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METHOD OF MAKING SIZED TEXTILE MATERIALS

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6 Claims. (Cl. 91—68)

This invention relates to the preparation or treatment of filaments, threads and yarns with a finish, to render them more amenable to textile operations. It has particular reference to the incorporation in materials containing organic derivatives of cellulose of a material that prevents the development of charges of frictional electricity on the materials, makes the material stiffer yet nonbrittle, and sufficiently lubricates the material for textile and other operations.

An object of the invention is the economic and expeditious production of materials containing organic derivatives of cellulose that are amenable to textile operations. Other objects of the invention will appear from the following detailed description.

Filaments, yarns and threads sized with alkylolamine resinate size according to this invention are uniformly sized and lubricated and do not become sticky upon exposure to atmospheric conditions. In scouring and dyeing it is quite observable that this resinate size gives rapid wetting out as compared with unsized yarn or gelatin sized yarn. The sizing material acts in water as a soap. It is readily removed by water at about 70° C. and acts as a mild detergent to carry off dirt and oily material as it is removed.

After removal of the resinate size from the material it dyes very level. No saponification of the organic derivative of cellulose base material is effected by the size and the ease with which it is removed prevents any hazard of saponification due to heated or chemical baths that are required to remove many sizing materials. The free hydroxy radical of the size, moreover, apparently lends thereto the property of penetrating the cellulose derivative to aid in wetting out.

Filaments coated with the alkylolamine resinate size may be twisted into yarns having a large number of twists per inch for the purpose of forming crepe fabrics. After the fabrics are woven the size is readily removed, leaving ample space between the filaments to impart a good crepe and soft hand to the fabric. The resinate size aids in the formation of crepe yarns and fabrics in that it not only coats, stiffens and lubricates the yarns but also makes them less liable to break or fluff. The resinate size acts to make the yarn more amenable to bending without breaking and holds the filaments together to prevent fluffing.

The alkylolamine resinate has the still further advantage of reducing the amount of static electricity retained upon the filaments. Yarn containing the same, therefore, offers less trouble in weaving and knitting where the friction on the yarn imparts thereto an electric charge that causes it to adhere to metal parts and the filaments to fluff, i. e. to separate from each other. This property of inhibiting the development of static electricity is also of great advantage in the carding and drafting of staple fibres containing organic derivatives of cellulose to form yarn in accordance with the cotton, wool, worsted, French or spun silk systems.

According to this invention I apply to or incorporate in filaments, yarns, threads, films or foils a resinate material, that is, an alkylolamine salt or soap of a resin acid; for example, monoethanolamine abietate, diethanolamine abietate and triethanolamine abietate. These salts or soap-like materials are hard but not brittle at room temperature and below room temperature, but at just above room temperature they soften and they become fluid at between 70 and 80° C. Other similar dibasic acids may be employed to form the resinate salt of triethanolamine or other similar alkylolamines. For example, the resinous material employed may be the ethanolamine, butanolamine or propanolamine salts of the resinous acids of colophony, Congo copal or Zanzibar copal.

The alkylolamine resinate material may be applied to the yarn from solution of the same in suitable solvents or from a fused bath of the same by means of any suitable furnishing device such as a wick, roller or discs. The alkylolamine resinate material may be dissolved in xylene, toluene, etc. in from 10% to 50% concentrations. Preferably, sufficient amount of this solution is applied to the yarn so that the yarn obtains a coating of from 2 to 10% of the alkylolamine resinate size, the amount being based on the weight of the yarn. The yarn may also be coated by submerging packages, such as wound bobbins, of yarn in the solution of the alkylolamine resinate material.

As an aid to the lubricating properties of the coating, the coating material may contain from 1 to 5% of oily material, for example, olive oil, teaseed oil, cocoanut oil, spermaceti or a triethanolamine salt of a fatty acid such as oleic acid and stearic acid. Spermaceti is preferred, as this lubricant successfully overcomes tendency of stickiness and is a good lubricant without appreciably reducing the sizing power of the alkylolamine resinate. Beside the oil the finish may have added thereto small quantities of water to satisfy the hygroscopic character of the composition to a point where it is in equilibrium with the atmos-

phere. Further the coating composition may contain a suitable fugitive tint or color such that the yarn is easily identifiable. In treating crepe yarns or yarns of high twist, the lubricant may be applied in an operation separate from that or those in which the twist is placed in the yarn, or it may be applied during any stage of the twisting operation.

