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METHOD OF MAKING A TEXTILE FABRIC

Frederick Bradley Smith, Jackson Heights, N. Y., assignor to Celanese Corporation of America, a corporation of Delaware

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This invention relates to textile fabrics containing yarn of cellulose acetate or other organic derivative of cellulose which fabrics have many desirable properties.

An object of my invention is to prepare fabrics containing organic derivative of cellulose yarn and which present crepe or cockle effects. A further object of my invention is to prepare fabrics containing organic derivatives of cellulose yarn and having a soft and full hand. Other objects of this invention will appear from the following detailed description.

In order to make fabrics which have a rough surface such as occurs in crepe fabrics, it has previously been necessary to employ yarns having a very high or hard twist. In the prior practice, usually a crepe fabric is prepared by weaving alternate picks of highly twisted yarns twisted in opposite direction and then subjecting the fabric so formed to a creping bath, which causes the highly twisted yarn to buckle or cockle and thus produce a crepe effect. This method of producing crepe effects is open to serious objections. In the first place, this method is relatively expensive due to the great cost of imparting high twist to yarns. Moreover it is not possible to produce crepe fabrics having a truly soft hand by this method, since the highly twisted yarn imparts to the fabric a harshness that cannot be fully overcome.

Furthermore, it is not possible by ordinary means to produce crepe effects by the use of highly twisted cellulse acetate yarn, since such highly twisted yarn does not tend to crepe to an appreciable extent when a fabric containing the same is subjected to the ordinary crepe baths. Therefore under ordinary prior practice, when a crepe fabric containing cellulose acetate yarn is desired, the cellulose acetate yarn is woven with highly twisted yarn of another fibre, and the fabric so formed is subjected to a creping bath to cause the yarn of the other fibre to cockle or crepe, the cellulose acetate yarn remaining flat in the fabric.

I have found that if yarn of cellulose acetate or other organic derivatives of cellulose is woven in alternation with a stretched yarn of regenerated cellulose, and the fabric so formed is then subjected to an aqueous or other bath that causes the shrinkage of the regenerated cellulose yarn, the cellulose acetate yarn is caused to cockle, crinkle or buckle to produce a fabric having a more or less rough surface, more or less simulating the appearance of the crepe fabric. The fabric so formed has an extraordinarily soft hand or feel, and furthermore is very "lofty", that is it has a full or "spongy" feel. Moreover by this method, yarn of relatively low twist may be employed and thus the expense of imparting high twist to the yarn is avoided. Furthermore in the fabric produced by this invention, the yarn of cellulose acetate or other organic derivative of cellulose is cockled or buckled, a result not attainable by the ordinary method of producing crepe yarn.

In accordance with my invention, I produce ornamental and other desirable effects on fabrics by subjecting mixed fabrics, which are so constructed that either the warp or the weft or both, contains yarn of organic derivatives of cellulose and stretched yarn of regenerated cellulose with a reagent that causes the shrinkage of the stretched regenerated cellulose yarn but not of the organic derivative of cellulose yarn. The shrinking of the regenerated cellulose yarn causes the organic derivatives of cellulose yarn to crinkle, buckle or cockle more or less, thus producing the many desirable effects above described.

The yarn of the organic derivative of cellulose may be made of filaments of organic esters of cellulose such as cellulose acetate, cellulose formate, cellulose propionate or cellulose butyrate or of cellulose ethers such as ethyl cellulose, methyl cellulose and benzyl cellulose. These yarns may if desired be sized with a suitable size prior to weaving. Such yarns may be of a low twist, but the use of organic derivative of cellulose yarn of high twist to obtain any desired effect is not excluded.

The yarns of regenerated cellulose may preferably be of relatively low twist, or they may be of high twist if an effect requiring highly twisted yarn is required.

Prior to weaving, the regenerated cellulose yarn is stretched, say from 5 to 10% or more, in any suitable manner. For instance the regenerated cellulose yarn may be wetted with water and stretched to the desired extent and dried while under tension. In the case where such regenerated cellulose yarn is used as part of the warp, this stretching may be conveniently done during the sizing of such yarn.

The construction of the fabric should be such that the yarns of cellulose acetate or other organic derivative of cellulose alternate either in the weft or in the warp with stretched yarns of regenerated cellulose. This alternation may be regular that is for instance, an alternation of one, two or more yarns of cellulose acetate and one, two or more yarns of regenerated cellulose, or it may be

in a form to produce checks, stripes or even complicated designs such as are produced by Jacquard looms.

As stated the alternation of the two kinds of yarn may occur either in the weft alone or in the warp alone or both in the weft and in the warp. Thus a fabric may have a warp consisting wholly of yarns of cellulose acetate or consisting wholly of yarns of regenerated cellulose, cotton, natural silk or wool while the weft may be reconstructed by the alternation of one, two or more picks of stretched yarn of regenerated cellulose and one, two or more picks of cellulose acetate yarn. On the other hand the weft may consist wholly of either cellulose acetate yarn or wholly of regenerated cellulose, cotton, wool or natural silk yarn while the warp is made up of one, two or more ends of celiulose acetate yarn alternating with one, two or more ends of stretched regenerated cellulose yarn.

The use of a mixed fabric which is constructed of a warp consisting wholly of one kind of yarn and a weft consisting wholly of another kind of yarn will not produce the desired result since on shrinking of one kind of yarn, say the weft, no cockling of the other yarn, say the warp will be produced, the only effect being that a fabric of closer weave is produced.

