Dec. 20, 1966 H. H. TIGNER 3,292,228

SPRAY METHOD FOR UNTWISTING WOVEN PILE FIBERS

Filed Sept. 30, 1963 3 Sheets-Sheet 1

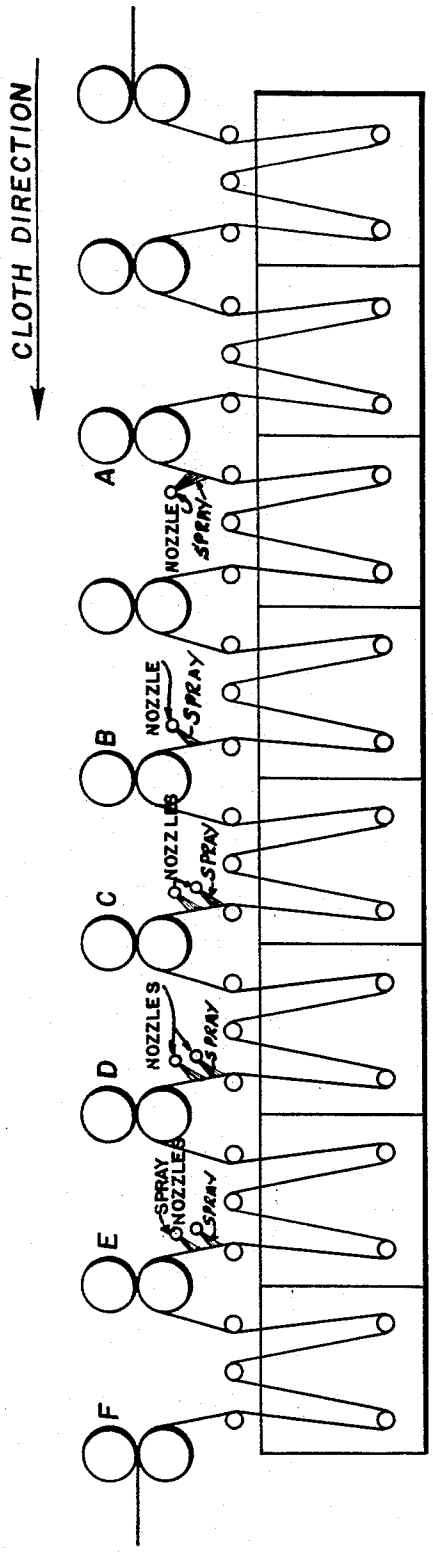


FIG. 1

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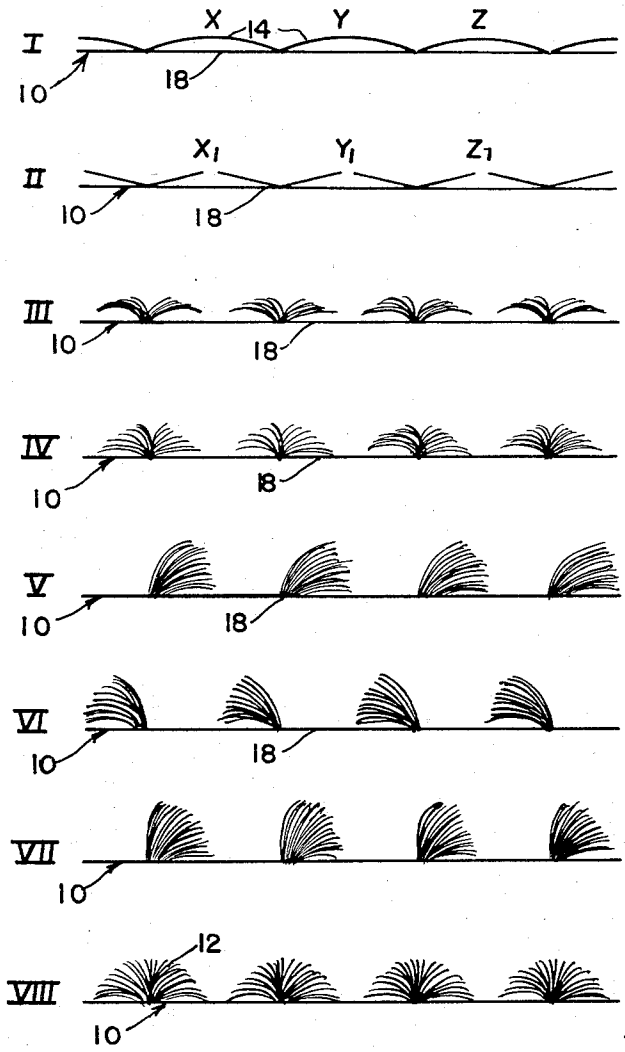


