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FABRIC AND METHOD OF MAKING THE SAME

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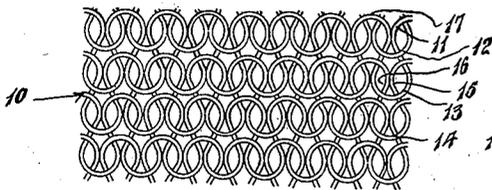


Fig. 1.

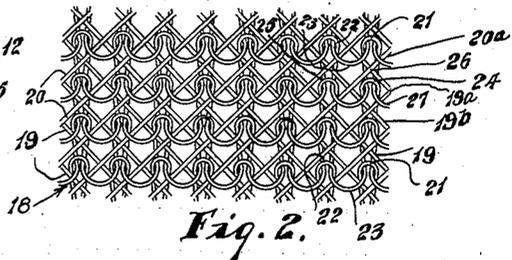


Fig. 2.

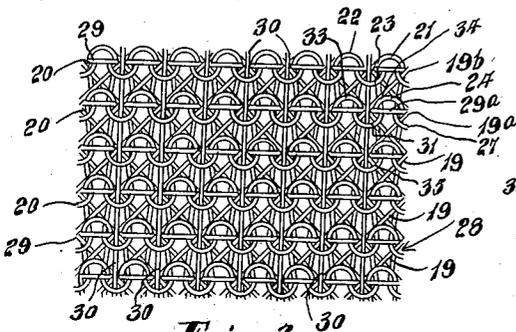


Fig. 3.

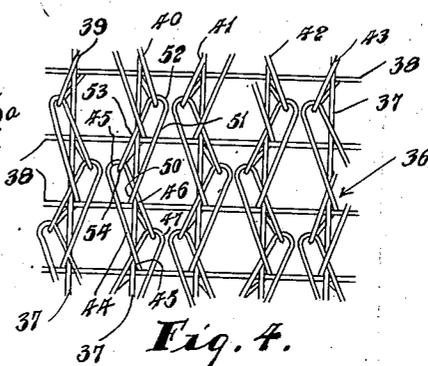


Fig. 4.

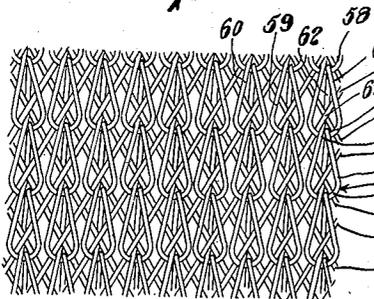


Fig. 5.

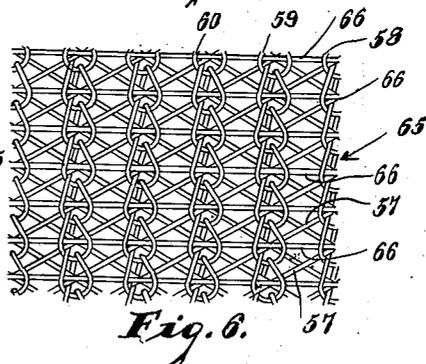


Fig. 6.

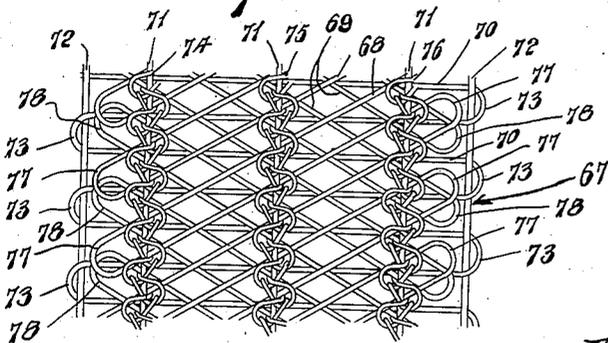


Fig. 7.

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FABRIC AND METHOD OF MAKING THE SAME

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2 Claims. (Cl. 66—190)

This invention relates to new and useful improvements in fabrics and methods of making the same, and in the making of the present fabric, and in the practicing of the present method—
5 threads of flacid material such as yarns and worsteds of cotton, wool, silk, rayon, hemp, jute and the like may be used.

