

Jan. 19, 1943.

T. H. HILLIARD
FABRIC TREATMENT
Filed July 30, 1940

2,308,511

Fig. 1.

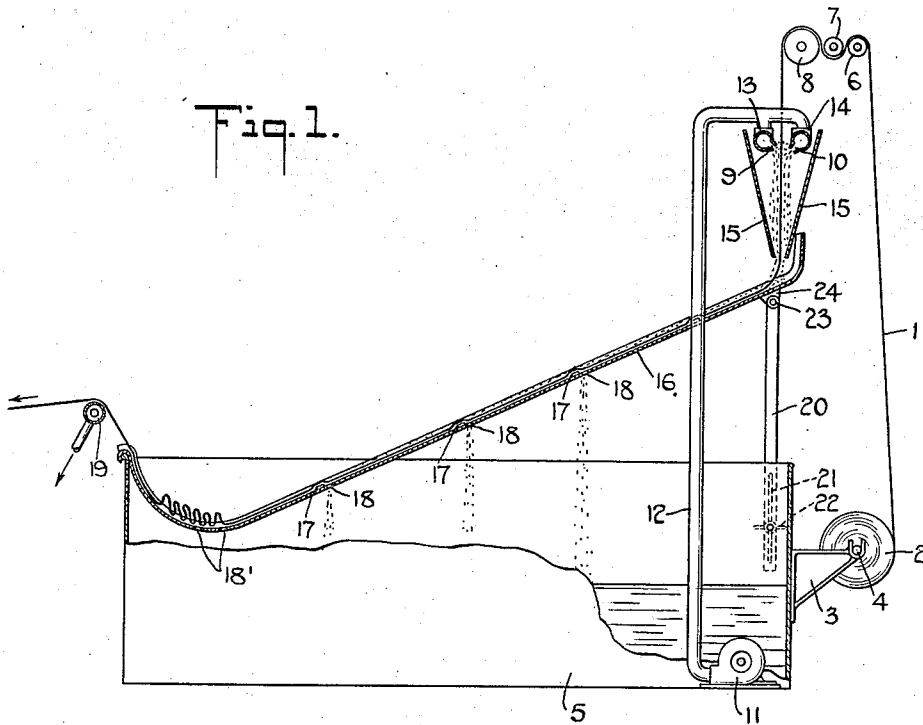
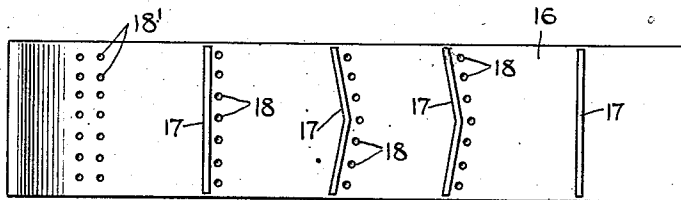


Fig. 2.



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UNITED STATES PATENT OFFICE

2,308,511

FABRIC TREATMENT

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Application July 30, 1940, Serial No. 348,357

8 Claims. (Cl. 8—135)

This invention relates to the subduing of the luster of fabrics containing yarns of organic derivatives of cellulose, and relates more particularly to the pre-treatment of said organic derivative of cellulose fabrics prior to the delustering treatment.

An object of this invention is to pretreat organic derivative of cellulose fabrics prior to delustering.

Another object of this invention is to pretreat said fabrics so that when they are subjected to a delustering treatment any creases or distortions in the fabric will not become permanently set.

Other objects of this invention will appear hereinafter from the following detailed description.

It is often desirable to decrease and subdue the high luster normally present on fabrics containing yarns of organic derivatives of cellulose and this is usually done by subjecting the fabrics to various treatments. In some cases the fabrics are delustered by subjecting them to delustering agents such as wet steam, water at or near the boiling point, say 80° C. to 100° C., or hot aqueous solutions containing soaps or other salts that promote the delustering action. Such salt solutions may be swelling agents as well as delustering agents, such as a solution of barium sulphocyanate, or the solution may contain an added swelling agent such as acetic acid.

The fabric is generally subjected to the action of such delustering agents as, for example, those mentioned above, by suspending it over rods or supports placed below the surface of the delustering bath contained in a suitable tank, and it is permitted to remain in the bath for the period necessary to obtain the desired delustering action. When fabrics are treated in this manner, however, the high temperature of the aqueous bath has a softening and plastifying effect on the organic derivative of cellulose materials and as a result the action of the bath tends to create a permanent distortion in the fabric where creases existed, or where the fabric has been in contact with the rods or supports. This is especially the case where fabrics presenting alpaca or matelasse effects are given a delustering treatment. Various attempts have been made to minimize this distortion but no satisfactory solution to the problem has been developed.