FIG. 2

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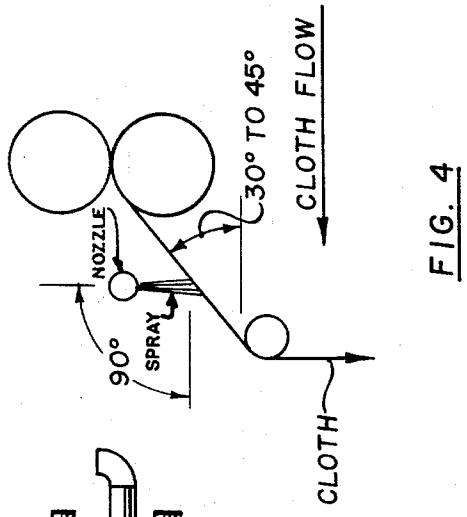


FIG. 4

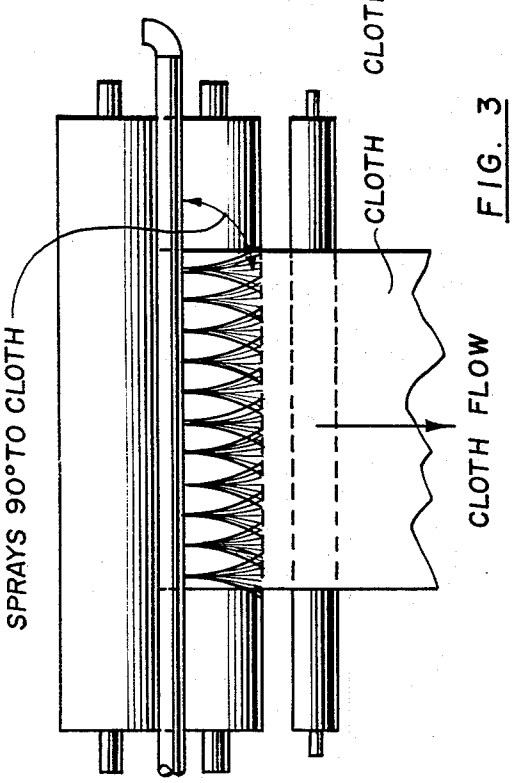


FIG. 3

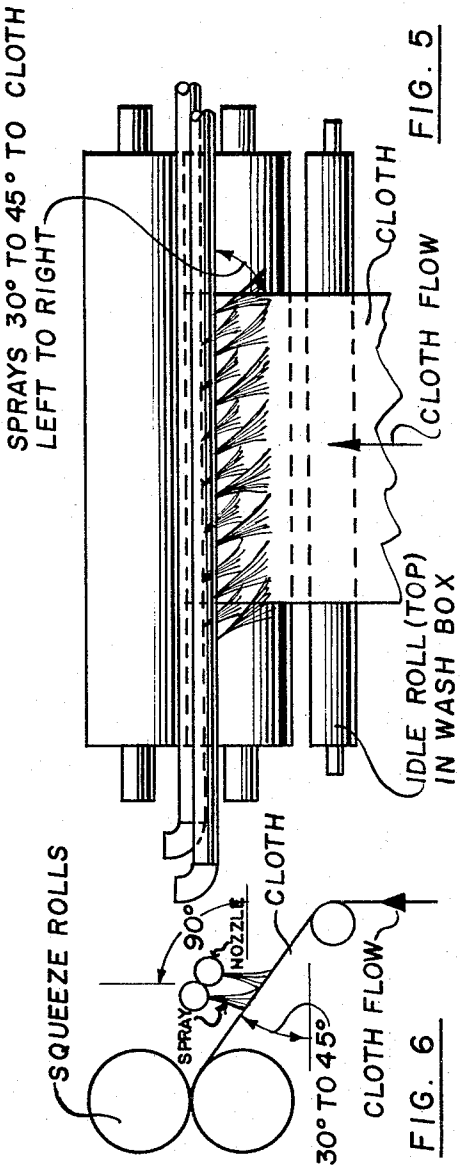


FIG. 5

FIG. 6

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3,292,228

SPRAY METHOD FOR UNTWISTING WOVEN PILE FIBERS

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3 Claims. (Cl. 26—2)

This invention relates to a spray method for untwisting woven fibers and especially to a method or process for spraying cut and twisted fibers particularly the sort produced on such fabrics as corduroy where the fabric is produced with a series of uncut loops or floats running in one direction of the warp or woof which loops or face loops or floats are subsequently cut and must be untwisted in order to give a smooth soft finish.

One type of cut pile fabric is corduroy. This fabric is so produced and woven and finished as to create a soft ribbed effect. The woven fabric initially consists of a series of loops or floats, typically running in the warp direction, such constituting the face of the cloth and these loops or floats are tied to the foundation of the fabric by binders created in the cloth construction. There are many variations of this particular fabric in the weaving design, however, the ultimate goal of all the designs is to create a fabric having a finished effect with the face being a ribbed pile. Generally, the method of producing this fabric consists of weaving the fabric, cutting the face loops or floats either in one or two or more operations, desizing to remove all mill size, then a series of both dry and wet mechanical brushings the amount and number depending on the construction of the fabric, next singeing or shearing to remove loose or uneven fibers, then bleaching or washing preparatory to dyeing, next dyeing to a pre-determined color with a particular type of dye stuff, optionally, then dry brushing to loosen pile fibers, sizing or oiling, inspecting and finally the put up and packing. In the present process, the aforementioned step of dry and wet mechanical brushing before dyeing, which is necessary to remove the twist in the cut threads and to shape the ribs running warp-wise, has been eliminated and is replaced by a mechanical wet washing step which improves the finish of the fabric. Some fabrics and/or some shades may improve by dry brushing after dyeing.