In woven textiles as produced heretofore composed of longitudinal and generally perpendicular
10 transverse strands any strain or stress which tends to tear or rip must be met and resisted by but one thread or strand at a time. This is true since the design of warp and weft fabrics is such that any strain or tearing force cannot be spread
15 or distributed so as to be resisted by more than one thread or strand at a time. Further objection to such woven fabric lies in the fact that there are but a limited number of ways in which two series of strands arranged always perpendicular
20 to each other can be made to cross over and under one another. This seriously limits the number of designs possible. Also, in a woven fabric the threads cannot be spaced any appreciable distance apart as the fabric under such
25 spacing would disintegrate.

Knitted fabrics are chiefly composed of but one thread interwoven with itself by a series of interlocking loops. With such fabrics the color effect is limited and a great weakness of such fabrics resides in the fact that when the thread is broken, regardless of the amount of wear the article has experienced, the two severed ends of the strand retreat from one another and a so-called "run" appears, thereby spoiling the article. The second great weakness of knitted fabrics lies in their extreme elasticity with the result that they stretch considerably in all directions under but slight force. As a result of these objections knitted fabrics are confined almost entirely to use
40 in stockings, sweaters and the like where elasticity is necessary. It is a further objection to knitted fabrics that but one stitch can be made to each complete cycle of a machine's operation, and it is to be noted that the patterns and designs possible in any fabric composed basically
45 of but a single strand are very limited and the color effects are also limited.

An object of the present invention is to provide a fabric having the appearance of a knitted
50 fabric but in which the tendency to stretch in any one or all directions may be eliminated or carefully controlled.

Another object is to provide a fabric which may be made up into a substantially limitless
55 number of designs so as to give any desired ap-

pearance and which may be made up in the form of a close or open fabric.

A further object of the invention is to provide a method whereby the new fabric may be efficiently produced.

Other objects and advantages will become apparent from a consideration of the following detailed description taken in connection with the accompanying drawing wherein satisfactory embodiments of the invention are shown. However,
10 it is to be understood that the invention is not limited to the details disclosed but includes all such variations and modifications as fall within the spirit of the invention and the scope of the appended claims.

In the drawing:

Fig. 1 is a plan view showing a piece of standard or usual knit fabric;

Fig. 2 is a similar view showing a small portion of fabric constructed according to the present invention and wherein diagonal or reinforcing strands are used in conjunction with the strands of the fabric of Fig. 1;

Fig. 3 is a further development of Fig. 2 and shows a fabric somewhat similar to Fig. 2 but
25 with the addition of cross or lock strands and longitudinal strands;

Fig. 4 is a plan view of a small piece of fabric including cross and longitudinal strands secured together by interweaving therewith a loop fabric.

Figure 5 shows a small section of fabric comprising a base including diagonal strands with which are interwoven a series of loops extending longitudinally of the fabric.

Figure 6 is a view similar to Figure 5 but
35 with the addition of cross strands.

Figure 7 shows the fabric somewhat similar to Figure 6 but with the addition of longitudinal strands and with the alternate loops extending in opposite directions across the longitudinal
40 strands.

Referring in detail to the drawing, in Figure 1 is shown a small piece of fabric knitted in the usual manner. This piece of fabric, generally designated 10, is as usual formed by a series of
45 interlocking loops, the loops of each row being arranged side by side or transversely of the fabric and the loops of one row being interlocked with those of a preceding row. It will be noted that the strand 11 is passed rearwardly through the
50 loop 12 and then formed into a loop 13 and carried forwardly through the loop 12 providing a loop overlying the arms 15 and 16 of the loop 14 and a loop 17 adjacent the said loop 12. In the
55 knitting of the fabric 10 a horizontal row is com-

pleted prior to the starting of a second horizontal row and since the machine must go through a complete cycle in the formation of each individual loop, it will be understood that the fabric is produced but slowly.

The fabric 10 of Figure 1 has all the objections noted above in connection with a knitted fabric and in Figure 2 is shown a form of the fabric of the present invention. This fabric has all the appearance of a knitted fabric, but is strengthened or reinforced in such a manner as to prevent its stretching in two directions. In Figure 2 the fabric is generally designated 18 and comprises a base like portion including the sets of diagonal strands 19 and the sets of diagonal strands 20. The strands 19 are below the strands 20 and such strands 20 are simply superposed on or laid on the strands 19 and at right angles thereto, but are not interwoven therewith. A knitted or looped fabric is formed on the base comprising the diagonal strands 19 and 20 and this knitted fabric is formed in the usual manner of knitting by using one or more continuous threads as desired, and it will be noted that the loops are in horizontal rows and that the adjacent loops are interlocked. As an example, it is noted that the loops 21 and 22 are interlocked by an oppositely extending loop 23. This is repeated throughout the fabric.

