

UNITED STATES PATENT OFFICE.

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PROCESS FOR THE TREATMENT OF VEGETABLE FIBERS.

1,400,381.

Specification of Letters Patent.

Patented Dec. 13, 1921.

No Drawing.

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To all whom it may concern:

Be it known that I, CHARLES SCHWARTZ, a citizen of the Republic of France, and a resident of Villeurbanne, Department of Rhone, France, have invented a new and useful Process for the Treatment of Vegetable Fibers, of which the following is a specification.

The process which forms the subject of the present invention has for object the treatment of fibers of vegetable origin, that is to say, derived from cellulose or cellulosic products, in such a way as to impart to them the character of wool, both physically as to feel, appearance, and caloric qualities, and chemically as regards their affinity and absorbent capacity toward coloring matters.

It has been found that these qualities can be communicated to cellulosic fibers when the products of a suitable slow dissociation of proteic bodies by strong mineral acids are fixed thereon.

The products of the dissociation are solutions which are precipitated by the addition of water.

The present process utilizes precisely these properties of the proteic bodies by precipitating their products of dissociation upon the cellulosic fibers to improve the latter.

This result can be obtained in various ways: Either the fabric to be treated is impregnated with the liquor of dissociation, the latter squeezed out and the material washed, or again the fabric is impregnated with the usual proteic solutions and then treated with the hydrolyzing liquid, squeezed out and washed.

In either case there is formed upon the fiber, and closely integral therewith, a precipitate of the intermediate insoluble product of the dissociation of the proteic body.

The following proteids, casein, egg-albumen, serum-albumen, and gelatin, are very favorable for these reactions.

Hydrolyzing agents which begin to act at the ordinary temperature and are therefore specially suitable for this purpose, are: 65 to 80 per cent. nitric acid, 55 to 65 per cent. sulfuric acid, 25 to 37 per cent. hydrochloric acid, phosphoric acid of 55 to 57° Bé. These acids may be combined together. The time of immersion and the temperature are regulated according to the nature of the fiber, the proteic substance employed, and the element which serves to effect the dissoci-

ation. This dissociation may be sufficiently effected in a few seconds, as in the case for example of casein with 65 per cent. sulfuric acid, or may require some minutes as occurs with nitric acid for example.

A variation of temperature from 5° C. below zero to 20° C. above zero, has no appreciable influence upon the result obtained.

Precipitation is produced by merely washing the treated fiber in water.

As primary substances for carrying out the process, there may be employed not only the proteids as such but also the products of their transformations, as for instance their combinations with formaldehyde or tannin. In the same way the precipitates formed on the fiber may be treated with bodies which form stable compounds with the proteids, as for instance formaldehyde or formaldehyde and ammonia.

The process is applicable to all vegetable fibers, both natural and artificial, in all forms and in any stage whatever in the operations to which they are subjected in the textile industry, whether they are in the mass or in the state of lap, cops, card-ends, twistings yarns or fabrics, and whether these fibers are mercerized or not.

This treatment of the fiber may be regarded as a preparation for all the usual processes of dyeing, printing and reserves.

Examples.

(1) The fiber is impregnated with a slightly ammoniacal solution of casein, containing 10 per cent. of the latter, dried, and submitted for some time to the action of formaldehyde vapor; it is then treated for two minutes with 75 per cent. nitric acid at the ordinary temperature, squeezed or pressed out and washed.

The yellowish color of xanthro-proteid developed by a secondary reaction may easily be removed by treatment with weak carbonate of soda.

(2) In the former example, the 75 per cent. nitric acid may be replaced by a mixture of:

85 parts of nitric acid of 40° Bé.
15 parts of sulfuric acid of 52° Bé.

(3) In example 1, the 75 per cent. nitric acid may be replaced by a mixture of:

92 parts of nitric acid of 44° Bé.
8 parts of phosphoric acid of 45° Bé.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare what I claim is:

- 5 1. A process for the treatment of vegetable fibers, with a view to imparting to them the character of wool, both physically, as to feel, appearance and caloric quality, and chemically, as regards their affinity and
10 absorbent capacity, said process consisting in fixing upon the fiber products resulting from the hydrolysis of proteic substances by the action of strong mineral acids thereon.
- 15 2. A process for the treatment of vegetable fibers, for the purpose described, consisting in impregnating the fibers with a proteic solution, treating the same with strong mineral acids, and then washing with water.
- 20 3. A process for the treatment of vegetable fibers, for the purpose described, con-

sisting in impregnating the fibers with a proteic solution, drying the said fibers, treating the same with strong mineral acids, and then washing with water.

- 25 4. A process for the treatment of vegetable fibers, for the purpose described, consisting in impregnating the fibers with a proteic solution, treating with bodies which are of a nature to combine with and chemi- 30 cally transform proteid, treating said impregnated fibers with strong mineral acids, and then washing with water for precipitating upon the fibers the product of said chemical transformation and hydrolyzation 35 of the proteic substances.

In testimony whereof I have signed my name to this specification.

CHARLES SCHWARTZ.

Witnesses:

PHILIPPE DESGRANGES,
ADOLPHE BOHN.