Nov. 29, 1966 R. C. GOODBAR ET AL 3,287,788

METHOD OF MAKING STRETCHABLE COTTON FABRICS

Filed Nov. 21, 1963

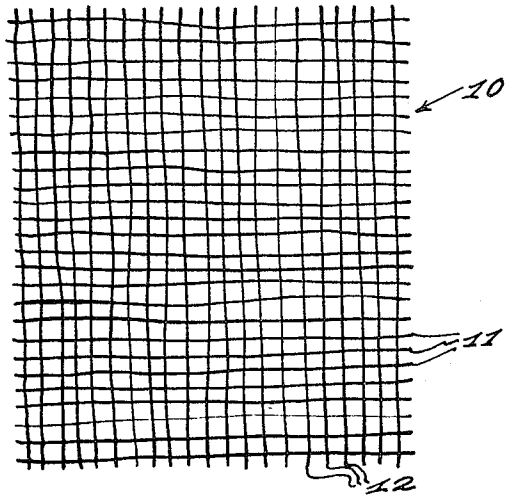

Fig. 1

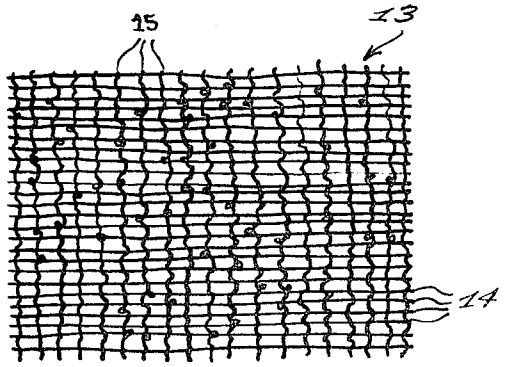

Fig. 2

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METHOD OF MAKING STRETCHABLE COTTON FABRICS

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1 Claim. (Cl. 28—76)

This invention relates to stretchable cotton fabrics and a method of making same and more particularly to a cotton fabric with a high degree of stretchability and elasticity in one direction and with approximately normal elastic properties in the other direction.

The need has long been present for a fabric which will stretch in one direction and remain firm and tight in the other direction. Fabric of this type is particularly useful for clothing, diapers, bandages, and the like; wherein the fabric is intended to fit tightly over an irregular surface.

This invention provides a fabric woven from cotton fibers in a novel manner and which is treated in such a way as to produce a high degree of stetchability in one direction while retaining the normal stretch characteristics in the other direction.

This is obtained by a novel weave construction and a slack mercerizing process which will be pointed out more specifically hereinafter.

Further features of this invention will be understood from a consideration of the following more detailed description taken in conjunction with the accompanying drawings, in which:

FIGURE 1 illustrates the woven cotton fabric before treating, and

FIGURE 2 illustrates the woven cotton fabric after treating.

The greige woven cotton fabric before finishing, generally indicated at **10** in FIG. 1, comprises warp yarns **11** and filling yarns 12 extended to the normal dimensions of both.

The greige construction of a conventionally woven cotton gabardine of approximately the same finished weight is woven at a width of 49½ inches. This fabric had 124 x 76 weave construction and weighed 1.63 yards per pound. The fabric finished at 7 ounces per square yard at 47 inches width. The fabric contained 24/1 warp yarns with a twist of 4.75 T.M. and 20/1 filling yarns with a twist of 3.75 T.M.

In order to facilitate the advantages of the present invention, this conventional weave construction had to be modified.

The novel fabric of this invention is woven as wide as possible on 50 inch looms for the greige goods in order to provide maximum shrinkage in the subsequent treatments and finishing thereof. The wider the fabric is in the filling direction or direction of the yarns **12**, the more shrinkage you may obtain in that direction. The resulting greige construction of the fabric woven on these looms has a width of 51¾ inches, which will be more susceptible to shrinkage than the conventionally woven fabric.

The weave construction is reduced to 107 x 74, partly as a result of increasing the spread of the fabric on the loom. The warp yarns have been lightened to 27/1 as compared to the 24/1 in the conventionally woven fabric to allow additional space between the ends for maximum shrinkage. The warp yarns have the same twist of 4.75 T.M. It has also been found that optimum results are obtained by using 17.25/1 filling yarns with a higher twist of 4.75 T.M. This increased twist in the filling yarns aids in fabric recovery from elongation.

The greige weight of this novel fabric is lightened compared to the conventionally woven fabric from 1.63 yards per pound to 1.70 yards per pound and in some instances even as light as 1.86 yards per pound to obtain the same ounce per square yard at 40 inches as was normally obtained at 47 inches.

This woven greige fabric is susceptible to maximum shrinkage in the filling direction or the direction of the yarns **12** due to:

(1) The width of the fabric which increases the spread,

(2) The reduced ends per inch, and

(3) The lightened warp yarns which have maximum spacing between the ends.

The woven greige fabric may now be subjected to the normal preparatory finishing operations which include the regular singeing, desizing, kier boiling, and drying operations.

Following these preparatory finishing operations, the bleached fabric is slack mercerized on a mercerizer in a 25% to 30% solution of sodium hydroxide at 60° twaddel at room temperature. Warp wise tension is maintained on the fabric during this mercerizing process, while a tension-free condition is maintained in the filling direction. These conditions allow maximum shrinkage in the filling direction while maintaining approximately the same dimensions in the warp direction.

The remaining finishing operations will be performed without exerting any widthwise or fillingwise tension that might possibly eliminate the stretch potential. The remaining operations might include regular can or looper drying, dyeing, or printing operations. A resin finish is sometimes used on the stretch fabrics for stabilization and retention of the stretch properties.

As may be seen in FIG. 2, the resulting slack mercerized stretch fabric, generally indicated at **13**, has warp yarns **14** which have generally maintained their length from the woven greige dimensions and filling yarns **15** which have shrunk or twisted up to reduce their length.

This finished stretch fabric **13** can be elongated in the filling direction from 15% ot 20% under a load of 3 to 6 pounds. This load range would elongate a 47" conventionally finished fabric only 8% to 10%. Therefore, a considerable increase is obtained in the stretch properties by this novel woven and finished stretch fabric.

This invention has been described in detail above for purposes of illustration only and is not intended to be limited by this description or otherwise except as defined in the appended claim.

What is claimed is:

A method of producing a stretchable cotton fabric which has a greater stretch potential in one direction than the other comprising the steps of weaving a greige fabric having a width of approximately 51¾ inches with 27/1 warp yarn having a twist multiple of 4.75 and 17.25/1 filling yarns with a twist multiple of 4.75, preparatory finishing of the fabric, slack mercerizing the fabric in a 25% to 30% solution of sodium hydroxide at 62° twaddle while maintaining a tension free condition in the filling direction and maintaining tension in the warp direction, the final finishing of the fabric without exerting any tension in the filling direction.

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UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,287,788 November 29, 1966

Reid C. Goodbar et al.

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 2, line 44, for "ot" read -- to --; line 64, for "the", first occurrence, read -- and --.

Signed and sealed this 12th day of September 1967.

(SEAL)
Attest:

ERNEST W. SWIDER
Attesting Officer

EDWARD J. BRENNER
Commissioner of Patents