The fabric may be constructed with any desired weave. Even if the cellulose acetate or other organic derivative of cellulose yarn is woven closely into the fabric, fullness is imparted to such fabric after shrinkage of the regenerated cellulose yarn. However, the looser the weave of such cellulose acetate yarn in the fabric, the greater will be the fullness of the fabric and the rougher will be the appearance of such fabric. Therefore for the best effects, I prefer to weave the fabric in such a manner as to cause the cellulose acetate yarns that alternate with the stretched regenerated cellulose yarn to float on the face and/or back of the fabric. For instance, if such cellulose acetate yarn is employed in the warp, it may float across, two, three, four or more picks on the face of the fabric before it is caused to pass to the back of such fabric. The greater the amount of floating of such cellulose acetate yarn, the greater will be the degree of fullness and softness imparted to the fabric.

An example of a suitable reagent that causes the shrinkage of the regenerated cellulose yarns and not of the organic derivative of cellulose, is water or aqueous solutions. The aqueous solution or water may be applied to the fabric by rinsing or soaking the same therein or it may be applied in the finishing of the fabric, such as scouring or dyeing. After treatment with the aqueous liquid, the fabric should preferably be dried without tension so as to permit the previously stretched yarns of regenerated cellulose to shrink and thus cause the yarns of the organic derivative of cellulose to cockle. The water or aqueous liquid may be applied to the fabric at ordinary temperatures or at elevated temperatures up to the boiling temperatures. The organic derivative of cellulose yarns are practically unaffected with respect to shrinkage when treated with the water or aqueous liquid. The reagent for causing the shrinkage may be applied to the whole surface of the fabric or it may be applied locally in the form of a paste or by brushing or by spraying onto stencils so that the cockle effect is obtained in only certain predetermined portions of the fabric, whereby many ornamental effects may be obtained on fabrics that are woven with ordinary yarn by ordinary looms by the simple application of the shrinking agent above described.

The fabric after treatment may be dyed, printed or finished in any suitable manner. This fabric may be dyed either to obtain a solid color, or it may be dyed in a cross-dyeing bath wherein one color is imparted to the organic derivative of cellulose yarn and another color is imparted to the regenerated cellulose yarn, thus enhancing the ornamental effect.

If desired, the fabric may be subjected to hot aqueous fluids, such as water or aqueous soap solutions at or near the boiling point of water, or to wet steam or to any other agency to cause the cellulose acetate or other organic derivative of cellulose yarn to become delustered. On the other hand, the cellulose acetate or other organic derivative of cellulose yarn may be delustered prior to being woven into the fabric, or cellulose acetate yarn having therein finely divided organic or inorganic pigments which reduce the opacity or luster thereof may be used for making the fabric.

In order further to illustrate my invention, but without being limited thereto, the following specific example is given.

Example

The following is one example of the many modes of carrying out my invention.

Yarn of regenerated cellulose of 100 denier having 2.5 turns per inch is wetted and stretched 10% or more of its length while wet, is sized and dried under tension. A warp beam having 70 ends per inch is made from such stretched regenerated cellulose yarn.

Another warp beam is made of sized cellulose acetate yarn of 150 denier having 3 turns per inch, care being taken not to stretch such yarn any more than is absolutely necessary, there being 70 ends per inch in such warp.

The warp of the cellulose acetate yarn and the warp of the stretched regenerated cellulose yarn are entered in the loom, one end of cellulose acetate yarn alternating with one end of regenerated cellulose yarn, making a total of 140 ends per inch. The cellulose acetate yarn is inserted in the first eight shafts of the harness of the loom, and the stretched regenerated cellulose yarn in the last four shafts of the harness.

The filling inserted in the warp is a composite yarn made by the doubling with a twist of 5 turns per inch of one end of cotton yarn having a 60 single count and three ends of cellulose acetate yarn each of 75 denier having 5 turns per inch. The weaving is so conducted that the filling is inserted, one pick in a shed, to form 44 picks per inch, the reconstituted cellulose warp being woven in a plain, tabby or taffeta weave, while the cellulose acetate warp is caused to produce a fancy diagonal weave, floating alternately across four picks on the face and then across four picks on the back of the fabric.

The fabric so formed is scoured, dyed and/or otherwise finished with aqueous baths and dried while not under tension. The pre-stretched regenerated cellulose yarn of the warp is thus caused to shrink causing the cellulose acetate warp yarns to crinkle, buckle or cockle. The fabric has a very pleasing rough crepe-like appearance and has a very soft and full or "lofty" hand. Very pleasing effects can be obtained by subjecting this fabric to the action of hot aqueous fluids at or

near the boiling point of water to deluster the cellulose acetate yarn.

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 my invention.

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

1. Method of producing a fabric having a full hand comprising associating together yarns of cellulose acetate and yarns of regenerated cellulose which, after having reached the set condition, have been subjected to a stretching operation in alternating relationship in such manner that a fabric is formed wherein at least part of the cellulose acetate yarn floats therein, and then subjecting the fabric to an agency that causes the regenerated cellulose yarn to shrink.

2. Method of producing a fabric having a full hand comprising associating together yarns of cellulose acetate and yarns of regenerated cellulose, which, after having reached the set condition, have been subjected to a stretching operation so as to stretch the yarn 5% of its length, in alternating relationship in such manner that a fabric is formed wherein at least part of the cellulose acetate yarn floats thereon, and then subjecting the fabric to an agency that causes the regenerated cellulose yarn to shrink.

FREDERICK BRADLEY SMITH.