

# UNITED STATES PATENT OFFICE

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## METHOD OF PREPARING ARTIFICIAL FILAMENTS

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This invention relates to the preparation of artificial filaments, yarns and the like and relates more particularly to the preparation of yarns having a pleasing appearance and improved textile properties.

An object of our invention is to prepare artificial filaments having improved appearance and other desirable properties and which contain a water-insoluble soap or salt of a higher fatty acid. Other objects of our invention will appear from the following detailed description.

It has been previously proposed to incorporate inorganic pigment-like material in artificial yarn to subdue the lustre and increase the opacity thereof. In commercial processes involving the use of such pigments, many considerations enter so that the choice of a commercially suitable pigment is quite difficult. We have found that such pigment must grind easily, must have a low specific gravity so that it does not tend to separate out readily from the spinning solution to which it is added, and preferably should be of light color. We have found that the water-insoluble salts of the higher fatty acids, such as zinc stearate, meet these requirements.

Moreover yarns containing the pigment-like materials formerly proposed are quite abrasive, and cut the guides, knitting needles and other parts of textile apparatus with which they come in contact. We have found that yarn containing the water-insoluble salts of higher fatty acids, such as zinc stearate have little or no more abrasive properties than yarn not containing such salts.

In accordance with our invention we prepare artificial filaments containing-cellulosic materials which have improved properties by incorporating therein a finely divided water-insoluble soap or salt of a higher fatty acid.

The filaments made or treated in accordance with this invention may be of low denier which are associated together to form yarn, or the filaments may be heavier such as bristles, artificial horsehair and straw. Such filaments may be of the reconstituted cellulose type formed by the Chardonnet, viscose or cuprammonium process, but this invention is particularly applicable to filaments containing organic derivatives of cellulose such as organic esters of cellulose and cellulose ethers. Examples of such 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 in a volatile solvent such as acetone and extruding such solutions through fine orifices into an evaporative atmosphere, as in dry spinning, or into a precipitating bath, as in wet spinning.

As stated, we incorporate in the filaments a finely divided water-insoluble soap or salt of a higher fatty acid. Any suitable insoluble soap or salt of a higher fatty acid may be used, examples of which are the stearate, oleate, palmitate, cerotate, elaidate or carnaubate of zinc, aluminum, magnesium, calcium, strontium and barium. A mixture of two or more of these may be used.

In one form of our invention the insoluble soap or salt of the higher fatty acid is incorporated in the dope or spinning solution containing the cellulose compound. Generally the amount of such salt added is from 0.1 to 10% of the weight of the cellulose compound present in the finished yarn. The soap or fatty acid salt is preferably in very fine form, the particles having a diameter of less than 0.1 to 5 microns and preferably less than 1 or 2 microns for increased covering power. This fine size may be attained by grinding the insoluble soap either with water or part of the spinning solution or the solvent used in the spinning solution in a ball mill or colloid mill. The ground material is then added to the solution of the derivative of cellulose and to which may also be added diethylene glycol, heavy white mineral oil, olive oil, castor oil or other oils. The spinning solution containing the pigment is then preferably thoroughly mixed and subjected to the usual filtration before spinning. However the addition of the water-insoluble soap to the spinning dope at any stage of the filtration process or even after completion of filtration is not excluded. When the water-insoluble soap or salt of the higher fatty acid is added to the spinning dope, a soap that is not soluble in the solvent for the spinning dope is preferably selected.

In another form of our invention, the finely divided water-insoluble soap is incorporated in the yarns or filaments by treating such yarns or filaments after their formation either in the form of hanks or in the form of woven or knitted fabric with a suspension of such soap in the presence of a swelling or penetrating agent for the cellulosic material of which such filaments are composed which causes the insoluble soap to become disseminated throughout the filaments. Thus if the filaments are made of cellulose acetate, the swelling agent employed may be an aqueous solution of acetone, acetic acid, thioc-

anates of sodium, potassium or ammonium, di-acetone alcohol or any other suitable swelling agent.

5 Filaments or yarns made in accordance with this invention have a subdued lustre and increased opacity and covering power, the amount of which depends upon the fineness of the size of the insoluble soap or salt of higher fatty acid particles and the amount employed. Yarns made in accordance with this invention have highly improved textile properties, as is shown by the fact that they can be knitted to form circular knit or warp knit fabrics having many wales and courses and which are free of distortions and pin holes. Moreover such yarns may be woven to form fabrics which are more free of warp streaks and weft bars.

Yarns prepared by our method may be wound and twisted more readily and form cones or other packages which do not tend to collapse. Heavier filaments such as bristles, straw and the like when made in accordance with this invention have improved knotting properties.

Moreover yarns prepared by our method, unlike yarn containing the pigment-like material previously employed, do not cut the guides, reeds, knitting needles and other parts of apparatus with which they come in contact during textile operations. Zinc stearate and the other insoluble soaps have a low specific gravity so that they do not tend to readily separate from the spinning solutions or dopes containing them, which is a great advantage in storing such dopes.

In order further to illustrate our invention, but without being limited thereto, the following specific example is given.

#### *Example*

One (1) part by weight of an acetone soluble cellulose acetate is dissolved in three (3) parts by weight of acetone and to this is added one hundredth (0.01) part by weight of zinc stearate in a small amount of water or acetone preferably containing cellulose acetate. This dispersion may be obtained by grinding the zinc stearate with the liquid, to which granules or fibers of

cellulose acetate have preferably been added, in a colloid mill or ball mill so that the most of the particles have a size of less than 1 micron in diameter. The mass is thoroughly mixed and then filtered. The filtered solution is then extruded through the orifices of a spinneret into a drying evaporative atmosphere and the filaments are drawn off and twisted together to form yarn which is wound. The yarn so formed has all the desirable properties above described.

If desired olive oil or diethylene glycol or a mixture of the two, in amounts of 1 to 5% of the weight of the cellulose acetate present may be added to the solution of the cellulose acetate prior to spinning. Also instead of adding the finely divided zinc stearate to the spinning solution before the filtration, it may be added after such filtration.

It is to be understood that the foregoing description is given merely by way of illustration and that many variations may be made therein without departing from the spirit of our invention.

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

1. Process for delustering artificial textile materials containing cellulose acetate, which comprises fixing a water-insoluble zinc salt of a higher fatty acid in said materials by treating the same after their formation with a swelling agent and with a suspension of the water-insoluble zinc salt in the absence of a fixing agent.

2. Process for delustering artificial textile materials containing cellulose acetate, which comprises fixing zinc stearate in said materials by treating the same after their formation with a swelling agent and with a suspension of zinc stearate in the absence of a fixing agent.

3. Process for delustering artificial textile materials containing cellulose acetate, which comprises fixing zinc stearate in said materials by treating the same after their formation with a suspension of zinc stearate in aqueous acetone.

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