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TEXTILE MATERIAL

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This invention relates to the manufacture of textile fabrics exhibiting crêpe effects.

Textile fabrics exhibiting crêpe effects have long been obtained by employing in their construction highly twisted yarns, hereinafter referred to as crêpe yarns or crêpe threads, made of natural silk in the gummed state, the crêpe effects appearing when the gum is subsequently removed by a suitable scouring or like operation. Difficulties have however been experienced in the production of fabrics exhibiting crêpe effects from highly twisted crêpe threads made of cellulose acetate or other organic substitution derivatives of cellulose.

According to United States application S. No. 491,070 filed 24th October, 1930 fabrics exhibiting crêpe effects may be produced by incorporating therein sized and highly twisted crêpe threads, the fabrics being subsequently treated so as to swell the sizing materials without rendering the latter unduly soft or yielding. Again according to United States applications S. Nos. 514,898 and 514,899 both filed 10th February, 1931 the desired crêpe effects may be produced by incorporating in the fabrics highly twisted crêpe threads sized with polymerized vinyl compounds or other polymerized organic compounds, the crêpe effects appearing upon subsequently subjecting the fabrics to suitable treatment, for example to the action of a scouring bath. Fabrics exhibiting crêpe effects may also be produced by the process described in United States application S. No. 501,461 filed 10th December, 1930, namely by incorporating highly twisted crêpe threads and subsequently swelling the filaments of the crêpe threads. It appears probable that swelling of the filaments of the crêpe threads and/or the size thereon is responsible for a reduction in length of the said threads and production of the crêpe effects.

We have now discovered a new method of treating fabrics containing highly twisted crêpe threads, sized or unsized, whereby swelling or other modification of the crêpe thread filaments and/or any size thereon may be effected and the fabrics caused to exhibit crêpe effects.

According to the present invention a process for the production of crêpe effects upon fabrics containing highly twisted crêpe threads comprises the treatment of the fabrics with emulsions or dispersions of organic substances having a swelling action on filaments of the crêpe threads and/or any sizing material thereon.

The invention is of particular advantage in the treatment of materials containing crêpe threads

made with unsized filaments of cellulose acetate or other organic derivatives of cellulose and will be more particularly described with reference to the treatment of such materials.

Any organic substances or mixtures of substances, capable of being brought into the form of emulsions or dispersions in aqueous or other media, and having a swelling action on cellulose acetate or other cellulose derivatives or other materials constituting the crêpe thread filaments and/or any size thereon may be utilized in accordance with the process of the present invention. Such substances, hereinafter referred to as swelling agents, may be solvents for the cellulose derivatives or other materials, but preferably substances having only a gelatinizing action on the cellulose derivatives or other materials are employed. It will be appreciated that the substance used as the swelling agent, whether of the solvent or gelatinizing type, may be selected according to the nature of the cellulose derivative or other material. In the case of acetone soluble cellulose acetate, such as is commonly employed in the manufacture of artificial filaments and threads, there may be instanced as examples of swelling agents of the gelatinizing type, tetrachlorethane, chloroform, dichlorethylene, ethylene dichloride, chlorotone, and other halogenated compounds, also ketones, for example cyclohexanone, alcohols for example benzyl alcohol, esters, particularly esters of high boiling point for example diethyl phthalate, and aryl sulphonamides and their derivatives substituted in the nucleus and/or in an amide group, for example a xylenomonomethyl sulphonamide or a mixture of isomeric xylene monomethyl-sulphonamides.

Excellent crêpe effects may for example be produced upon a fabric comprising highly twisted weft threads of cellulose acetate by padding the said fabric with an emulsion of tetrachlorethane or of other of the aforesaid swelling agents, prepared with the aid of ammonium oleate or other soap, and subsequently washing and finishing the fabric as desired or requisite.

It is possible that the water or other dispersion or emulsion medium present may play an important part in the process and that the swelling action is not due solely to the presence of the swelling agent. We have, indeed, further found that fabrics exhibiting crêpe effects may be produced by treating yarns containing filaments of cellulose acetate or other organic derivatives of cellulose with emulsions or dispersions of swelling agents, twisting the yarns to a high degree if not already so twisted, incorporating them into

fabrics, and subjecting the fabrics to the action of an aqueous bath, for example an aqueous soap solution as commonly employed in the scouring of textile materials. This method of producing fabrics exhibiting crêpe effects is included in and comprises an important feature of the present invention.

The emulsions or dispersions of swelling agents may be prepared with the aid of any suitable emulsifying or dispersing agents, and particularly satisfactory results have been obtained by the use of emulsions prepared with the aid of saponin or with soaps, for example sodium, potassium, or ammonium oleate, or with Turkey red oil or other sulphonated soaps or oils.

