Patented June 20, 1933 1,914,491

UNITED STATES PATENT OFFICE

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TEXTILE MATERIAL AND METHOD OF MAKING THE SAME

No Drawing. Application filed December 16, 1929. Serial No. 414,564.

This invention relates to the treatment of artificial filaments or threads made of organic derivatives of cellulose in order to present them in a better form for spinning.

An object of our invention is to treat filaments or threads of organic derivatives of cellulose in such a manner that comparatively short lengths or staples of the same may be successfully associated together to form "spun" yarn.

Other objects of our invention will appear from the following detailed description.

The formation of "spun" yarn from comparatively short lengths or staples of filaments or threads composed of organic derivatives of cellulose presents serious difficulty. This is due to the fact that such filiments or threads are straight and do not contain kinks or crinkles whereby such filaments can intermesh or intertangle, with the result that these filaments as they are produced do not adhere to each other or intertwine sufficiently to form commercially satisfactory "spun" yarn.

We have found that if such filaments or threads, made for example of cellulose acetate, are subjected to a treatment whereby they become crinkled, because of their contour they can readily adhere to each other, and they then may be successfully associated together in a spinning operation to form a commercially useful "spun" yarn.

In accordance with our invention we impart a crinkle to filaments, threads or yarns made of organic derivatives of cellulose by any suitable chemical, physical or mechanical means. The filaments or threads thus treated and in the form of short lengths, staples or chappé may then be subjected to a spinning operation whereby the same are associated together to form "spun" yarn.

The filaments, threads or yarns to be treated in accordance with our invention may be made of any suitable organic derivatives of cellulose such as organic esters of cellulose or 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 greatest advantages accrue from the spinning of short lengths of such filaments or threads solely, they may be associated with fibres of other materials such as cotton, natural silk, wool or reconstituted cellulose and then spun.

The artificial filaments of organic derivatives of cellulose may be formed from solutions of the same in suitable solvents by extruding such solutions through orifices into a drying evaporative atmosphere as in dry spinning or by extrusion through orifices into a bath containing a precipitating liquid as in wet spinning. Such filaments may be treated while in the untwisted state by our process or two or more of such filaments may be associated together by twisting to form yarns or threads which yarns or threads may be treated by our process.

The filaments or yarns may have the crinkle imparted thereto while they are still in the comparative continuous lengths in which they are formed, in which case they may be subsequently cut into staples or chappé of suitable length. On the other hand the filaments or threads may be cut into suitable lengths and such cut material may be subjected to a process wherein a crinkle is imparted thereto.

As to the length of the staples, lengths varying from 1″ to 20″ or more in length, say 10″ are suitable. The artificial filaments may be of any suitable weight per unit length, say from 1 to 30 denier or more, examples of which are 1.9, 3.5 or 5.5 denier. Any suitable method may be employed for imparting a crinkle to the filaments or threads, and these methods may involve physical, mechanical or chemical means.

As an example of one mode of imparting crinkle, the filaments or yarn as they are formed in the spinning machine and in substantially continuous length, are stretched under comparatively great tension and while under such tension are cut into staples. Upon release of the tension and particularly after the staples are subjected to a bath of water or aqueous liquid, the same shrink and crinkle. As a further example, the filaments or threads while in continuous lengths

or cut into staples are caused to crinkle or tangle by means of a blast of air or gas. We have also found that filaments or yarn containing certain kinds of cellulose acetate, may be crinkled when they are subjected to boiling water or other aqueous liquids or to wet steam.

After the crinkling treatment, the short lengths of filaments or threads are then subjected to a suitable spinning operation such as is used for the spinning of short lengths of natural silk, cotton or wool fibres to form threads by any of the well known systems such as the "cotton", the French, the "worsted", the "wool", the "spun silk", the Bradford system, etc., etc. This spinning operation also includes the preliminary treatments necessary to present the filaments or fibres in the form required for the actual operation of twisting them into yarn.

Because of the crinkling treatment, the contour of the filaments of organic derivatives of cellulose is so altered that they more readily intertwine or adhere to each other so that they may be spun successfully. By our process "spun" yarn formed solely from chappé or relatively short lengths or staples of artificial filaments made of organic derivatives of cellulose such as cellulose acetate, can be successfully manufactured, a result that has heretofore not been possible in a commercially feasible manner.

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 this invention.

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

1. In the method of forming "spun" yarn containing comparatively short lengths of filaments made of organic derivatives of cellulose, the step of cutting such filaments while they are stretched under tension.

2. In the method of forming "spun" yarn containing comparatively short lengths of filaments made of cellulose acetate, the step of cutting such filaments while they are stretched under tension.

3. In the method of forming "spun" yarn containing comparatively short lengths of filaments made from organic derivatives of cellulose, the steps of cutting such filaments into staples while the filaments are under tension and subjecting the staples to the action of an aqueous liquid.

4. In the method of forming "spun" yarn containing comparatively short lengths of filaments made from cellulose acetate, the steps of cutting such filaments into staples while the filaments are under tension and subjecting the staples to the action of an aqueous liquid.

5. The method of forming "spun" yarn containing organic derivatives of cellulose comprising cutting filaments of organic derivatives of cellulose while they are stretched under tension and then spinning comparatively short lengths of such filaments.

6. The method of forming "spun" yarn containing cellulose acetate comprising cutting filaments of cellulose acetate while they are stretched under tension and then spinning comparatively short lengths of such filaments.

7. The method of forming "spun" yarn containing organic derivatives of cellulose comprising cutting filaments of organic derivatives of cellulose into staples while the filaments are under tension, subjecting the staples to the action of an aqueous liquid and then spinning the staples into yarn.

8. The method of forming "spun" yarn containing cellulose acetate comprising cutting filaments of cellulose into staples while the filaments are under tension, subjecting the staples to the action of an aqueous liquid and then spinning the staples into yarn.

In testimony whereof, we have hereunto subscribed our names.

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