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TREATMENT OF TEXTILE FABRICS AND THE PRODUCT THEREOF

Camille Dreyfus, New York, N. Y., and Herbert Platt, Cumberland, Md., assignors to Celanese Corporation of America, a corporation of Delaware

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This invention relates to the treatment of fabrics containing fibres of organic derivatives of cellulose and relates more particularly to the treatment of such fabrics with a modifying agent in order to impart to the fabrics a fuller, more lofty and resilient hand.

An object of the invention is the economical and expeditious method of treating a fabric containing at least some yarns formed of fibres of organic derivatives of cellulose to impart to the fabric a resilient, full and voluminous hand. Another object of the invention is the treating of fabrics containing yarns formed of a mixture of organic derivative of cellulose fibres and animal fibres to impart a desired hand thereto without reducing the strength of the animal fibres. Other objects of the invention will appear from the following detailed description.

It is known that fabrics containing a mixture of animal fibres, vegetable fibres and/or regenerated or reconstituted cellulose fibres mixed with artificial fibres containing organic derivatives of cellulose are made by a variety of processes. These fabrics, however, although they may have the desired appearance and strength may not have the desired hand or feel. In some instances fabric made of animal fibres and organic derivative of cellulose fibres, which are intended to compete commercially with fabrics of all-animal fibres, have a rag-like or boardy hand, whereas the fibres of all-animal fibres of the same structure has a resilient feel and is lofty in hand. By treating, in accordance with this invention, a fabric which has a rag-like hand comprising fibres of organic derivatives of cellulose and animal fibres, the treated fabric is Similarly, the treatment of fabrics formed of vegetable fibres or reconstituted or regenerated cellulose fibres, mixed with fibres of organic derivatives of cellulose, may be given an enhanced hand by treating the same in accordance with this invention.

A further advantage of treating fabrics containing fibres of organic derivatives of cellulose in accordance with this invention is that the fabrics so treated have the property of a non-slipping fabric, that is, the warp and weft appear to be anchored to each other and even in fairly open fabric or loosely woven fabric the tendency of the weft to slip on the warp is greatly reduced.

In accordance with our invention, we treat fabrics made wholly of yarns of fibres of organic derivatives of cellulose or from yarns containing a mixture of fibres of organic derivatives of cellulose with other fibres such as cotton, wool, silk, regenerated or reconstituted cellulose, etc., with a modifying agent comprising alcohol, acetone or other solvent or swelling agent, and a diluent for the solvent or swelling agent. The yarns containing fibres of organic derivatives of cellulose may be woven, knitted, netted or knotted with yarns of the same kind or with yarns of other materials. The treatment with the modifying agent may be for any suitable period of time and at any suitable temperature, depending upon the power of the solvent or swelling agent and the desired degree of treatment for the purpose intended.

The fabric to be treated by our invention may be any suitable woven, knitted, netted or knotted fabric. This fabric contains at least some yarns formed from a mixture of fibres of organic derivatives of cellulose and other fibres. Any suitable organic derivative of cellulose may be employed for forming the fibres such as the organic esters of cellulose and cellulose ethers. Examples of organic esters of cellulose are cellulose acetate, cellulose formate, cellulose propionate and cellulose butyrate, while examples of cellulose ethers are ethyl cellulose, methyl cellulose and benzyl cellulose. While the best results are obtained by the treatment of fabrics which consist wholly of yarns containing fibres of organic derivatives of cellulose, novel effects may be obtained by the treatment of fabrics that contain in addition to the yarns comprising organic derivatives of cellulose fibres, other yarns such as yarns formed from substantially continuous filaments of silk, reconstituted or regenerated cellulose or organic derivatives of cellulose. Fabrics may also be formed by interweaving yarns containing organic derivative of cellulose fibres with yarns formed entirely of animal fibres, cotton fibres or mixtures of the same.

The artificial fibres employed in forming at least some of the yarns in the fabric may be made by any suitable method, for example, by extruding an organic ester of cellulose, dissolved in a volatile solvent, through suitable orifices into a solidifying medium, thus forming substantially continuous filaments. A plurality of these filaments as they are formed, or from a plurality of preformed packages, may be grouped together in the form of a rope or they may be formed into a band, then cut or torn to suitable lengths. Either the continuous filaments or the staple fibres may be treated by applying thereto effect materials, lubricants or other finishes and may or may not be embossed to form crimps therein, or treated with baths which cause the fibres to curl. Fibres

from 1.5 inches to 12 inches or more in length may be employed to form yarns. These artificial fibres may be mixed with wool, cotton, silk or other fibres and processed into threads or yarns by the woolen method, the cotton method, the waste silk method or other suitable methods.