The action of the emulsions or dispersions upon the crêpe threads may frequently be assisted or intensified by including therein substances, whether soluble or insoluble in the dispersion or emulsion media, having a solvent or softening action upon the cellulose acetate or other organic derivative of cellulose contained in the crêpe threads or upon any size on the crêpe threads. Again, the preparation of the emulsions or dispersions of the swelling agents may be assisted by the presence of substances having a solvent or softening action on the swelling agents and such substances may in addition have a solvent or softening action on the cellulose derivatives of the crêpe threads or on any size thereon. As examples of such assisting agents may be mentioned acetone, ethyl or methyl alcohol, diacetone alcohol, ethyl lactate or other ester, and hydrocarbons, for example benzene, toluene, or other aromatic hydrocarbons. Inorganic agents having a solvent, softening, or swelling action on organic derivatives of cellulose, for example sodium, ammonium or other thiocyanate may likewise be utilized if desired.

The application of the emulsions or dispersions of swelling agents may be accomplished in any convenient manner, for example by passing the materials through baths thereof. Preferably however the application of the emulsions or dispersions is effected by padding, for example in a padding mangle. The materials may, if requisite, be permitted to remain in contact with the emulsions or dispersions of swelling agents for a substantial time for example 1-2 hours or more. To this end the materials may be allowed to remain for a time in the baths, where these are employed, or where padding methods of application are used the materials may be batched, that is to say they may be rolled or otherwise parcelled up and allowed to stand for the required period.

If desired the emulsions or dispersions of swelling agents may be applied locally to the materials. For example the dispersions or emulsions, suitably thickened if desired or requisite, may be printed or stencilled on the materials whereby brocade or like effects may be produced.

After the application of the emulsions or dispersions of the swelling agents the materials are preferably subjected to an aqueous treatment, for example scouring in a dilute aqueous soap solution, and are then finished and dried as desired.

If desired the materials may be dried after the application of the emulsions or dispersions of swelling or gelatinizing agents and then treated with water or other aqueous liquid which may, sometimes with advantage, be applied in restricted quantity. Thus, the materials uniformly or locally treated with the emulsions or dispersions may be subjected to the action of water vapour or water or other aqueous liquid may be sprayed

on to the materials in regulated quantity. Crêpe effects enhanced as compared with those obtainable when the materials are treated with water in substantially unrestricted amount, as in the case of a bath treatment, may thus be obtained. The aforesaid treatment with water in restricted amount may likewise be applied where fabrics have been woven from highly twisted yarns impregnated prior to weaving with emulsions or dispersions of swelling agents for the material of the filaments.

The degree of twist imparted to the crêpe yarns or threads consisting of or containing cellulose acetate or other organic derivatives of cellulose may be similar to that commonly employed in the production of crêpe threads from natural silk in the gum, for example the threads may have imparted thereto a twist of from 50-75 turns per inch. Any other suitable degree of twist may however be employed according to the effects it is desired to produce.

The highly twisted crêpe threads may be incorporated in the fabrics in any suitable manner, for example the weft alone may be wholly or partially composed of such threads or the warp may also contain them. It is found most convenient in general however, to employ threads of relatively low twist in the warp and to employ in the weft both crêpe threads having a left-hand twist and crêpe threads having a right-hand twist. Weft threads having left and right-hand twist respectively may be disposed in the fabrics in any convenient manner. For example pairs of threads of left-hand twist may alternate with pairs of threads of right-hand twist.

The crêpe threads used in producing fabrics in accordance with the present invention may be made of or contain any desired organic derivatives of cellulose, for example cellulose esters, e. g. cellulose acetate, formate, propionate or butyrate, or cellulose ethers, e. g. ethyl, methyl, or benzyl cellulose, or the analogous condensation products derived from cellulose and glycols or other polyhydric alcohols. The fabrics may be composed wholly of yarns or threads made of or containing organic derivatives of cellulose, or they may comprise also yarns or threads of other fibres or filaments whether natural or artificial. As examples of such other fibres or filaments may be mentioned artificial filaments of the regenerated cellulose type and cotton, wool or silk or other natural fibres.

Though the invention has been described principally with reference to the manufacture of crêpe fabrics from unsized highly twisted crêpe threads made with filaments of cellulose acetate or other organic derivatives of cellulose the invention is not limited to the use of such crêpe threads. As previously indicated crêpe threads made with filaments of other materials, for example degummed silk, may likewise be utilized in the manufacture of crêpe fabrics in accordance with the invention.

Crêpe threads may also be employed composed of filaments of two or more different kinds, whether in respect of material or size or both. Thus there may be used threads containing both filaments of cellulose esters or ethers and filaments of regenerated cellulose or natural silk, or threads containing cellulose ester or ether filaments of two or more different deniers.

Further, the crêpe threads, whether made from filaments of organic derivatives of cellulose or natural or artificial filaments or fibres of other

materials, may be sized prior to twisting and/or weaving. In such case the emulsions or dispersions of swelling agents may be adapted to swell either the filaments of the crêpe threads, or the sizing materials thereon, or both. If desired the swelling of one may be accomplished with the aid of emulsions or dispersions of swelling agents therefor and the swelling of the other by some other treatment applied simultaneously or before or after. Emulsions or dispersions of hydrocarbons may for instance be applied in the treatment of fabrics containing crêpe threads sized with rubber or a polymerized vinyl compound or other polymerized organic compound. After swelling the crêpe thread filaments and/or any sizing materials the latter may be removed from the fabrics in any desired manner for example by scouring in a suitable bath.

