Aug. 23, 1955 W. SCHUMANN 2,715,762

METHOD OF FORMING KNITTED FABRIC

Filed July 21, 1954

Fig. 1.

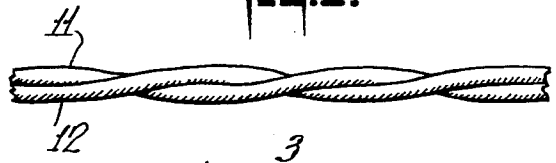


Fig. 2.

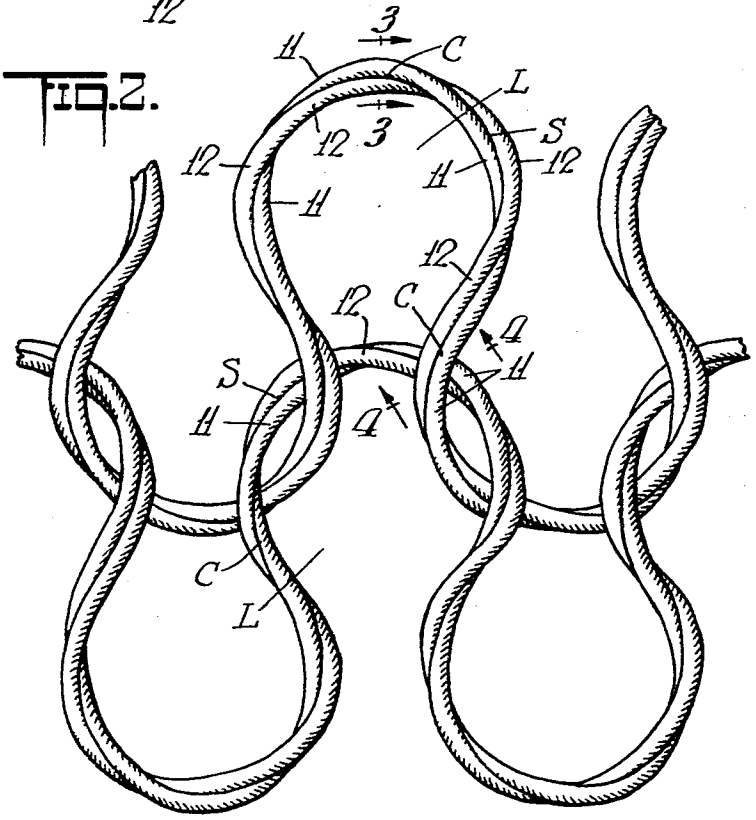


Fig. 3.

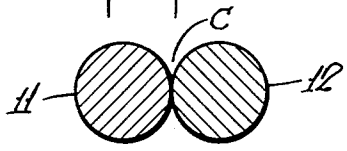


Fig. 5.

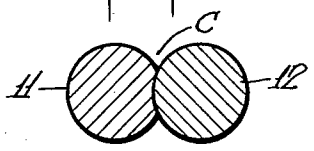


Fig. 4.

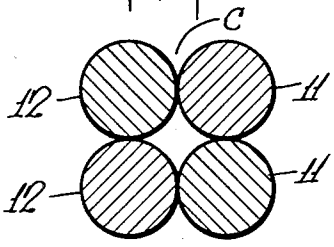
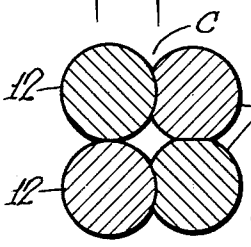


Fig. 6.



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METHOD OF FORMING KNITTED FABRIC

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Application July 21, 1954, Serial No. 444,895

3 Claims. (Cl. 28—76)

This invention relates to the art of knitting, more particularly to the manufacture of knitted fabric such as hosiery from synthetic yarn.

As conducive to an understanding of the invention, it is noted that in the manufacture of women's full-fashioned nylon hosiery, mono-filament yarn of ten or fifteen denier is generally used to provide a sheer, attractive fabric.

Where such fabric is knitted with single loops each dependent upon the next adjoining course and loop for the permanence of the fabric, by reason of the relative weakness of the fine threads, they are apt to snag and tear with a resultant run in the stocking. Furthermore, such fine denier plastic fabric made with single loops is smooth and slick and such fabric tends to cling to any object which it contacts, particularly human hands, which often causes picks and pulls in the fabric with resultant damage thereto.

It is accordingly among the objects of the invention to provide a relatively simple method utilizing conventional hosiery knitting equipment for producing from fine, mono-filament plastic threads, shear, attractive full-fashioned hosiery of desired dull appearance which has the same high resistance to wear, snags and runs as heavy, relatively unattractive service weight fabric.

