Patented Nov. 4, 1941

2,261,240

UNITED STATES PATENT OFFICE

2,261,240

PROCESS OF TREATING TEXTILE MATERIALS

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No Drawing. Application December 29, 1937, Serial No. 182,249. In Germany January 5, 1937

2 Claims. (Cl. 91—70)

The present invention relates to a process of treating textile materials and more particularly to a process of producing cellulosic fibers which have the same affinity for acid dyes as for instance wool.

In our copending application Ser. No. 182,248 filed December 29, 1937, now Patent No. 2,208,095, of the same filing date, we have disclosed that by reacting sulfur-containing compounds such as carbon disulfide, carbonyl sulfide, sulfur chloride, and thiophosgene with alkyleneimines, nitrogen-containing condensation products may be obtained which are insoluble in dilute acids and alkalies.

These insoluble substances containing nitrogen and sulfur may also be produced upon and in cellulose fibers. This may be achieved by treating the fibers with solutions or vapors of the components of the resin and polymerizing said components to yield the resin on or in the fibers.

It is an object of the present invention to provide a process of treating cellulosic fibers such as cotton, rayon, artificial silk and wool from viscose or copper oxide ammonia solutions, organic cellulose esters and ethers, and the like, which process imparts to the treated materials affinity for acid wool dyestuffs.

A further object of the invention is the provision of cellulosic fibers containing nitrogen and capable of being dyed together with and in the same manner as natural wool.

Still further objects of the invention will become apparent from the detailed specification following hereinafter.

The present invention is based on the observation that the condensation which is described with more detail in the aforementioned copending application may with great advantage be carried out by impregnating the fibers or foils with the components of the artificial resin and effecting the condensation in or on the artificial fibers.

The completely insoluble condensation product from carbon disulfide and the cyclic base thus enclosed in the fibers constitutes an impregnation fast to washing and friction as it is enclosed in greater part in the capillaries of the cellulose. The fastness to washing and friction may be improved by an after-treatment of the impregnated fiber with a wetting agent. The fiber treated in this manner contains about 1 to 3 per cent of nitrogen and corresponding proportions of sulfur. The content in nitrogen and sulfur depends on the nature of the fiber and on the duration of the action of the solutions of the cyclic base and carbon disulfide and also on the concentration of the solutions. The physical constants of the fibers are not changed by the treatment and in the case of wooly fibers or crimped or delustered fibers of wool-like character the crimping and the delustered appearance are not lost.

By the described impregnation the fibers become similar to wool and have the same capacity as wool for being dyed, for example with acid dyestuffs. When these fibers are worked up together with wool it is not necessary to dye by a two-bath process both kinds of fibers being uniformly dyed together with a single dyestuff.

The new process may be inserted as an operation in the production of artificial fibers; for this purpose there may be inserted in a series of successive baths for finishing the threads one containing the cyclic base of the type of ethyleneimine and another containing carbon disulfide and the artificial threads may be passed through these baths. It is advantageous to finish up by washing the threads with hot water. The process is applicable for all textile fibers which come into question as substituents for wool, in particular for all kinds of cellulose threads.

Still more simply the new product may be applied to cellulose threads by starting from the freshly made cellulose hydrate produced from viscose and free from cellulose xanthate but still containing much carbon disulfide after the adhering acid has been washed away by cold water or cold salt solution this carbon disulfide having been derived from the decomposition of the cellulose xanthate or a secondary product. The carbon disulfide is in the capillaries of the fibers and by regulation of the washing baths may be adjusted in quantity so that the amount present may suffice for the formation of the insoluble imine carbon disulfide product so as to obtain the desired content of nitrogen and sulfur in the fiber.

Finally after the treatment with the imine it is preferable in this case also to apply a steaming or a washing with hot water or hot salt solution.

The invention will be better understood with reference to the following examples which serve to illustrate the invention without, however, limiting the scope thereof to the specific details set forth therein.

Example 1.—1 kilo of cellulose fibers is steeped at room temperature in 8 kilos of a solution containing 14 per cent of ethyleneimine until the fiber is completely saturated. This fibrous mass is then freed from the excess of ethyleneimine by

squeezing. The ethyleneimine still contained in the mass is brought into reaction with carbon disulfide in solution, emulsion or as vapor and if necessary the fibrous mass is again pressed. The fiber acquires a yellow appearance in the air. Finally the fibrous material is extracted with boiling water until it is again completely white and has become slightly delustered.

In this manner the product of the invention is produced in the fiber.

Example 2.—Viscose is forced through nozzles into a precipitating bath which precipitates only cellulose xanthate. In order to remove the by-products of the carbon disulfide and other sulfo-compounds the threads are finally washed with cold salt solution or sodium sulfide solution or even with a solvent and then the pure xanthate is decomposed completely by means of dilute acid. Only now is the reaction of the fiber containing carbon disulfide with the cyclic base brought about and the further treatment or the precipitation of the insoluble condensation product follows. The fibers are then finished in the known manner.

What we claim is:

1. A process of producing a resin impregnated cellulosic material which can be dyed by wool dyeing processes, which process comprises steeping said cellulosic material with ethyleneimine until saturated, freeing the material of excess ethyleneimine, reacting the retained ethyleneimine with carbon disulfide, and extracting the impregnated cellulosic material with boiling water.

2. The process of claim 1, wherein the cellulosic material is viscose which has been purified by forcing it into a cellulose xanthate precipitating bath, washing and decomposing the pure xanthate by means of dilute acid.

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