Where the production of the crêpe effects is dependent, wholly or in part, on the swelling of sizing materials on the crêpe threads, it is advisable that the individual filaments of the latter be coated with size. In order that this may be the case the crêpe threads may be sized prior to twisting or at least prior to the application of a high degree of twist, or if desired, the filaments of the crêpe threads may be sized, singly or in comparatively small groups, prior to their being brought together to form a thread of the required thickness.

The invention is illustrated but not limited by the following examples:—

Example 1

A fabric composed of a warp of cellulose acetate yarns of low twist and a weft consisting of cellulose acetate yarns twisted to 65 turns per inch, two picks of left-hand twisted yarn alternating with two picks of reverse twisted yarn, is padded with an emulsion prepared with the aid of ammonium oleate as emulsifying agent and containing 5 per cent. of benzyl alcohol. After padding the material is rolled up and allowed to lie for a short time and is thereupon scoured, dried and finished in the usual manner. Preferably the fabric is dried without tension.

Example 2

Yarn composed of filaments of cellulose acetate is passed through an emulsion of benzyl alcohol prepared as described in Example 1, and after drying is twisted to 65 turns per inch, part of the yarn being given left-hand twist and part reverse twist. The treated and twisted yarn is then woven into a warp of cellulose acetate yarn of low twist, two picks of left-hand twisted yarn alternating with two picks of reverse twisted yarn. The fabric is then passed through a warm chamber in which it is subjected to the action of a very fine mist or spray of water at a temperature of about 60° C., the water being applied in quantity about 20–40 per cent. of the weight of the fabric. The fabric is finally washed and dried without tension.

Example 3

A fabric composed of cellulose acetate yarns woven in the manner described in Example 1 is printed with a thickened emulsion containing 8 per cent. of benzyl alcohol emulsified with the aid of ammonium oleate. After standing for a time the fabric is scoured, dried and finished in the ordinary manner. A fabric exhibiting brocade-like effects is thus obtained.

Example 4

A fabric of the crêpe-de-Chine type is made from a cellulose acetate warp of low twist and a cellulose acetate weft consisting of yarn twisted to 60 turns per inch, two picks of left-hand twisted weft alternating with two picks of right-hand twisted weft. The fabric is then padded in a 10 per cent. emulsion of tetrachlorethane in Turkey red oil for twelve hours. The fabric is finally scoured, dyed, washed and dried without tension.

What we claim and desire to secure by Letters Patent is:—

1. Process for the production of fabrics exhibiting crepe effects which comprises treating yarn containing filaments of organic derivatives of cellulose with aqueous dispersions of organic swelling agents therefor, twisting the yarn to a high degree, incorporating the yarn in fabrics and subjecting the fabrics to the action of an aqueous media.

2. Process for the production of fabrics exhibiting crepe effects which comprises treating yarn containing filaments of cellulose acetate with aqueous dispersions of organic swelling agents therefor, twisting the yarn to a high degree, incorporating the yarn in fabrics and subjecting the fabrics to the action of an aqueous media.

3. Process for the production of fabrics exhibiting crepe effects which comprises treating yarn containing filaments of cellulose acetate with an aqueous dispersion of benzyl alcohol, twisting the yarn to a high degree, incorporating the yarn in fabrics and subjecting the fabrics to the action of an aqueous media.

4. Process for the production of fabrics exhibiting crepe effects which comprises treating yarn containing filaments of organic derivatives of cellulose with aqueous dispersions of organic swelling agents therefor, twisting the yarn to a high degree, incorporating the yarn in fabrics and subjecting the fabrics to the action of a restricted quantity of an aqueous media.

5. Process for the production of crepe threads which comprises treating yarn containing filaments of organic derivatives of cellulose with aqueous dispersions of organic swelling agents and twisting the yarn to a high degree.

6. Process for the production of crepe threads which comprises treating yarn containing filaments of cellulose acetate with aqueous dispersions of organic swelling agents and twisting the yarn to a high degree.

7. Process for the production of crepe threads which comprises treating yarn containing filaments of cellulose acetate with an aqueous dispersion of benzyl alcohol and twisting the yarn to a high degree.

8. As new products applicable for the manufacture of crepe fabrics, highly twisted threads or yarns comprising filaments of organic derivatives of cellulose, which threads have been treated with an aqueous dispersion of an organic swelling agent prior to the insertion of the twist therein.

9. As new products applicable for the manufacture of crepe fabrics, threads or yarns comprising filaments of organic derivatives of cellulose having a twist of 50 to 75 turns per inch, which threads have been treated with an aqueous dispersion of an organic swelling agent prior to the insertion of a twist therein.

10. As new products applicable for the manufacture of crepe fabrics, threads or yarns comprising filaments of cellulose acetate having a twist of 50 to 75 turns per inch, which threads have been treated with an aqueous dispersion of an organic swelling agent prior to the insertion of a twist therein.
11. As new products applicable for the manufacture of crepe fabrics, threads or yarns comprising filaments of cellulose acetate having a twist of 50 to 75 turns per inch, which threads have been treated with an aqueous dispersion of benzyl alcohol prior to the insertion of a twist therein.

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