I have now discovered that such distortion, creasing, wrinkling and rowiness in the delustered fabrics due to the softening and plastifying action of the delustering bath may be overcome by giving the fabrics a preliminary shrinking treatment

whereby the fabrics are shrunk while free from any tension. As a result of such shrinking treatment the shrunken fabric may be delustered in the usual manner and the fabric shows a marked resistance to creasing, wrinkling and other distortion in the delustering bath.

For further understanding of my invention, reference is had to the accompanying drawing wherein a form of apparatus is shown for carrying out my invention. In said drawing

Fig. 1 is a side elevation of the fabric treating apparatus showing the path of the fabric through the apparatus, and

Fig. 2 is a plan view of the support upon which the fabric rests as it is treated.

Referring now to the drawing and particularly to Fig. 1, a greige fabric 1 of cellulose acetate is unwound from a roll 2 which is supported as by brackets 3 in which are set the ends of the shaft or core 4 upon which the roll is wound. The brackets 3 which support the roll 2 may be attached to a wall of the tank 5, or the roll 2 from which the fabric 1 is drawn may be supported in any other suitable manner. The fabric 1 is passed over feed rollers 6, 7 and 8 which may be driven at any desired speed depending upon the rate at which it is desired to treat the fabric. The fabric 1 is then thoroughly wet out by passing it between two powerful sprays 9 and 10 of the shrinking solution maintained at its boiling point. The sprays are fed by means of a centrifugal pump 11 which draws the treating liquid from tank 5 and forces it through pipe 12 into the spray headers 13 and 14. In order to prevent the undue splashing of the liquid there is provided a set of plates 15 in close proximity to the spray headers 13 and 14. The thoroughly wetted fabric 1 is permitted to drop gently to the bottom of an inclined trough 16 and is floated down the trough by the excess liquid from the sprays running down said trough. It is to be understood that the sides of the trough 16 are built up slightly to direct the flow of the liquid downward and to keep the liquid from running over the sides. The movement of the fabric 1 down the surface of the trough 16 is controlled by slats 17 placed at intervals along the length of the trough. The center slats are positioned to form a slight angle and this angle assists in spreading the liquid uniformly across the trough and keeps the fabric from creasing longitudinally as it moves down said trough. In close proximity to and in front of the slats in the bottom of the trough are a series of perforations 18, which permit the return flow of a portion of the liquid to the tank.

The remainder of the liquid flows down the trough and returns to the tank 5 by flowing over the sides of the trough 16 and through the perforations 18' at the base. The fabric is fed at such a rate that it gathers lightly at the base of the trough. It is then withdrawn from the trough and the excess liquid is removed by passing it over a perforated tube 19, the fabric being subjected to suction as it passes over this tube. The angle at which the trough 16 is maintained may be varied by sliding the bar 20 upward or downward in the slot 21 and locking it in place by means of the thumb-screw 22. The bar 20 is pivotally attached to the trough 16 as by a bolt 23 passing through a bracket 24 to permit easy adjustment.

In order that the fabrics may be pretreated and preshrunk according to my invention without being subjected to any tension, the rate at which the fabric is taken up from the inclined trough should be so adjusted to the rate at which it is fed that the fabric will be permitted to gather lightly on said trough as it moves downward to the point where it is taken up. To obtain this effect the rate at which the fabric is fed should approximate the rate at which it is removed so that a substantially constant length of slack fabric will be maintained on the surface of the inclined trough.

Fabrics pretreated and preshrunk in this manner without tension show an unusual resistance to creasing, rowiness and other distortions when subjected to the final delustering treatment by the various agents mentioned above.

Although the invention has been described in connection with a fabric made of cellulose acetate yarns, it is pointed out that the process is applicable to fabrics made of or containing yarns of other organic derivatives of cellulose such as organic esters of cellulose and cellulose ethers. Examples of other organic esters of cellulose are cellulose propionate, cellulose butyrate and mixed esters such as cellulose acetate-propionate, while suitable cellulose ethers are ethyl cellulose, methyl cellulose and benzyl cellulose. The fabric need not be made wholly of organic derivatives of cellulose but may contain yarns of other fibers such as silk, cotton, reconstituted cellulose, wool, etc.

The time during which the fabric is maintained on the inclined trough and therefore subject to the preshrinking action of the hot liquor will, of course, vary with the nature of the fabric and the particular solution used. The period of time may vary from about $\frac{1}{3}$ of a minute to about 5 minutes. With heavier fabrics the time may be preferably from about 1 minute to about 5 minutes while lighter fabrics may be subjected to the action of the hot liquor for periods varying from about $\frac{1}{3}$ of a minute to about 1 minute to obtain the desired results. The length of time the fabric remains in the trough and the speed with which it descends may be controlled by varying the rate of fabric feed, the rate of flow of the treating liquid or by varying the angle of the trough. By suitably varying these factors desirable results may be achieved with any type of fabric.

