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PROCESS OF TREATING TEXTILE FABRICS AND THE PRODUCT THEREOF

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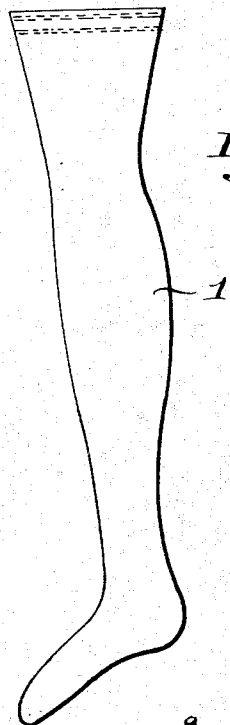


Fig. 1

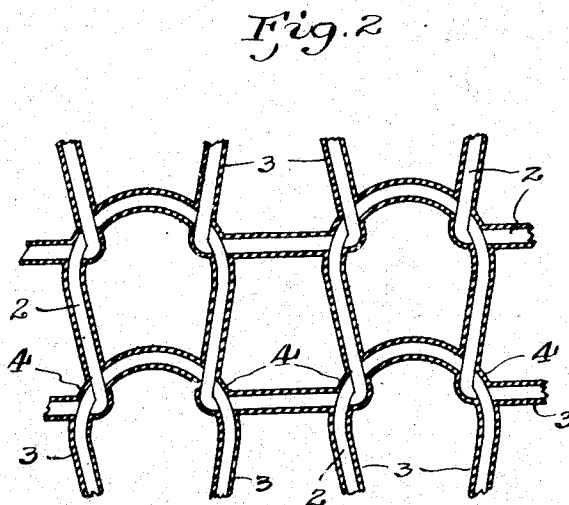


Fig. 2

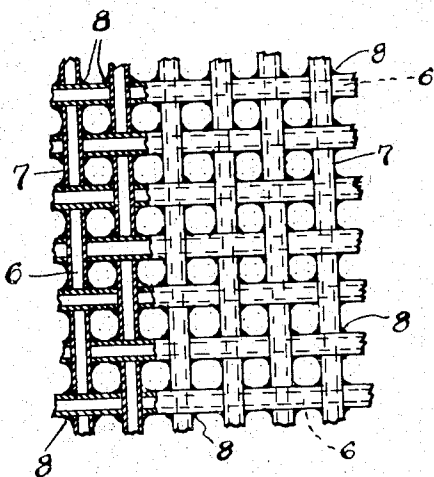


Fig. 3

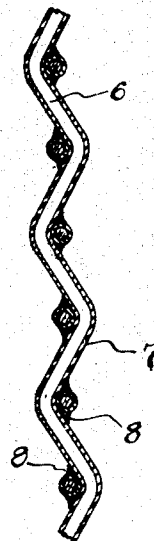


Fig. 4

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PROCESS OF TREATING TEXTILE FABRICS
AND THE PRODUCT THEREOF

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Application August 1, 1938, Serial No. 222,368

4 Claims. (Cl. 117-98)

This invention relates to a process of treating textile fabrics and the product thereof and has to do particularly with the treating of knit and woven fabrics with a substance or substances which tend to (a) form a permanent thin continuous film around the discrete fibers forming the fabric and thereby increase the wear-resisting qualities of the fabric, and (b) lock the individual threads at their points of traverse by a resilient bond, which in the case of knit fabrics, such as stockings, materially reduces the tendency to "run" or "ladder" and in the case of woven fabrics, particularly fabrics composed in part or entirely of artificial silk, the tendency to "slip."

According to this invention, the class of materials used in treating the fabrics to produce the above-mentioned results fall within the generic class of latices and especially resins, either natural or synthetic, and particularly such resins and in such quantities as do not thoroughly penetrate the fibers of the fabric, thereby rendering it stiff and harsh, but rather form a thin pliable film about the discrete threads of the fabric, which film has but a slight effect on the original "hand" of the fabric. This film is likewise of such a nature that the threads are resiliently bonded together at their traverses, whether they be knit or woven, so that "running" or "laddering" in the case of knit goods, and "slipping" in the case of woven goods, is materially inhibited.

