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ARTIFICIAL THREAD

Van L. Bohnson and Fenton H. Swezey, Waynesboro, Va., assignors to Du Pont Rayon Company, New York, N. Y., a corporation of Delaware

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This invention relates to artificial thread and more particularly to the production of artificial thread formed of cellulose acetate, which upon subsequent treatment with hot water or hot soap solution, such as at or near the boiling point thereof, or with steam, loses a considerable portion of its luster and assumes a dull or mat appearance.

One of the procedures now commonly employed in the manufacture of artificial thread from organic derivatives of cellulose, such as celulose acetate, is known as the dry spinning process. According to this process, a solution containing the desired organic derivative of cellulose dissolved in a suitable solvent, such as cellulose acetate dissolved in acetone or a mixture of acetone and alcohol, is spun, i.e. extruded through a spinneret, into an evaporative atmosphere, whereby a thread of well-defined luster is produced. When a spinning solution comprising 24% or 25% more or less of cellulose acetate having an acetyl value, calculated as acetic acid, of 54% to 55%, dissolved in acetone or acetone and alcohol, is spun, the thread formed is also characterized by a well-defined luster. The high luster or sheen makes the thread admirably suitable for certain uses. However, for certain uses where a low or subdued luster is required, the lustrous thread is not appropriate.

It has been proposed to deluster threads formed of cellulose acetate by subjecting said threads in their normal state and appearance to boiling solutions, such as water or soap solutions, or steam. Where this treatment was long and severe, the threads were weakened and very often damaged. A thread formed of cellulose acetate having an acetyl value calculated as acetic acid, of 54% to 55% is quite resistant to delustering by such treatments. In many instances, when such a thread was treated with boiling liquids, such as water or soap solutions, even after 2 hours treatment, the thread still possessed a marked luster.

Another method of preparing artificial thread characterized by a low luster contemplated incorporating in the cellulose acetate spinning solution certain foreign materials, such as non-solvents, animal or vegetable oils, waxes, higher esters or fatty acids, various wetting agents and dissolved salts. These substances were permitted to remain in the final thread or were removed therefrom by treatment with boiling water, soap solutions or other solvents, whereby voids were formed in the yarn which imparted a dull or mat appearance. The presence of the foreign substances and/or their subsequent removal deleteriously affected the tensile strength of the thread, which was, of course, highly undesirable.

We have found that by spinning a solution containing a plurality of cellulose acetates having different characteristics, such as different acetyl values, different solubility characteristics or different actyl values and viscosities, there is produced a thread which, upon treatment with hot aqueous fluids, for example, steam or hot liquids, such as water or soap solutions, at or near the boiling point thereof, will be readily delustered and the above-mentioned disadvantages overcome.

It is, therefore, an object of this invention to provide an artificial thread formed of a plurality of cellulose acetates having different characteristics, such as different acetyl values, different solubilities or different acetyl values and viscosities.

Another object of this invention is to provide a spinning solution for preparing a thread of the type mentioned in the preceding paragraph.

Additional objects will appear from the following description and appended claims.

In carrying out the principles of the instant invention, there is prepared in any convenient manner a spinning solution of suitable viscosity and containing a plurality of cellulose acetates having different characteristics. This solution is spun according to the dry spinning process whereby a thread of normal luster is produced. This thread, either prior to its fabrication into a fabric or subsequent to the weaving or knitting thereof into cloth, if subjected to a hot aqueous fluid, for example, steam or hot liquids, such as water or soap solutions, at or near the boiling point thereof, will be readily delustered.

As has been mentioned, the spinning solution, and therefore the thread produced from the same, contains a homogeneous mixture of a plurality of cellulose acetates of different characteristics. In the preferred embodiment of the invention, the cellulose acetates which are employed are characterized by different acetyl values. Due to the fact that the solubilities of cellulose acetates are, in general, governed by the acetyl values, the acetates may also be described as having different solubility characteristics. The cellulose acetates employed may or may not, in addition, differ from each other in their viscosities.