Generally described, the present method or process comprises taking goods on which there is a face with loops or floats and during the desizing operation spraying the surface of the cut loops or floats with a pressure spray of water or other liquid which impinges upon the twisted face loops or floats and untwists same to produce the desired effect and finish of the fabric. The present process may also be applied to other fabrics such as velveteens, towels, bedspreads, rugs and any fabric that requires cutting or shearing of the yarn threads prior to or during the finishing operations. In one typical set-up the goods after cutting were run through a series of wash boxes consisting of six boxes with desizing chemicals therein with squeeze rolls just before the boxes. The boxes all contain water and the spray was directed at a point where the cloth was squeezed. This spray consisted of a one and one-half (1½) inch pipe with holes of one-eighth inch every three and one-quarter inches in a straight line. The water was supplied at approximately 140 degrees F. with normal city water pressure. After the cloth was run through the six boxes it was dried. The operation was repeated one time and the pile of the corduroy was fully untwisted to form the races of the corduroy without any mechanical brushing.

An object of this invention is to untwist the twisted fibers in a cut pile fabric by spraying with a liquid.

A further object of this invention resides in the use

of pressure spray nozzles to treat cut pile fabric such as corduroy to finish the cut loops or floats into a rib effect on the face of the fabric.

Another object of this invention resides in the elimination of mechanical brushing which removes some of the fibers and replacing same by means of a liquid such as water impingeing upon the cut loops in order to untwist the fibers in a neat and smooth and symmetrical and consistent manner.

Still another object of this invention resides in the elimination of the effects of mechanical brushing and the replacement by a spray step which provides a better looking finish and one which is capable of better dyeing in certain circumstances.

Other and further objects of my invention will become apparent upon reading the following specification taken in conjunction with the accompanying drawings, wherein:

FIG. 1 is a diagrammatic view of one typical set-up employing the present novel step of removing the twist in the cut threads by a series of water sprays.