In the drawing:

Fig. 1 represents a textile fabric article, in this case a knit stocking treated in accordance with the invention.

Fig. 2 is an enlarged schematic view of a section of knit fabric treated in accordance with our process and giving an exaggerated view of the film and the bonds at the traverses of the threads.

Fig. 3 is an enlarged view of a section of woven fabric, having a resinous film about the discrete threads and resilient bonds at the traverses of the threads.

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

In carrying out the invention, a knitted article such as a stocking 1, having threads which are formed into loops 2, may be dipped into a resin solution prepared as hereafter described. The stocking is then removed and dried. The resultant product is a stocking having its individual threads covered with a thin resinous film, indicated at 3 and locked together at the traverses of the threads by resilient resinous bonds 4.

Likewise, in treating woven fabrics the article or fabric is passed through a resin solution and dried. The treated fabric is similar to that shown in Fig. 3, with a thin pliable film 7 of resin

around the individual threads 6 and resilient resinous bonds 8 at the traverses of the threads.

The bonds 4 in the knitted fabric are not an absolute insurance against a "run" but in most cases any breaking of a loop or loops 2 will permit the thread to run or unravel only as far as the resilient resinous bond at the nearest traverse.

Likewise the bonds 8 in the woven fabric greatly decrease the tendency of the threads in this fabric to slip when placed under stress as the threads are resiliently bonded at the traverses.

As an example of a specific manner in which fabrics have been successfully treated to produce the products aforesaid, sheer silk stockings are preferably washed in an alkaline solution to thoroughly clean the fibers. This step is not necessary, but is advisable. The stockings are then rinsed and dried in some suitable manner as in a centrifugal drier. Next, the stockings are dipped in a resin solution prepared as follows, the parts being the percentage of the ingredients to the total weight of the solution:

	Parts
Aluminum stearate	1
Butyl stearate	1
Aroclor	2
Benzol	96

Aroclor is a water insoluble synthetic resin comprising a chlorinated di-phenyl made by the Swann Chemical Company of Birmingham, Alabama, and is readily soluble in benzol. The aluminum stearate serves to impart water resistant qualities to the treated fabric and is useful as a protection against the effects of perspiration. The butyl stearate serves as a plasticizer and assists in retaining the original "hand" in the treated fabric.

These ingredients are dissolved in the benzol at room temperature by stirring. The stockings are dipped in the solution and then run through squeeze rolls to remove the excess material, or they may be centrifugally extracted. Then the stockings are preferably stretched on suitable forms and dried. The drying step may be at room temperature but we prefer to dry them at an elevated temperature of from 160° F. to 200° F.

An examination of the dried treated stockings shows that a substantially continuous thin transparent resinous film is formed about the individual threads, and that the threads are bonded together at their traverses. Repeated tests, both in the laboratory and by practical use, have shown that stockings thus treated are much more run and snag resistant than untreated stockings. The snag resistant feature is produced because the individual filaments of the thread are bonded close to the body of the thread

by the resinous film, and the run-resistant feature is produced by the bonding of the threads to each other at their traverses by the resilient resinous bonds 4.

Woven fabrics may likewise be treated in the same solution to produce a relatively non-slippable fabric, the fabric being placed on a roll and passed through a passing machine and then through a drying chamber to remove and recover the excess solvent. The resilient resinous bonds 6 at the traverses of the threads serve to reduce materially the tendency of the fabric to "slip," particularly those fabrics composed partially or wholly of artificial silk, whose surfaces are ordinarily and inherently smooth and slippable.

A feature of this invention which has not heretofore been emphasized is that the finish produced by the process described is relatively permanent. Repeated washings in hot alkaline water have little or no effect on the characteristics of the treated fabrics enumerated above.