Below the loops 21 and 22 are loops 24 and 25, and it will be noted that the loop 21 is arranged in the space between four of the diagonal strands, and substantially in line with the intersection 26 of the diagonal strand. Loop 24 is below such intersection, and it will be noted that the strand 27 forming the loop 21 is carried across the diagonal strand 19a and then through the loop 24 and upwardly at the rear sides of the diagonal strands and formed into the loop 21 and then downwardly at the rear sides of said diagonal strands and outwardly through the loop 24 and across the diagonal strands 20a and 19b. In this way the knitted fabric is plied to the base comprising the diagonal strands 19 and 20, and the said diagonal strands are secured or locked together and it is to be understood that the operation described above is repeated throughout the fabric.

Referring now to Figure 3, there is shown a fabric designated 28 and which is similar to the fabric 18 of Figure 2 but with the addition that the fabric 28 includes cross strands 29 and vertical or longitudinal strands 30. The strands 29 and 30 cross one another at the intersection of the diagonal strands 19 and 20, and it will be noted that a base is made up comprising the cross strands 29, diagonal strands 20 and 19 and the longitudinal strands 30. The four sets of strands 19, 20, 29 and 30 are simply laid onto one another and are not interwoven. However, the four sets of strands mentioned are secured together or interlocked by the looped fabric interwoven with them.

This interlocking or securing together of the base strands by the looped strands results in the formation of a non-stretching fabric and to accomplish the purpose a loop 31 may be laid over the longitudinal strand and the two diagonal strands immediately below an intersection of the base strands and the arms of said loop are carried under a cross strand 29a to the underside of the base fabric and are brought to the upper side of the fabric at the next intersection of base strands. In the drawing it will be noted that the arms 33 and 34 of a loop 35 below the loop 31 are brought to the upper side of the fabric by being passed

between the arms of the loop 31 at a point immediately above the cross strand 29a and immediately below the portions of a pair of diagonal strands just above said cross strands.

Referring now to Figure 4, wherein the piece of fabric is generally designated 36, it will be noted that the same includes a base comprising longitudinal strands 37 and cross strands 38. As shown the strands 37 are simply superposed on the strands 38 and are not interwoven therewith. Securing the strands 37 and 38 together are looped strands, and it will be noted that the looped strands 39, 40, 41, 42 and 43 are not interlocked with one another and are not connected with one another except through the base strands 37 and 38. The looped strands are all treated the same, and a detailed description of the looped strand 40 will be given. This strand includes an arm 44 brought to the upper side of the fabric at 45, and then carried across a longitudinal strand 37 and a horizontal strand 38, and looped as at 45. The strand 40 is then carried back across the longitudinal strand 37 and the cross strand 38 as at 46, and is then passed through a previously formed loop 47. Arm 46 of the strand 40 is then carried at the under side of the base strands and is brought to the upper side of the fabric at 50 providing an arm 51 and a loop 52, the arm 53 of which is carried back down across the base strands 37 and 38 and through the loop 45 as at 54. It will be noted that by this arrangement the alternate loops are carried in opposite directions across the longitudinal or vertical strands and that the loops are arranged in vertical rows as distinguished from the horizontal rows of Figure 1. With the fabric of Figure 4 a considerable savings in material may result, since an open mesh may be formed. The looped strands secure the layers forming the base together and the layers of strands forming the base also secure the vertical rows of looped strands together, so as to form the completed fabric.

Referring now to Figure 5, the fabric of that figure generally designated 55 comprises a bottom layer of diagonal strands 56 and a top layer of such strands 57. These diagonal strands 56 and 57 form a base and are only laid one on the other and they are not interwoven with one another. A looped fabric is formed on the base and comprises vertical rows of loops 58, 59, 60, etc. It will be noted that the vertical rows of loops are not interlocked with one another, and are not connected except by the diagonal strands forming the base. In forming the fabric a loop 58a is laid across diagonal strands 56a and 57a immediately below their intersection 61 and against their upper sides, and an arm 61 of said loop is carried through the loop above said loop 58a and then downwardly at the rear side of the fabric as at 62 and then out through the loop 58a as at 63 and then down to provide a loop 58b, the arm 64 of which corresponds with the arm 61 of the loop 58a above referred to. In this way the vertical rows of loops are formed and are interlocked with the base comprising the diagonal strands 56 and 57, so as to secure said base strands together.

