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TEXTILE PRODUCTS AND METHOD OF MAKING SAME

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This invention relates to colored textile material such as yarns, fabrics, filaments, etc. and to a method of preparing same and more particularly to fabrics and articles such as men's hose that contain colored filaments and yarns of an organic derivative of cellulose and yarns of other materials such as natural or colored yarns or filaments of organic derivatives of cellulose, silk, wool or cotton which it is desired to bleach or dye to produce a cross-dyed effect.

An object of the invention is to prepare artificial filaments having their appearance or other properties modified by the incorporation therein of finely divided solids. A further object of the invention is the preparation of articles or fabrics of such filaments and of yarns of other materials such that the fabric or articles may be subjected to bleaching treatments or dyeing treatments to affect only the uncolored yarns with no effect upon the modified filaments. Other objects of the invention will appear from the following detailed description.

By this invention, very attractive fabrics or articles, especially men's hose, may be formed by a more expeditious method than heretofore employed. Thus, men's hose may be formed, the body portion from yarns containing organic derivatives of cellulose, a part of which contain a colored pigment, and the toes, heels and tops from cotton yarns. After the hose are formed, the cotton may be bleached without any effect on the colored yarns of the body of the hose and/or the unpigmented yarns of the body of the hose may be dyed to form with the pigmented yarns a cross-dyed effect. This is of special value when the pigmented yarns are of a dark shade such as dark blue or black.

By employing this invention, fabrics such as men's hose and like textile fabrics containing bleached white cotton yarns and colored yarns of artificial filaments may be formed in that the colored yarns will not bleed or break down in color in the bleaching baths. Thus, there is the decided advantage gained of forming the fabric and then bleaching instead of the normal practice of first bleaching the cotton then cross-dyeing the artificial filaments and then having to strip the colored stain from the cotton or regenerated cellulose if same be used.

In accordance with my invention, I form textile fabrics, especially men's hose that contain yarns, fibres or filaments that are to be bleached and colored yarns, filaments or fibres by forming the colored yarns, filaments or fibres from an organic derivative of cellulose, in such a manner as to have the color imparted thereto, at least in part, from a finely divided solid pigmented material included in the filaments or fibres of organic derivative of cellulose. Further, in accordance with my invention, I form men's hose, the body portion of which contains yarns of organic derivatives of cellulose containing a pigment and yarns of organic derivatives of cellulose or other suitable material such that when the hose are dyed with a dye having affinity for the unpigmented yarns of the body portion of the hose a cross-dyed effect is produced.

The colored yarn containing a pigment, to be woven or knitted with the yarn to be bleached or dyed, may be formed of fine denier filaments which are associated together by twisting to form the yarn or the yarn may be made of short lengths of filaments or staple fibres spun to a yarn, or the filaments may be heavier, such as bristles, artificial horsehair and straw. The filaments used in forming such yarn may be of reconstituted cellulose formed by the viscose, cuprammonium, Chardonnet or other process, but this invention is of particular importance in connection with yarns and fabrics containing colored pigmented filaments made of or containing organic derivatives of cellulose such as 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. The filaments containing the organic derivative of cellulose may be prepared by dissolving the organic derivative of cellulose in a volatile solvent such as acetone and extruding such solutions through orifices into an evaporative atmosphere, as in dry spinning, or into a precipitating bath, as in wet spinning.

The finely divided pigment or solid modifying agent may be incorporated or dispersed uniformly in the filaments by adding same to the spinning solution from which the filaments are formed. This pigment may be white to obtain increased opacity for work such as clocks on hose or designs of other nature in other textile fabrics. Thus, there may be employed white inorganic pigments such as tin oxide, tin phosphate, antimony oxide, titanium oxide, barium sulfate, lead sulfate, calcium sulfate, zinc oxide, zinc carbonate, aluminum oxide, silicon dioxide, barium borate, calcium borate or silicates such as china clay or other clays, talc or mica. The white pigment for lending covering power to the filaments containing the same such that deeper col-

ored yarns will not show through the desired design may also be of an organic nature such as diacetyl benzidine, diacetyl toluidine, dibenzoyl benzidine, naphthyl urea, anthraquinone, anthracene, suitable synthetic or natural resins, cellulose in the form of fibres or powder, degraded cellulose, starches, etc.