This invention is applicable to the preparation of filaments, yarns or threads containing organic derivatives of cellulose such as the organic esters and ethers of cellulose. 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. This invention is also applicable to the treatment of films and foils of such derivatives of cellulose, to which it may be applied as a coating and stiffening agent.

In place of using the alkylolamine resinate material as a coating, it may be added to suitable solutions of organic derivatives of cellulose that are spun into filaments or formed into films by extruding same into an evaporative atmosphere. Filaments and films containing the resinate material are stiffened yet are not brittle and they also resist permanent creasing having a tendency to spring back to their original shape. The alkylolamine resinate material may be used with cellulose derivative materials in quantity of from 1 to 20% depending upon the properties desired.

Yarns and filaments which have been sized with the alkylolamine resinate material may be twisted to crepe type yarns and/or woven, warp knitted, circular knitted and netted into fabrics. The fabrics may then be scoured free of the sizing material by aqueous baths at below a temperature of 80° C., dyed and finished.

The alkylolamine resinate material may be applied to the filaments as they leave the spinning cabinet and prior to being formed into a package or it may be applied during any suitable winding or processing operation. Thus, in rewinding or twisting operations, the yarn may be caused to contact with a roller furnishing device that dips into a solution of the alkylolamine resinate material. The yarn may also be coated during the warping operation in the manufacture of woven fabrics.

The following examples are given to further illustrate the invention and not as limitations.

Example I

A 50% solution of triethanolamine abietate in xylol is prepared. Yarns of cellulose acetate are finished with this solution by means of a furnishing roller during a winding operation. The yarns acquire 4% of the above resinate and are stiff, yet lubricated and not brittle.

Example II

A 50% solution of mono-, di- or triethanolamine abietate in xylol is prepared to which may be added 2% spermaceti. Yarns of cellulose acetate are finished with this composition by means of a furnishing roller adapted to contact the yarns during a winding operation. The yarns are well and evenly sized, stiffened and lubricated sufficiently to pass through guides and needles during knitting operation.

Example III

A 20% solution of mono-, di- or triethanolamine abietate in xylol is prepared to which may be added 2% spermaceti. Yarns of cellulose acetate wound on bobbins may be submerged in this solution for 1 hour. The yarns acquire a uniform coating amounting to about 5% on the weight of the yarn.

Example IV

To a solution of cellulose acetate in 95/5 acetone/water there is added 20%, based on the weight of the cellulose acetate, of an alkylolamine salt of a dibasic acid such as mono-, di-, or triethanolamine abietate to which may be added 1 to 3%, based on the weight of the alkylolamine salt present of spermaceti. This solution is either spun into filaments, or cast into a film or foil. The film and filaments are stiff, yet non brittle, and when bent tend to spring back to original shape.

It is to be understod that the foregoing detailed description is given merely 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. In a process for the production of artificial materials, the step of forming said materials from a solution comprising an organic derivative of cellulose and an alkylolamine salt of a resin acid.

2. In the process of producing artificial materials, the step of forming the same from a solution comprising cellulose acetate and an alkylolamine salt of a resin acid.

3. In a process for the production of artificial materials, the step of forming said materials from a solution comprising an organic derivative of cellulose and an alkylolamine abietate.

4. In a process for the production of artificial materials, the step of forming said materials from a solution comprising cellulose acetate and an alkylolamine abietate.

5. In a process for the production of artificial materials, the step of forming said materials from a solution comprising an organic derivative of cellulose, an ethanolamine abietate and spermaceti.

6. In a process for the production of artificial materials the step of forming said materials from a solution comprising cellulose acetate, an ethanolamine abietate and spermaceti.

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