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UNITED STATES PATENT OFFICE

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PRODUCTION OF TEXTILE PRODUCTS

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This invention relates to a new or improved process for the production of yarns or threads, and has particular reference to the production of yarns or threads made of or containing artificial silk and other artificial fibres.

Usually, yarns or threads of artificial silk and other artificial fibres are formed from a number of continuous filaments which are associated and twisted together, the yarns or threads then being applicable for use in fabric-forming operations such as knitting, weaving, or lace-making, or for doubling, either with similar yarns or threads or with yarns or threads composed of or containing other fibres or filaments. Such yarns or threads of associated continuous artificial filaments have also been sometimes cut into uniform short lengths and spun as such into threads together with other fibres or alone.

The object of the present invention is to produce yarns or threads composed partly or wholly of artificial silk and like filaments, and possessing a different character from yarns or threads hitherto produced with such artificial materials and more suitably for various textile applications.

In its broadest aspect, the invention comprises the production of yarns or threads from a fibrous mass consisting of an irregularly disposed continuous length or a number of irregularly disposed and independent and continuous lengths of artificial silk filaments or like filaments. According to the invention the fibrous mass is formed into staple lengths and the staple lengths, either unmixed, or mixed or blended with other fibres or filaments, are submitted to spinning operations similar to those employed in the production of yarns or threads from fibres such as wool or cotton.

The artificial filaments employed for the invention may be either produced by the so-called dry or evaporative method of formation or by the wet or coagulation method of formation.

Conveniently, the fibrous mass consists of a number of the irregularly disposed independent and continuous filaments and the formation of staple lengths from the mass may be effected in various ways. According to one way, for instance, the filaments may be broken or torn into lengths by any appropriate breaking or tearing operation, preferably after subjecting the mass to a teasing, combing or like operation; for example the filaments may be passed through one or more sets of breaking or drawing rollers, preferably after the filaments have been subjected to teasing or combing and caused to assume a direction approximately at right angles to the axes of the rollers. Or according to another way for example, an aggregated mass of filaments may be submitted to a cutting operation, either before or after it has been teased or combed, but preferably, in order to ensure uniformity of the staple, the cutting is carried out after the mass has been teased or combed to render the filaments more or less unidirectional, cutting then being effected transversely to this direction. It is understood that the particular ways above indicated of forming the staple lengths are given only by way of example and that any other appropriate means may be employed for forming masses of independent and continuous lengths of artificial filaments such as referred to into staple lengths.

After the continuous lengths of filaments forming the mass have been reduced to staple lengths, the resulting material is formed into yarn or thread, by any suitable spinning operation or operations for instance, a spinning operation or operations similar to those used for the production of woolen or cotton yarns or threads. The staple lengths of artificial filaments may be spun into any desired type of thread, which threads may moreover be doubled and twisted, either with similar threads or with threads composed of or containing other fibres, such as, for example, wool, cotton, natural silk, or a different class of artificial filaments, for the purpose of obtaining stronger or thicker yarns, or of producing variations in colour or form or other desired effects. Further according to the invention, the staple lengths of artificial filaments may be mixed or blended with fibres of such other materials prior to being spun, the introduction of the other fibres being effected

at any desired stage of the production of the yarns or threads, the yarns or threads obtained thus comprising an intimate intermingling of two or more types of filament or fibre.

In addition to the advantages offered by the presence of filaments and fibres having different physical characteristics, "mixed" threads of artificial silk or like filaments and of other fibres or filaments, (whether formed by doubling and twisting threads of unlike materials or by spinning together filaments or fibres of the unlike materials), and fabrics and materials made from or containing the mixed threads are especially valuable in the production of "cross-dyed" or differential effects by using dyestuffs for which the two or more mixed filaments or fibres have different affinities, or by employing dyestuffs capable of colouring one or more of the constituents while leaving the other or others uncoloured, though uniform shades of colour may be applied by using a dyestuff having an affinity for all the filaments and fibres, or by using different dyestuffs appropriate for the different constituents and capable of producing a similar shade thereon.

The invention is applicable to the production of yarns or threads from or with the aid of masses of independent continuous filaments of artificial silk and like materials generally, whether produced by wet or coagulation methods or by dry or evaporative methods, and particularly filaments of cellulose acetate and other cellulose derivatives such as cellulose formate, propionate, or butyrate, or thiocarbamic or alkoxy-alkacyl esters of cellulose, or methyl, ethyl, or benzyl cellulose, or the corresponding condensation products of cellulose and glycols or other polyhydric alcohols. Artificial silk and like filaments produced according to the processes described in my co-pending Application No. 390,355 of even date herewith are particularly suitable for formation into staple lengths and subsequent spinning according to the present invention, the filaments produced by the said processes being collected in a mass preparatory to their subjection to the process of the present invention, and, if desired, being drawn down to the required denier prior to collection.

It is not, however, necessary to exert such a drawing action on the filaments, since masses of independent and continuous lengths of filaments may be produced without subjecting the filaments to a drawing action. For example, filaments extruded from spinning solutions into a current of evaporative medium in a chamber or cell may be allowed to collect in the chamber or cell, or be discharged or delivered therefrom into a receptacle outside without subjection to a drawing action. By suitably controlling the conditions under which the solution is extruded, filaments of any required denier or with any other required characteristics may be obtained, and the collected mass of independent and continuous filaments is in a convenient condition for the subsequent operations of forming staple lengths and spinning as above described.

What I claim and desire to secure by Letters Patent is:—

1. Process for the production of yarns containing artificial staple fibres, said process comprising forming into staple lengths a mass of substantially continuous artificial filaments, which filaments are irregularly disposed throughout the mass so that adjacent filaments are unalined with each other, and submitting the staple lengths to a spinning operation to form said yarns.

2. Process for the production of yarns containing artificial staple fibres, said process comprising forming into staple lengths a mass of substantially continuous artificial filaments of organic derivatives of cellulose, which filaments are irregularly disposed throughout the mass so that adjacent filaments are unalined with each other, and submitting the staple lengths to a spinning operation to form said yarns.

3. Process for the production of yarns containing artificial staple fibres, said process comprising forming into staple lengths a mass of substantially continuous artificial filaments of cellulose acetate, which filaments are irregularly disposed throughout the mass so that adjacent filaments are unalined with each other, and submitting the staple lengths to a spinning operation to form said yarns.

4. Process for the production of yarns containing artificial staple fibres capable of being spun into spun yarn, said process comprising teasing a mass of substantially continuous artificial filaments in which the filaments are irregularly disposed throughout the mass so that adjacent filaments are unalined with each other, said teasing having the effect of bringing the filaments into a substantially unidirectional state, forming the teased mass into staple lengths, and submitting the staple lengths to a spinning operation to form said yarns.

5. Process for the production of yarns containing artificial staple fibres, said process comprising teasing a mass of substantially continuous artificial filaments of cellulose acetate in which the filaments are irregularly disposed throughout the mass so that adjacent filaments are unalined with each other, said teasing having the effect of bringing e filaments into a substantially unidirectional state, forming the teased mass into staple lengths, and submitting the staple lengths to a spinning operation to form said yarns.

In testimony whereof I have hereunto subscribed my name.

WILLIAM IVAN TAYLOR.