In accordance with the principles of this in-

vention, the desired results may be secured if the thread is formed of a plurality of cellulose acetates, such as, for example, 50% to 95% by weight of a cellulose acetate having an acetyl value, calculated as acetic acid, by 54% to 56%, and from 5% to 50% by weight of a cellulose acetate having an acetyl value, calculated as acetic acid, of 43% to 53%. In general, the lower the acetyl value of the minor ingredient, the greater the effects obtained. While the effect described may be obtained to some degree by a thread formed of 50% of a cellulose acetate having an acetyl value, calculated as acetic acid, of 56%, and 50% of an acetate having an acetyl value, calculated as acetic acid, of 51% to 53%, the preferred embodiment contemplates a thread composed of 90% to 96% of a cellulose acetate having an acetyl value, calculated as acetic acid, of 54% to 55% and 4% to 10% of a cellulose acetate having an acetyl value, calculated as acetic acid, of 45% to 47%.

The acetates may be prepared according to the well-known procedures for making cellulose acetates by extending the hydrolysis of the primary acetate until an acetate of the desired acetyl value is secured.

The spinning solution containing the plurality of acetates of different characteristics may be produced in any well-known manner and of any desired concentration, such as 24% to 25%. Usually the solvent or solvent mixture employed is of such a nature that the acetates are soluble therein. Due to this, a clearer and more homogeneous spinning solution is produced than that in which there is suspended or dispersed liquids or solids. As a consequence, spinning is less critical and less trouble is encountered in the filtration and spinning of such a solution. It is to be understood that by the term "solvent" is meant a single liquid possessing solvent properties or a mixture of liquids commonly termed "a solvent mixture".

In order to more clearly explain the nature of the instant invention, the following specific illustrative examples are set forth:

Example I.—A solution containing the following ingredients is spun by the ordinary dry spinning process:

	Parts by weight
Acetone	60.8
Alcohol (95%)	15.2
Cellulose acetate having an acetyl value, calculated as acetic acid, of 54%	21.6
Cellulose acetate having an acetyl value, calculated as acetic acid, of 45%	2.4

The thread so obtained is characterized by a normal luster. After weaving or knitting the thread into cloth, the fabric is treated with a boiling 2% soap solution for 1 hour, whereby the thread, and hence the fabric, assumes a dull or mat appearance.

Example II.—A solution of the following composition is spun by the usual evaporative process:

	Parts by weight
Acetone	60.0
Alcohol (95%)	15.0
Cellulose acetate having an acetyl value, calculated as acetic acid, of 56%	12.5
Cellulose acetate having an acetyl value, calculated as acetic acid, of 52%	12.5

The thread, after being reeled into skeins, is immersed for 1 hour in a boiling 2% soap solution. After rinsing and drying, the yarn is found to have acquired a delustered appearance which is not so marked as that secured in the other examples.

Example III.—A solution of the following ingredients is spun according to the dry spinning procedure:

	Parts by weight
Acetone	65
Water	10
Cellulose acetate having an acetyl value, calculated as acetic acid, of 54% to 55%	20
Cellulose acetate having an acetyl value, calculated as acetic acid, of 45% to 48%	5

The thread, either in skein form or in fabric form, is treated with a boiling aqueous soap solution, and after rinsing and drying the yarn is found to possess an opaque and mat effect.

Though the invention is hereinbefore described in connection with a mixture of two acetates of different characteristics, it is to be understood that the invention is not restricted thereto, since it is obvious that more than two acetates may be used with equal success.

Since it is obvious that various changes and modifications may be made in the above description without departing from the nature or spirit thereof, this invention is not restricted thereto except as set forth in the appended claims.

We claim:

1. An artificial thread having a normal luster, which luster can be reduced by treatment with a hot aqueous fluid, and formed of a homogeneous mixture of cellulose acetates and comprising approximately 50% to 95% by weight of a cellulose acetate having an acetyl value, calculated as acetic acid, of 54% to 56%, and 5% to 50% by weight of a cellulose acetate having an acetyl value, calculated as acetic acid, of 43% to 53%.

2. An artificial thread having a normal luster, which luster can be reduced by treatment with a hot aqueous fluid, and formed of a homogeneous mixture of cellulose acetates and comprising 90% to 96% of a cellulose acetate having an acetyl value, calculated as acetic acid, of 54% to 55%, and 4% to 10% of a cellulose acetate having an acetyl value, calculated as acetic acid, of 45% to 47%.