For fabrics which are composed wholly of an organic derivative of cellulose such as cellulose acetate, it is preferable to carry out the pretreating or preshrinking with the solution as near to the boiling point as practical, i. e., at temperatures of about 98° C. Where a fabric of cellulose acetate containing yarns of reconstituted cellu-

lose is treated, the spray is preferably maintained at temperatures of from about 60° C. to about 75° C. For fabrics of cellulose acetate containing yarns of natural silk, the preferable temperatures are from about 75° C. to about 85° C.

While the preliminary shrinking treatment may be carried out by subjecting the fabric to the preshrinking action of the delustering solution as described, other solutions which only shrink but which do not deluster the fabrics are likewise suitable for the preliminary treatment. Solutions of lower aliphatic alcohols such as methyl, ethyl and isopropyl alcohol are suitable shrinking agents as are solutions of acetone, dioxane, and nitric acid.

My process is applicable for the treatment of various types of fabrics. Not only is it suitable for use in connection with woven fabrics but it may be used as well for the preshrinking of knitted fabrics, such as warp knitted and circular knitted fabrics.

It is to be understood that the foregoing detailed description is merely given by way of illustration and that many variations may be made therein without departing from the spirit of my invention.

Having described my invention what I desire to secure by Letters Patent is:

1. In a process for delustering fabrics containing organic derivative of cellulose yarns, the steps of pretreating the fabric with a liquid adapted to shrink the fabric while the fabric moves down an inclined surface whereby the fabric is caused to shrink in the absence of tension, and placing stationary obstructions in the path of said fabric so as to spread the fabric, thereby preventing the fabric from creasing longitudinally as it moves down said inclined surface.

2. In a process for delustering fabrics containing cellulose acetate yarns, the steps of pretreating the fabric with a liquid adapted to shrink the fabric while the fabric moves down an inclined surface whereby the fabric is caused to shrink in the absence of tension, and placing stationary obstructions in the path of said fabric so as to spread the fabric, thereby preventing the fabric from creasing longitudinally as it moves down said inclined surface.

3. In a process for delustering fabrics containing organic derivative of cellulose yarns, the steps of pretreating the fabric with a liquid adapted to shrink the fabric while the fabric moves down an inclined surface whereby the fabric is caused to shrink in the absence of tension, and placing stationary angular obstructions in the path of said fabric so as to spread the fabric thereby preventing the fabric from creasing longitudinally as it moves down said inclined surface.

4. In a process for delustering fabrics containing cellulose acetate yarns, the steps of pretreating the fabric with a liquid adapted to shrink the fabric while the fabric moves down an inclined surface whereby the fabric is caused to shrink in the absence of tension, and placing stationary angular obstructions in the path of said fabric so as to spread the fabric, thereby preventing the fabric from creasing longitudinally as it moves down said inclined surface.

5. In a process for delustering fabrics containing organic derivative of cellulose yarns, the steps of pretreating a fabric with a liquid having a shrinking action on the fabric, causing the fabric to move down an inclined surface pro-

vided with stationary obstructions for spreading the fabric, the fabric being permitted to gather in transverse folds near the lower end of said inclined surface, whereby the shrinking of the fabric is effected in the absence of tension, and removing the shrinking liquid prior to the delustering treatment.

6. In a process for delustering fabrics containing cellulose acetate yarns, the steps of pretreating a fabric with a liquid having a shrinking action on the fabric, causing the fabric to move down an inclined surface provided with stationary obstructions for spreading the fabric, the fabric being permitted to gather in transverse folds near the lower end of said inclined surface, whereby the shrinking of the fabric is effected in the absence of tension, and removing the shrinking liquid prior to the delustering treatment.

7. In a process for delustering fabrics containing organic derivative of cellulose yarns, the steps of pretreating a fabric with a liquid having a shrinking action on the fabric, causing

the fabric to move down an inclined surface provided with stationary angular obstructions for spreading the fabric, the fabric being permitted to gather in transverse folds near the lower end of said inclined surface, whereby the shrinking of the fabric is effected in the absence of tension, and removing the shrinking liquid and passing the treated fabric through the air prior to the delustering treatment.

8. In a process for delustering fabrics containing cellulose acetate yarns, the steps of pretreating a fabric with a liquid having a shrinking action on the fabric, causing the fabric to move down an inclined surface provided with stationary angular obstructions for spreading the fabric, the fabric being permitted to gather in transverse folds near the lower end of said inclined surface, whereby the shrinking of the fabric is effected in the absence of tension, and removing the shrinking liquid and passing the treated fabric through the air prior to the delustering treatment.

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