Obviously the diagonal base strands serve to prevent the stretching of the fabric 55 in two directions and serve as a means for connecting the vertical rows of loops. Such loops serve to secure the superposed layers of diagonal strands together, it being appreciated that such diagonal strands are not interwoven but that the layers are simply laid one on the other. One great advan-

tage of this fabric where the loops are arranged in vertical rows is that separate loop forming mechanisms may be provided for the separate rows so that the fabric may be rapidly produced. When a separate mechanism is provided for each vertical row it will be clear that on each complete operation of the machine the length of the fabric will be increased one horizontal row of loops as distinguished from the old method wherein a complete operation of the machine is required for the forming of one loop in the series of a horizontal row of loops.

Referring now to Figure 6, the fabric of that figure is generally designated 65 and corresponds with the fabric of Figure 5 with the exception that cross strands 66 have been introduced. The cross strands 66 are arranged to overlies the alternate intersections of the diagonal strands 56 and 57, and the vertical rows of loops 58, 59, 60, etc. serve to secure together the diagonal strands and the cross strands since the diagonal and cross strands are not interwoven but are arranged in layers. Further, the diagonal and cross strands form a base serving to connect the vertical rows of loops, and the diagonal strands serve to prevent stretching of the fabric diagonally in either direction. The cross strands serve to prevent lateral or transverse stretching of the fabric.

Figure 7 shows a fabric generally designated 67 and which is quite similar to the fabric of Figure 6, and includes a layer of diagonal strands 68, a layer of diagonal strands 69, and a layer of cross strands 70. Also, a layer of longitudinal strands 71 may be included, and it will be understood that the strands 68, 69, 70 and 71 are not interwoven with one another but are simply arranged in layers, and as shown the cross strands 70 form the bottom layer, the diagonal strands 69 the next lowermost layer, the diagonal strands 68 being arranged in intersecting relation with the strands 69 and on the latter, and the longitudinal strands comprising the uppermost layer. If desired longitudinal strands 72 may be provided about which a strand may be looped at 73 and carried back on itself whereby to provide the cross strands 70 and whereby to provide a selvaged edge for the fabric.

The various layers of the strands comprising the base of the fabric are secured together by vertical rows 74, 75 and 76 of loops. These are

vertically extending rows of loops, and it will be noted that the loops are similar in form to the loops of Figure 4 and that the alternate loops of each row are carried diagonally across the vertical strands with which the loops are associated. It will also be noted in Figure 7 that the diagonal strands are each made up of a single strand, the strand forming the diagonal strands 68 being looped upon itself at 77, while the single strand forming the diagonal strands 69 is looped upon itself at 78.

It will now be seen that according to the present invention a looped fabric may be strengthened or reinforced so as to control or prevent its stretching in any one or more or all directions. To prevent stretching in one direction a single layer of either diagonal, cross or longitudinal strands may be used, and additional strands may be used to control or prevent stretching in another direction. Whenever desired certain of the diagonal or cross or longitudinal strands may be omitted to vary the design, and the stretch controlling or preventing strands comprising the bases of the various fabrics may be arranged closer together or further apart so as to provide a close stiff fabric or an open flexible fabric. The fabric of Figure 3 lends itself particularly to the weaving of a close and stiff texture, while that of Figure 4 may be woven in particularly open and flexible formation and may include much less material and may be cheaply produced. As before pointed out, when the loops are arranged in vertical rows the fabric may be produced at great speed, and it will be understood that the various strands may be of various materials and of various colors and of various cross sectional diameters.

I claim:

1. The method of making a fabric comprising providing sets of diagonal, longitudinal and cross strands, arranging such strands on one another in layers, and forming a completed fabric by locking the sets of strands together by a strand formed into a series of interlocking loops.

2. A fabric comprising a base including straight diagonal, cross and longitudinal sets of strands disposed in layers on one another, and a looped strand securing said base strands together.

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