3. An artificial thread having a normal luster, which luster can be reduced by treatment with a hot aqueous fluid, and formed of a homogeneous mixture of cellulose acetates and comprising 90% of a cellulose acetate having an acetyl value, calculated as acetic acid, of 54%, and 10% of a cellulose acetate having an acetyl value, calculated as acetic acid, of 45%.

4. An artificial thread having a normal luster, which luster can be reduced by treatment with a hot aqueous fluid, and formed of a homogeneous mixture of cellulose acetates and comprising equal parts by weight of a cellulose acetate having an acetyl value, calculated as acetic acid, of 56%, and a cellulose acetate having an acetyl value, calculated as acetic acid, of 51% to 53%.

5. An artificial thread having a normal luster, which luster can be reduced by treatment with a hot aqueous fluid, and formed of a homogeneous mixture of cellulose acetates and comprising 80% of a cellulose acetate having an acetyl value, calculated as acetic acid, of 54% to 55%, and 20% of a cellulose acetate having an acetyl value of 45% to 48%.

6. A cellulose acetate spinning solution for producing a thread of normal luster, which

luster is reduced by treatment with a hot aqueous fluid, comprising 50% to 95% by weight of a cellulose acetate having an acetyl value calculated as acetic acid, of 54% to 56%, and 5% to 50% of a cellulose acetate having an acetyl value, calculated as acetic acid, of 43% to 53% dissolved in a solvent, the proportions of the different acetates being based on the total combined quantities thereof.

7. A cellulose acetate spinning solution for producing a thread of normal luster, which luster is reduced by treatment with a hot aqueous fluid, comprising 90% to 96% of a cellulose acetate having an acetyl value, calculated as acetic acid, of 54% to 55%, and 4% to 10% of a cellulose acetate having an acetyl value, calculated as acetic acid, of 45% to 47% dissolved in a solvent, the proportions of the different acetates being based on the total combined quantities thereof.

8. A cellulose acetate spinning solution for producing a thread of normal luster, which luster is reduced by treatment with a hot aqueous fluid, comprising 90% of a cellulose acetate having an acetyl value, calculated as acetic acid, of 54%, and 10% of a cellulose acetate having an acetyl value, calculated as acetic acid, of 45% dissolved in a solvent, the proportions of the different acetates being based on the total combined quantities thereof.

9. A cellulose acetate spinning solution for producing a thread of normal luster, which luster is reduced by treatment with a hot aqueous fluid comprising equal parts by weight of a cellulose acetate having an acetyl value, calculated as acetic acid, of 56%, and a cellulose acetate having an acetyl value, calculated as acetic acid, of 51% to 53% dissolved in a solvent, the proportions of the different acetates being based on the total combined quantities thereof.

10. A cellulose acetate spinning solution for producing a thread of normal luster, which luster is reduced by treatment with a hot aqueous fluid, comprising 80% of a cellulose acetate having an acetyl value, calculated as acetic acid, of 54% to 55%, and 20% of a cellulose acetate having an acetyl value of 45% to 48% dissolved in a solvent, the proportions of the different acetates being based on the total combined quantities thereof.

11. An artificial thread having a normal luster, which luster can be reduced by treatment with a hot aqueous fluid, and formed of a homogeneous mixture of cellulose acetates and comprising at least 50% by weight of a cellulose acetate having an acetyl value, calculated as acetic acid, of 54%–56% and not over 50% by weight of a cellulose acetate having an acetyl value, calculated as acetic acid, of 43%–53%.

12. A cellulose acetate spinning solution for producing a thread of normal luster, which luster is reduced by treatment with a hot aqueous fluid, and formed of a homogeneous mixture of cellulose acetates and comprising at least 50% of a cellulose acetate having an acetyl value, calculated as acetic acid, of 54%–56% and not over 50% of a cellulose acetate having an acetyl value, calculated as acetic acid, of 43%–53% dissolved in a solvent, the proportions of the different acetates being by weight and based on the total combined quantities thereof.

VAN L. BOHNSON.
FENTON H. SWEZEY.