The yarns of filaments containing a colored pigment and especially a black pigment are of particular importance in this invention. In the preparation of colored filaments, either or both colored inorganic or organic pigments may be employed to obtain the desired color or shade. For a yellow color, ochre, sienna, chrome yellow, tin bronze, etc. may be employed. For a red color, Venetian red, red lead, vermilion, etc. may be employed. For a blue color, ultramarine, Prussian blue, milori blue, etc. may be used. For green, Guignet's green, verdigris, chrome green, etc. may be employed. For brown, raw umber, burnt umber, Vandyke brown may be used. For black, lamp black, carbon black, graphite, bone char, etc. may be used, which may be toned with iron gallate or other toners to obtain jet blacks. To obtain any other colors, the pigments may be mixed as is well understood in the paint art. To obtain metallic effects, finely divided or colloidal metals may be employed when coarse denier material is employed.

The amount of pigment added will vary with the degree of covering power and/or depth of color desired and the nature of the pigment employed and will generally be from 0.1 to 10% of the weight of the cellulosic material present in the finished yarn. In employing certain pigments and for large denier filaments more than 10% pigment may be added or incorporated with the organic derivative of cellulose.

Prior to incorporation of the pigment into or with the spinning solution, the pigment or like material is preferably reduced to a very fine state of subdivision by subjecting it to a manipulation involving kneading, squeezing or rubbing operation while it is dispersed in a plastic mass. This action causes the breaking up or disintegration of the agglomerates or aggregates in which the pigment particles may occur. These operations are conveniently carried out by processes ordinarily employed for making articles from cellulose derivative plastics. Thus, a heavy solution or plastic mass may be formed by mixing the same derivative of cellulose as is employed for making the filaments with a relatively small amount of volatile liquid that is a solvent or becomes a solvent at elevated temperatures for the derivative of cellulose, whereupon the pigment or other modifying material is added and the mass is kneaded at elevated temperatures. During this kneading, part of the solvent evaporates to leave the heavy doughy mass which is then worked between heated malaxating rolls, the sheets formed by such rolls being repeatedly passed between the heated rolls which are spaced rather closely. This rolling operation is repeated until substantially all of the volatile liquid is evaporated. The sheets are finally broken into pieces which are then used for incorporation in the spinning solution. Other methods of forming the color master material may be employed.

Because of the minute size of the particles of pigments incorporated by the above method with the filaments, the filaments have substantially the same tenacity and elongation as filaments free of any pigments while the color produced is of exceeding depth. Other methods may be employed for incorporating the pigment or pigments with the filaments.

Fabrics may be woven, circular knitted, warp knitted, knotted or netted containing these pigmented yarns of organic derivative of cellulose and other yarns, for example such other yarns as unpigmented yarns of organic derivative of cellulose, yarns containing organic esters of cellulose that have been partially, intermittently or totally saponified, yarns of regenerated cellulose made by any suitable process, yarns of cellulose such as cotton, linen, etc. or yarns of any other suitable material. Thus, fabrics may be formed having designs, stripes, clocks, etc. of pigmented yarn containing organic derivative of cellulose upon a base of unpigmented yarns of organic derivative of cellulose or regenerated cellulose or the reverse of this.

Although any suitable fabric may be formed, this invention is particularly applicable to the making of half hose or men's hose that have a body of pigmented yarn containing organic derivative of cellulose plaited over unpigmented yarns of organic derivative of cellulose, yarns of saponified organic esters of cellulose, yarns of regenerated cellulose or yarns of natural cotton. Also, any of these yarns may be plaited over the pigmented yarn containing organic derivative of cellulose. Such half hose or men's hose may be formed with toes, heels and top of cotton or yarns of regenerated or reconstituted cellulose.

After the hose are formed the yarns of cotton or other cellulose may be bleached to reduce them to a pure white without affecting the color or other properties of the pigmented yarns containing organic derivative of cellulose. The bleaching of the hose or other fabric may be by submerging the same in a bath containing chlorine or a peroxide in the strength and manner normally employed to bleach cotton, yarns or fabric.

If desired, a hose or fabric may be formed with a body portion of pigmented yarn containing organic derivative of cellulose with wearing portions or trimmings of a yarn of cellulose or the body portion may be caused to exhibit a cross-dyed effect by forming same from different pigmented yarns containing an organic derivative of cellulose.

Further, men's hose may be formed having a body portion of unpigmented yarns of organic derivatives of cellulose plaited over or under pigmented yarns of organic derivatives of cellulose, the pigment being of a dark color and/or amount to produce a dark colored yarn. The pigmented yarns are fast to light, acids and bleaching.