FIG. 2 is a diagrammatic view of a series of steps of the untwisting of the loops or floats according to the method set forth in FIG. 1, as follows:

I. A cross-sectional diagrammatic view of a corduroy fabric having uncut and untwisted floats X, Y, and Z.

II. A cross-sectional diagrammatic view immediately after cutting the floats X, Y, and Z of I.

III. A cross-sectional diagrammatic view showing the effects of spray A in FIG. 1.

IV. A cross-sectional diagrammatic view showing the effects of both sprays A and B in FIG. 1.

V. A cross-sectional diagrammatic view showing the effects of sprays A, B, and C in FIG. 1.

VI. A cross-sectional diagrammatic view showing the effects of sprays A, B, C, and D in FIG. 1.

VII. A cross-sectional diagrammatic view showing the effects of sprays A, B, C, D, and E in FIG. 1.

VIII. A cross-sectional diagrammatic view showing the effects of sprays A, B, C, D, and E and the final wash box in FIG. 1.

FIG. 3 is a diagrammatic top view of the spray A shown in FIG. 1.

FIG. 4 is a side elevation diagrammatic view showing spray A of FIG. 1.

FIG. 5 is a diagrammatic top view of a 30 to 45 degree lateral spray C shown in FIG. 1.

FIG. 6 is a side elevation diagrammatic view of the 30 to 45 degree lateral spray shown in FIG. 5.

It is to be understood initially that the specific sprays used are not a part of this invention and the effect on the fabric and the untwisting can be accomplished by various sprays utilizing different water pressures and different liquids at different temperatures, the object being to impinge the spray on the surface of the twisted fibers sufficiently to untwist same by the contact of the constant spray. One typical spray is called in the art of textile processing an Emerson spray which is readily obtainable from various sources, being a spray which gives a fan shaped spray wherein the individual fans from more than one spray overlap at the surface of the cloth.

By way of background, the fabric **10** (FIG. 2–I et al.), which can be corduroy or the like, is so designed and woven as to create a ribbed effect with individual, parallel ribs **12** (FIG. 2–VIII) which are produced from a series of loops **14** (FIG. 2–I) woven into the fabric, and normally running warp direction, constituting the face of the cloth. The loops **14** normally are tied to the foundation or back **18** of the fabric by means of binders. There are many variations of this particular fabric in the weaving design, however, the ultimate goal is to create a finished fabric having a ribbed pile effect on the face thereof.

The conventional finishing of this type of fabric in the known prior art consists of the following steps:

I. The operation of cutting the face loops is practiced by individual knives catching under the loops and cutting same as the fabric is advanced. This may be done by cutting alternate rows the first pass and the uncut rows the second pass through the cutting mechanism.

II. Next the fabric is desized to remove all the mill sizing.

III. Then a series of dry and wet brushings, from a mechanical brush arrangement, is applied to the cut face loops to remove the twist in the cut threads and to shape the cut threads to form even ribs running warp-wise.

IV. Then the fabric is singed or sheared to remove loose uneven fibers.

V. Then the fabric is bleached or washed preparatory to dyeing.

VI. Then if the fabric is to be dyed it is at this point dyed a pre-determined color with a particular type of dye stuff.

VII. Then there is dry brushing of a mechanical nature to loosen pile fibers.

VIII. Then there is a sizing or oiling of the fabric to create a smoother finish and give a luster.

IX. Then there is a step of inspecting the fabric, and

X. The fabric is put up and packed.

According to the new process, the above noted step of mechanical brushing is eliminated altogether and through the use of a spray arrangement, the appearance of the fabric is improved and a complete uniform finish is produced on all styles and weights of fabrics. Further, a slight increase in finished weight is accomplished as compared to the regular mechanical finishing method due to the elimination of the loss of fibers removed by the mechanical dry and wet brushing. Furthermore, the fabrics produced by the present method have more body or feel in the finished goods. It is estimated that it is possible to save as much as approximately two cents per yard by the present method.