According to the invention, two mono-filament threads of suitable plastic such as nylon of any given denier are mounted in the single conventional thread carrier generally used to knit stockings. One of the threads is in the normal state generally received from the manufacturer, i. e., it is not pre-shrunk and the other thread is completely pre-shrunk, so that no additional shrinkage will occur during the conventional pre-boarding or heating operation which is performed to mold and set the stocking to the desired shape after the stocking is knit to form plural thread loops.

In the following drawings in which are shown one or more of various possible embodiments of the several features of the invention,

Fig. 1 is a fragmentary view of a pair of mono-filament threads,

Fig. 2 illustrates a portion of the fabric prior to the pre-boarding process,

Figs. 3 and 4 are sectional views taken along lines 3—3 and 4—4, respectively, of Fig. 2, and

Figs. 5 and 6 are views similar to Figs. 3 and 4 after the pre-boarding process.

To manufacture the fabric illustrated in Fig. 2, two mono-filament threads **11** and **12** of desired denier are provided. One of the threads, i. e., thread **11**, is in the same state as received from the manufacturer, i. e., it is not pre-shrunk. The other thread **12** is pre-shrunk so that no additional shrinkage will occur after knitting and during the pre-boarding operation.

The two threads are positioned in one and the same thread carrier of a conventional knitting machine and when knitted by a common needle, will intertwine as shown in Fig. 1. Although the threads will generally

intertwine in irregular manner, for ease of illustration they have been shown to be regularly intertwined in the drawings.

After the fabric is knit in conventional manner, the loop L of the fabric will have the same general appearance as the loops formed in single yarn fabric except that each loop will have two threads which lie side by side, as shown in Figs. 3 and 4. After the stocking comes off the knitting machine, it is shapeless and is placed on a suitable form, and subjected to live steam in a box or retort to mold the stocking to desired shape which is retained for the life of the stocking.

When the fabric is subjected to heat during the pre-boarding process, the loop formation of the thread **12** which has been pre-shrunk, does not change, but the loop formation of the thread **11** that has not been pre-shrunk, will shrink and become smaller than the loop formation of the pre-shrunk thread, so that the threads will become spaced from each other at least partially along the bights of the loop as at the positions shown at S.

As the non-pre-shrunk thread **11** shrinks during the pre-boarding process, wherever it crosses a portion of another non-pre-shrunk thread **11** or a pre-shrunk thread **12**, as at C, it will exert tension thereon, with the result that the engaging non-pre-shrunk threads and engaging non-pre-shrunk and pre-shrunk threads will securely bond together. Furthermore, as the threads are irregularly twisted, as shown in Fig. 1, the loops L will also be of irregular shape due to such shrinkage of the non-pre-shrunk thread, with resultant desired dull appearance.

Due to the spacing of the threads at the positions designated S, the threads are subjected to individual rather than joint snagging with the result that if one of the threads should break, the other thread will prevent running of the fabric. Furthermore, as a result of the secure bonding at the multiplicity of cross-over points C throughout the fabric, the loops are snag-resistant and even if both threads of a loop should break, as the adjacent cross-over points C of the threads are securely bonded together, the danger of runs in the fabric will be minimized and the free ends may be severed so that the appearance of the fabric is substantially unimpaired.

Although as illustratively described herein, two mono-filament threads are used, it is within the scope of the invention to use a mono-filament thread together with multi-filament thread, as long as one of the threads is pre-shrunk and the other is not.

As a result of the method above described, a knitted fabric is provided which, although it may be made from fine plastic thread, is durable, long lasting and not subject to picks, snags or runs, and though especially useful for full-fashioned nylon hosiery may be used for any other knitted articles.

As many changes could be made in the above method and article, and many apparently widely different embodiments of this invention could be made without departing from the scope of the claims, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:

1. The method of forming a knitted fabric which comprises positioning in a thread carrier of a conventional knitting machine, at least two plastic threads only one of which is pre-shrunk, knitting plural thread loops of such threads and after the fabric is knitted, thereafter subjecting the latter to heat in order to shrink the non-pre-shrunk thread, whereby one of the threads of each loop will exert tension against the other at the cross-over por-

tions of said loops to bond the threads together at said cross-over portions.

2. The method of forming a knitted fabric which comprises positioning in a thread carrier of a conventional knitting machine, at least two plastic threads, only one of which is pre-shrunk, and after the fabric is knitted, removing the latter from the knitting machine and subjecting the fabric to live steam in a chamber in order to shrink the non-pre-shrunk threads, whereby one of the threads of each of the loops will exert tension against the other at the cross-over portions of said loops to bond the threads together at said cross-over portions.

3. The method recited in claim 2, in which the fabric is placed on a form prior to being subjected to the live steam so that it will assume the shape of such form.

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