

UNITED STATES PATENT OFFICE

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TREATMENT OF TEXTILE MATERIALS CONTAINING CARBONIZABLE FIBRES AND PRODUCT THEREOF

No Drawing. Original application filed May 3, 1928, Serial No. 274,956. Divided and this application filed October 26, 1929. Serial No. 402,794.

This invention relates to the treatment of yarns containing vegetable fibres, such as cellulose, that are readily carbonizable by certain carbonization processes and fibres or threads of a material, such as organic esters of cellulose, silk or wool that are not readily carbonizable by such processes, whereby novel effects are obtained.

This application is a division of our prior application 274,956 filed May 3, 1928.

An object of our invention is to produce novel effects with textile materials containing mixtures of materials that are readily carbonizable by a given process, and materials that are not readily carbonizable by such process by wholly or partially carbonizing the readily carbonizable material.

Another object of our invention is to produce novel "spun yarn" by subjecting a mixed spun yarn containing a readily carbonizable fibre, such as cellulose, and short lengths of filaments made of organic derivatives of cellulose, that are not readily carbonized by the same method, to a carbonizing treatment, either locally or throughout, whereby satisfactory "spun" yarn is produced. Other objects of our invention will appear from the following detailed description.

In accordance with our invention, we treat a "spun" yarn containing fibres that are readily carbonizable by the subsequent treatment and threads or fibres that are not readily carbonizable by such treatment with a composition of matter containing a solution that promotes carbonization of the readily carbonizable material, and we then subject the yarn to elevated temperature, whereby the readily carbonizable material is removed or rendered removable while the other material is hardly affected at all.

The readily carbonizable fibres employed in our invention are vegetable fibres such as cotton or flax or fibres of reconstituted cellulose. The yarns, threads or fibres of material that is not readily carbonized by the subsequent treatment may comprise animal fibres such as natural silk or wool, but we prefer to employ organic derivatives of cellulose. Examples of organic derivatives of cellulose are organic esters of cellulose

such as cellulose acetate, cellulose formate, cellulose propionate and cellulose butyrate, or cellulose ethers such as methyl cellulose, ethyl cellulose and benzyl cellulose.

Any suitable carbonizing agent may be used. Among the carbonizing agents that are suitable for use when an organic derivative of cellulose is present or when animal fibres are present in the textile materials, are solutions of aluminum chloride or hydrochloric acid of suitable concentration; while if animal fibres such as natural silk or wool are the only carbonization-resistant fibres present, stronger carbonizing agents such as sulphuric acid or the acid sulfates of sodium or potassium may be employed. The carbonizing solution may be employed as such, and may be applied to the textile material by dipping, immersion, padding or spraying. On the other hand, the carbonizing solution may be employed in admixture with a thickening agent such as starch, dextrine, British gum, gum tragacanth, etc. and applied in the form of a paste locally in any desired pattern, or over the entire surface of the yarn.

After the textile material has been treated with the composition of matter containing the carbonizing solution, it is heated to elevated temperatures, say 110° C. to 120° C. for a sufficient period of time to carbonize the vegetable or cellulosic material, after which the carbonized material is removed by brushing or washing.

One application of our invention is for the preparation of "spun" yarns made of organic derivatives of cellulose. Organic derivatives of cellulose yarns are made from solutions of the organic derivatives of cellulose by extrusion of the solutions through fine orifices and the removal of the solvent from the filaments thus formed. Since the filaments are formed continuously, the yarns formed therefrom are of continuous length. Often it is desirable to prepare yarns of these materials that comprises short lengths of such filaments or yarns that are spun together. However, because of the lack of cohesion between yarns of cellulose acetate, it is not possible to prepare satisfactory "spun" yarns unless fibres of other materials are

associated with the short lengths of the cellulose acetate yarn.

By our invention "spun" yarns consisting wholly of cellulose acetate staples may be prepared by spinning a mixture of the short cellulose acetate staples and vegetable fibres such as cotton, reconstituted cellulose, etc., to form a yarn, and then subjecting the mixed yarn to a carbonization treatment as herein described to remove the vegetable fibres, thus leaving a "spun" yarn consisting wholly of short staples of cellulose acetate fibres. Obviously some animal fibres, such as silk or wool, may be mixed with the cellulose acetate and cotton fibres, and since they are unaffected by the carbonization treatment, a yarn comprising cellulose acetate fibres and animal fibres will remain.

Obviously the textile material may be dyed, bleached, etc., either before or after the carbonization treatment, in any suitable manner as is well understood in the art. If it is desired to prevent delustering of the yarn containing the organic derivatives of cellulose, deluster-preventing salts such as Glauber's salt or any of the deluster-preventing salts mentioned in U. S. Patent No. 1,765,581 dated June 24, 1930, may be added to the treating solution.

In order further to illustrate our invention, the following detailed description of two examples are given.

Example

A "spun" yarn containing short filaments of cellulose acetate, which are resistant to carbonization, and of cheap cotton, or reconstituted cellulose fibre, which is easily carbonized, is selected. This yarn is immersed in the form of hanks in a bath containing a solution of aluminum chloride of 6° to 13° Bé. at ordinary room temperature. The excess of aluminum chloride solution is then removed by pressing, squeezing, or hydroextraction, etc., and the yarn is then placed in a carbonized dryer and treated at a temperature of 110° to 115° C. for from 1 to 1½ hours. The yarn is then removed from the dryer and is brushed or washed, whereupon the carbonized cotton is removed. Since the cellulose acetate yarn is unaffected, a "spun" yarn consisting wholly of cellulose acetate fibres is produced.

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. The process of producing spun yarn containing organic derivatives of cellulose, comprising spinning short lengths of organic derivatives of cellulose yarn with veg-

etable fibres and then carbonizing the vegetable fibres out of the mixed spun yarn.

2. The process of producing spun yarn containing cellulose acetate, comprising spinning short lengths of cellulose acetate yarn with vegetable fibres and then carbonizing the vegetable fibres out of the mixed spun yarn.

3. The process of producing spun yarn containing cellulose acetate, comprising spinning short lengths of cellulose acetate yarn with cellulosic fibres, and then carbonizing the cellulosic fibres out of the mixed spun yarn.

In testimony whereof, we have hereunto subscribed our names.

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