The yarns may be formed of a mixture of from 50 to 5 parts of organic derivative of cellulose fibres with 5 to 50 parts of animal fibres, cotton fibres or silk fibres. For forming fabrics suitable for men's wear which have the appearance and hand of all-wool worsted fabrics, it is preferable to form yarn from about 70 parts of organic derivative of cellulose fibres and about 30 parts of wool fibres. For other types of fabric, however, other percentages may be more desirable.

The modifying agent with which the fabrics are to be treated preferably contains from 1% to 20% of methyl alcohol, ethyl alcohol, acetone, or other solvent or swelling agent in aqueous solution. Although the modifying agent preferably contains from 1% to 20% of the solvent or swelling agent, higher percentages may be employed. When treating fabrics containing animal fibres the concentration of the solvent in the modifying agent is preferably below 10%, as higher concentrations tend to extract the oil from the animal fibres thus rendering the same more brittle. However, when treating a fabric consisting of yarns containing organic derivatives of cellulose fibres and vegetable fibres the concentration of the solvent in the treating bath may be as high as 20%, 30% or more.

Any suitable fabric as described above may be treated with the modifying agent by submerging the fabric in a bath of the modifying agent, which bath is maintained at a temperature depending upon the duration of the treatment and upon the concentration of the solvent in the bath. The treating bath may be maintained at a temperature of from 30 to 90° C. When treating fabrics containing yarns formed from a mixture of animal fibres and organic derivative of cellulose fibres, a temperature of about 70° C. is preferable while maintaining the concentration of the solvent between 2% to 5%. The time of treatment will depend upon the temperature at which the treatment is carried out. For instance, in treating fabrics made of yarns containing a mixture of animal fibres and organic derivative of cellulose fibres at about 70° C., from 2 to 20 minutes is found sufficient. Other methods of subjecting the fabric to treatment with the modifying agent may be employed, for instance, by spraying the fabric with the aqueous solution of the solvent or swelling agent.

After the treatment of fabrics with the modifying agent, the excess solution may be removed from the fabric by passing the same through nip rollers or through a pair of rollers covered with an absorbent material such as linen or cotton fabric, the same being at room temperature or at elevated temperatures. For example, a laundry mangle may be employed.

As a guide to the concentration of modifying agents, temperatures and time of treatment which may be employed in accordance with this invention, the following examples for treating fabrics consisting of yarns formed from about 70 parts cellulose acetate fibres and about 30 parts animal fibres are given.

Example I

The fabric consisting of yarns made of about 70 parts cellulose acetate fibres and about 30 parts animal fibres may be treated for 5 minutes at 75° C. in a bath containing from 2 to 5% ethyl or methyl alcohol. The fabric so treated has a resilient, full and voluminous hand.

Example II

The fabric consisting of about 70 parts cellulose acetate fibres and about 30 parts of wool fibres may be treated for 1 to 3 minutes at 65–70° C. in a bath containing 5% of acetone. The fabric so treated has a resilient, full and voluminous hand.

Example III

The fabric consisting of about 70 parts cellulose acetate fibres and about 30 parts of wool fibres may be treated for 15 minutes at 50° C. in a bath containing 4% acetone. The fabric so treated has a resilient, full and voluminous hand.

The modification of the hand and the imparting of the non-slipping properties is also accompanied by a slight shrinkage. For instance, fabric having 44 picks before treatment may have 45 to 46 picks after treatment.

It is preferable to treat the fabric with the modifying agent or in a bath containing the modifying agent after the fabric is dyed. This treatment does not affect the tone or depth of color or its stability. Fabric treated prior to dyeing may in certain cases lose the desired properties imparted thereto in the heated dye baths when the same are relatively high in temperature and wherein the fabric is under tension. A preferred method of treating a fabric in accordance with this invention is to dye the fabric, separate the fabric from the dye bath without drying, then treat the fabric with the modifying agent and tenter drying.

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

Having described our invention, what we desire to secure by Letters Patent is:

1. A process for producing a desirable hand in fabrics containing yarns formed of a mixture of organic derivative of cellulose fibres and animal fibres, which comprises treating said fabric for a period of from 1 to 15 minutes with a modifying agent comprising an aqueous solution of a swelling agent, selected from the group consisting of methyl alcohol, ethyl alcohol and acetone, in a concentration of from 2 to 5% maintained at from 50 to 75° C., and removing excess modifying agent from the fabric while the fabric is under a pressure which is at the most insufficient to cause the yarns in the fabric to adhere one to the other or otherwise deform the fabric.