These hose may then be dyed with a dye that imparts color to organic derivatives of cellulose. If the pigmented yarns are black no noticeable change in their color is produced while the unpigmented yarns are dyed the desired color, thus producing cross-dyed effects. If the pigmented yarn is not black, the color of the pigment will be topped with the color of the dye and result in a color different than the color of the unpigmented yarn, thus also producing a cross-dyed effect.

Example I

Men's hose are circular knitted on the usual type of machine having toe, heel and top of unbleached cotton yarn and a body portion of pigmented yarns containing an organic derivative of cellulose, preferably cellulose acetate, plaited over unpigmented yarns containing an organic derivative of cellulose, with or without clocks of

the under yarn. The pigmented yarn may contain 3% of lamp black based on the weight of the organic derivative of cellulose in the yarn.

The hose are then bleached by submerging the same in a bath containing either chlorine or hydrogen peroxide. The cotton is bleached a pure white while the color of the black pigmented yarn is unaffected and no color bleeds from one type of yarn to the other.

Hose or fabric made of pigmented yarn containing organic derivative of cellulose and other yarns is fast to light and bleaching and does not bleed or change color in presence of perspiration or during laundering.

Example II

The hose produced by Example I, or men's hose produced by forming at least the body portion of the same of a pigmented yarn of dark color plaited over or under unpigmented yarn are treated with a dye having an affinity for the unpigmented yarn. The pigmented yarn may contain about 3% of lamp black. The result is a hose having black yarn fast to light, acid and bleaching plaited over or under a colored yarn of any desired color depending upon the dye employed.

There is produced a cross-dyed effect by employing but a single dye.

It is to be understood that the foregoing detailed description is merely given by way of illustration and many alterations 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 textile articles having decorative effects, which comprises forming the article from pigmented yarn comprising artificial filaments or fibers and unpigmented yarn and then treating the formed article with a dyestuff having an affinity for said unpigmented yarn, whereby the article is cross-dyed, said unpigmented yarn being colored only by said dyestuff and said pigmented yarn being colored by the pigment.

2. Method of producing textile articles having decorative effects, which comprises forming the article from pigmented organic derivative of cellulose yarn and unpigmented yarn, and then treating the formed article with a dyestuff having an affinity for said unpigmented yarn, whereby the article is cross-dyed, said unpigmented yarn being colored only by said dyestuff and said pigmented yarn being colored by the pigment.

3. Method of producing textile articles having decorative effects, which comprises forming the article from pigmented cellulose acetate yarn and unpigmented yarn, and then treating the formed article with a dyestuff having an affinity for said unpigmented yarn, whereby the article is cross-dyed, said unpigmented yarn being colored only by said dyestuff and said pigmented yarn being colored by the pigment.

4. Method of producing textile articles having decorative effects, which comprises forming the article from pigmented organic derivative of cellulose yarn and unpigmented cellulose yarn, and then treating the formed article with a dyestuff having an affinity for the unpigmented yarn, whereby the article is cross-dyed, said unpigmented yarn being colored only by said dyestuff and said pigmented yarn being colored by the pigment.

5. Method of producing textile articles having decorative effects, which comprises forming the article from pigmented organic derivative of cellulose yarn and unpigmented organic derivative of cellulose yarn, and then treating the formed article with a dyestuff having an affinity for the unpigmented yarn, whereby the article is cross-dyed, said unpigmented yarn being colored only by said dyestuff and said pigmented yarn being colored by the pigment.

6. Method of producing textile articles having decorative effects, which comprises forming the article from pigmented organic derivative of cellulose yarn, unpigmented organic derivative of cellulose yarn and cotton yarn, and treating the formed article with a dyestuff having an affinity for the said unpigmented organic derivative of cellulose yarn, whereby the article is cross-dyed, said unpigmented yarn being colored only by said dyestuff and said pigmented yarn being colored by the pigment.

7. Method of producing textile articles having decorative effects, which comprises forming the article from pigmented cellulose acetate yarn, unpigmented cellulose acetate yarn and cotton yarn, and treating the formed article with a dyestuff having an affinity for the said unpigmented cellulose acetate yarn, whereby the article is cross-dyed, said unpigmented yarn being colored only by said dyestuff and said pigmented yarn being colored by the pigment.

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