and the unfinished edge in the tubular piece T along a regular helical line. Said line may be irregular, and it is generally inclined to the axis of the blank. That is, said line makes an angle other than 90° to the axis of the blank. This line may be regular or irregular, and yarn 7 may be formed with loops of different sizes in the blank.

By using non-elastic yarns 2, the knitted fabric has substantially the same properties as the usual woven fabric with reference to stretch or elasticity.

I have shown a preferred embodiment of my invention, but it is clear that numerous changes and omissions can be made without departing from its spirit.

For example, the strip of fabric can have two unfinished longitudinal edges.

I claim:

1. A tubular blank of knitted fabric comprising series of courses, each series comprising a plurality of helical courses, a yarn laid into the fabric continuously along one of said series of courses and engaged by the loops thereof, one of said series of courses being adapted for removal throughout the blank to separate the blank into a continuous strip of fabric.

2. A tubular blank of knitted fabric comprising series of courses, each series comprising a plurality of helical courses, and a yarn laid into one of said series of courses and engaged by the loops thereof, another of said series of courses adjoining and engaging the yarn engaging series of courses and being removable whereby to divide the blank into a continuous strip bounded on one edge by said yarn.

3. The method of forming a flat strip of fabric comprising knitting a tube of series of helically disposed courses, each series being formed of a continuously knit separate yarn and one of said series being formed of a continuously knit removable yarn and removing said removable yarn, whereby a flat strip is formed.

MAX WEBER.