Another solution which has been found to be equally effective in treating both knit and woven fabrics is prepared as follows, the parts being given by weight:

	Parts
Aluminum stearate -----	1
Butyl stearate -----	1
Aroclor -----	2
Vinylacetate -----	5
Benzol -----	91

The vinyl acetate in this solution is obtained from the Carbide and Carbon Chemicals Corp., of 30 East 42nd Street, New York. It is transparent and flexible and its use in this solution imparts added resistance and pliability to the finished fabrics. The other ingredients in this solution are in the same proportion and serve the same purpose as they do in the first solution previously described. The steps in treating fabrics with this solution are identical with those enumerated for the first-named solution.

We have also found that an excellent quality stocking is produced by taking stockings treated with either of the above described solutions and giving them a latex treatment as described in the copending application of Lloyd G. Copeman, Serial No. 127,714 filed February 25, 1937. Thus treated, a double film is formed around the individual threads, the under film being resinous and the outer film of latex, and likewise a double resilient bond is formed at the traverses of the threads.

It should be here noted that both of the above-described solutions are of such consistency that the interstices of the treated fabrics are left open. In other words, the solutions are so thin that the resins form only around the individual threads, and the porosity of the fabric is in no way affected.

Obviously other solvents than benzol may be employed, depending on the nature of the resins used and other considerations, such as inflammability. For example, we have found that carbon tetrachloride, tetrachlorethylene and other chlorinated hydrocarbons can be successfully and advantageously employed.

It is readily apparent from the foregoing description that fabrics treated in accordance with the preceding methods are relatively snag and

run proof in the case of knitted articles and slip-proof in the case of woven articles; that the wearing qualities of the fabrics are materially increased; that the finish is relatively permanent and is unusually resistant to moisture, spotting, staining and perspiration; and that the "hand" or feel of the fabrics is in no way impaired.

The words "resin" and "resinous" as used in the claims are intended to cover (a) true resins either natural or synthetic and (b) resinous substances; that is, substances which while not in themselves true resins, resemble resins in their physical properties.

Stockings produced by this process are a new product comprising a knitted core of textile material having its exposed surfaces formed of a thin pliable resinous film with a resilient resinous bond at the traverses of the threads. As has been previously pointed out, the wearing qualities of such stockings are materially greater than ordinary stockings made solely of silk, rayon or cotton and at the same time their snag and run-resistant qualities are materially increased.

What we claim is:

1. The method of producing a fabric partially or wholly stabilized against slipping, comprising relatively slippable spaced interwoven threads, which comprises impregnating the contacting areas of interweave of said spaced interwoven threads of the fabric with a solution of a water insoluble synthetic resin, stretching the fabric to the desired width before drying, and drying said stretched fabric for such a time as to drive off the solvent and leave the water insoluble transparent covering of synthetic resin around each contacting area of interweave of said interwoven threads, whereby the fabric is stabilized against slipping without substantially changing the appearance of the fabric.

2. A partially or wholly non-slippable stretched fabric composed partially or wholly of relatively slippable spaced interwoven threads bonded together solely at the contacting areas of interweave thereof by a transparent covering of synthetic resin substantially identical with the product of claim 1.

3. The method of producing a fabric partially or wholly stabilized against slipping, comprising relatively slippable spaced interwoven threads, which comprises impregnating the contacting areas of interweave of said spaced interwoven threads of the fabric with a thin solution of a water insoluble synthetic resin, and drying said fabric for such a time as to drive off the solvent and leave the water insoluble transparent resilient covering of synthetic resin around each contacting area of interweave of said interwoven threads, whereby the fabric is stabilized against slipping without substantially changing the appearance of the fabric.

4. A partially or wholly non-slippable stretched fabric composed partially or wholly of relatively slippable spaced interwoven threads bonded together solely at the contacting areas of interweave thereof by a transparent covering of synthetic resin substantially identical with the product of claim 3.

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