The typical mill operation in FIG. 1 which could be employed to finish corduroy fabric by the present method is as follows:

The drawing contains a series of roller pairs designated by respective letters A, B, C, D, E and F, described as follows:

A. A single nozzle which is arranged to spray at a 45 degree angle with the flow of the cloth (see FIG. 2–III).

B. A single nozzle arranged to spray 45 degrees against the flow of the cloth (see FIG. 2–IV).

C. A double spray, 45 degrees (left to right) laterally across the width of the cloth (see FIG. 2–V).

D. Double spray, 45 degrees (right to left) laterally across the width of the cloth (see FIG. 2–VI).

E. Double spray, 45 degrees (left to right) laterally across the width of the cloth (see FIG. 2–VII).

The fabric is run in the manner shown in FIG. 1 through the successive sets of rollers A through F, inclusive, receiving the single spray 45 degrees with the flow of the cloth in Step A, the single spray arranged 45 degrees against the flow of the cloth in Step B, the double spray at 45 degrees across the width (left to right) of the cloth in Step C, the double spray, 45 degrees across the width (right to left) of the cloth in Step D and then the double spray, 45 degrees (left to right) across the width of the cloth in Step E.

In the typical operation, good and satisfactory conditions for untwisting would be obtained at a temperature of about 160° to 190° F. on both spray temperatures and the box temperature. However, satisfactory results could be obtained at temperature of approximately 130° F. A variation will occur in different weaves as there will always be a difference caused by the relationship of the count, twist, type of cotton and other factors with respect to the ease or time of untwisting of the piece of cut corduroy. Also, the sprays should be at a reasonable pressure or they will not properly untwist the goods although some lesser results may be obtained. Therefore, some adjustment may be necessary in the pressure on different constructions of corduroy. However, in most set-ups it is anticipated that from approximately 25 pounds to 50 pounds of pressure should be satisfactory.

While I have shown and described the essential points of my invention together with a suggested typical commercial arrangement, this is by way of disclosure and illustration only and does not constitute either the only forms of the invention or the only physical characteristics or conditions since various alterations, changes, deviations, eliminations, substitutions, ramifications, and elucidations may be made in the embodiments shown and described without departing from the scope of my invention as defined in the appended claims.

I claim:

1. A continuous method for untwisting and separating twisted pile fibers produced by cutting fiber loops on one side of a woven textile corduroy-like cloth, comprising continuously advancing the cloth beneath a series of sprays and sequentially spraying a liquid under pressure onto the surface of the cloth against the untwisted fibers for a period of time at a temperature between 130° and 190° Farenheit and a pressure sufficient to untwist same to create even rows of untwisted pile.

2. A continuous method of untwisting and separating twisted pile fibers produced by cutting fiber loops on one side of a woven textile corduroy-like cloth comprising continuously advancing the cloth beneath a series of sprays and sequentially spraying a liquid under pressure onto the surface of the twisted fibers as the fibers are advanced beneath the spray, directing at least one of the sprays onto the surface of the fabric laterally as the fabric is advanced therebeneath and directing another of the sprays laterally onto the surface of the fabric in a direction opposite to the direction of the said aforementioned one spray, to untwist and raise the fibers uniformly and to create smooth rows of untwisted pile fibers.

3. A continuous method for removing the twist in the threads of cut textile corduroy-like fabrics to separate the twisted fibers in order to produce straighter, untwisted fibers of neat rows in such fabrics as corduroy or the like, comprising:

(a) directing a desized fabric having cut threads to and through a single liquid spray running the width of the fabric and directed at approximately a 45 degree angle to the direction of the flow of the fabric,

(b) then directing the fabric continuously beneath a single liquid spray running the width of the fabric directed at a 45 degree angle to the flow of the cloth,

(c) the nozzles in paragraphs (a) and (b) above being directed oppositely, one being directed in the direction as the fabric is moving and the other being directed in the direction opposite thereto,

(d) then directing the fabric beneath a double liquid spray directed at a 45 degree angle laterally across the width of the fabric,

(e) then directing the fabric beneath a double liquid spray directed at a 45 degree angle laterally across the width of the fabric opposite to the direction of liquid spray in (d) above, and

(f) directing the fabric beneath a double liquid spray directed at a 45 degree angle laterally across the width of the fabric as in (d) above.

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