2. A process for producing a desirable hand in fabrics containing yarns formed of a mixture of cellulose acetate fibres and animal fibres, which comprises treating said fabric for a period of from 1 to 15 minutes with a modifying agent comprising an aqueous solution of a swelling agent, selected from the group consisting of methyl alcohol, ethyl alcohol and acetone, in a concentration of from 2 to 5% maintained at from 50 to 75° C., and removing excess modifying agent from the fabric while the fabric is under a pressure which is at the most insufficient to cause the yarns in the fabric to adhere one to the other or otherwise deform the fabric.

3. A process for producing a desirable hand in fabrics containing yarns formed of a mixture of organic derivative of cellulose fibres and wool

fibres, which comprises treating said fabric for a period of from 1 to 15 minutes with a modifying agent comprising an aqueous solution of a swelling agent, selected from the group consisting of methyl alcohol, ethyl alcohol and acetone, in a concentration of from 2 to 5% maintained at from 50 to 75° C., and removing excess modifying agent from the fabric while the fabric is under a pressure which is at the most insufficient to cause the yarns in the fabric to adhere one to the other or otherwise deform the fabric.

4. A process for producing a desirable hand in fabrics containing yarns formed of a mixture of cellulose acetate fibres and wool fibres, which comprises treating said fabric for a period of from 1 to 15 minutes with a modifying agent comprising an aqueous solution of a swelling agent, selected from the group consisting of methyl alcohol, ethyl alcohol and acetone, in a concentration of from 2 to 5% maintained at from 50 to 75° C., and removing excess modifying agent from the fabric while the fabric is under a pressure which is at the most insufficient to cause the yarns in the fabric to adhere one to the other or otherwise deform the fabric.

5. A process for producing the desirable hand in fabrics containing yarns formed of about 70 parts of organic derivative of cellulose fibres and about 30 parts of wool fibres, which comprises treating said fabric for a period of from 1 to 15 minutes with a modifying agent comprising an aqueous solution of a swelling agent, selected from the group consisting of methyl alcohol, ethyl alcohol and acetone, in a concentration of from 2 to 5% maintained at from 50 to 75° C., and removing excess modifying agent from the fabric while the fabric is under a pressure which is at the most insufficient to cause the yarns in the fabric to adhere one to the other or otherwise deform the fabric.

6. A process for producing a desirable hand in fabrics containing yarns formed of about 70 parts of cellulose acetate fibres and about 30 parts of wool fibres, which comprises treating said fabric for a period of from 1 to 15 minutes with a modifying agent comprising an aqueous solution of a swelling agent, selected from the group consisting of methyl alcohol, ethyl alcohol and acetone, in a concentration of from 2 to 5% maintained at from 50 to 75° C., and removing excess modifying agent from the fabric while the fabric is under a pressure which is at the most insufficient to cause the yarns in the fabric to adhere one to the other or otherwise deform the fabric.

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HERBERT PLATT.

CERTIFICATE OF CORRECTION.

Patent No. 2,158,110. May 16, 1939.

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It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 1, first column, line 31, for the word "fibres" first occurrence, read fabric; line 36, after "is" insert the words and period in all respects similar to the fabric of the same construction formed entirely of animal fibres.; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 11th day of July, A. D. 1939.

Henry Van Arsdale

(Seal) Acting Commissioner of Patents.

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4. A process for producing a desirable hand in fabrics containing yarns formed of a mixture of cellulose acetate fibres and wool fibres, which comprises treating said fabric for a period of from 1 to 15 minutes with a modifying agent comprising an aqueous solution of a swelling agent, selected from the group consisting of methyl alcohol, ethyl alcohol and acetone, in a concentration of from 2 to 5% maintained at from 50 to 75° C., and removing excess modifying agent from the fabric while the fabric is under a pressure which is at the most insufficient to cause the yarns in the fabric to adhere one to the other or otherwise deform the fabric.

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6. A process for producing a desirable hand in fabrics containing yarns formed of about 70 parts of cellulose acetate fibres and about 30 parts of wool fibres, which comprises treating said fabric for a period of from 1 to 15 minutes with a modifying agent comprising an aqueous solution of a swelling agent, selected from the group consisting of methyl alcohol, ethyl alcohol and acetone, in a concentration of from 2 to 5% maintained at from 50 to 75° C., and removing excess modifying agent from the fabric while the fabric is under a pressure which is at the most insufficient to cause the yarns in the fabric to adhere one to the other or otherwise deform the fabric.

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