Patented Apr. 30, 1940 2,198,994

UNITED STATES PATENT OFFICE

2,198,994

TEMPORARILY MARKING TEXTILE FIBER

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No Drawing. Application December 31, 1937, Serial No. 182,911. In Germany October 30, 1935

2 Claims. (Cl. 19—146)

This invention concerns a method of temporarily marking textile fiber and the product of such method, i. e. the process of making an intermediate product, which is readily distinguished from other products by color, such color being however removable at will. The method of this invention also furnishes an improved step for mixing processes, serving there to facilitate the control of a mixing.

In spite of the fact, that a fiber marking which withstands the processes to which a textile may be subjected, but which nevertheless may be removed if so desired, would be of great use in the art of textiles, a suitable solution of such a problem is not known. It has been suggested in the past to use ultramarine pigment or cadmium dyes, in order to distinguish, for instance, between right and left twisted yarn, such marking being applied to one or the other of such yarns. But such marking has been found objectionable, because hydrogen sulphide is formed, when the coloring is removed. Such gas is not only poisonous, but is also apt to cause spots or stains on material or goods.

Even though the art has not found a satisfactory means for temporarily and removably marking textile fiber, there nevertheless remains the problem, on account of the great number of uses to which such a method could be placed. A temporary or removable marking may furthermore not only serve for distinguishing between different twists, but also for indicating different kinds of fibers, as to strength, size and length and other qualities. Such a marking would allow instantaneous identification, as a whole or in part, of any fiber, or of raw materials which have been stored in washed condition, or in the case of partly finished goods at any stage of the process. Vegetable fibers may be distinguished from animal fibers, natural fibers from staple fibers, and also different kinds of fibers from each other.

A marking of this invention proves of particular advantage in the mixing of different kinds of fibers in order to obtain and ascertain as good a mixing as possible. For instance, the components may be differently marked, or some may be weighted by the marking agent,—others not, and the mixing is continued until a homogeneous color effect is obtained. In this case the marking agent serves as "mixing indicator." Therefore, a practical solution of the hitherto unsolved problem facilitates the control of a step of mixing substantially fungible materials, i. e. materials which are not readily discernible in appearance.

The method of this invention employes such pigments or pigmental combinations as can easily be destroyed by chemical reaction without giving off hydrogen sulphide or other obnoxious or destructive gases or vapors.

The first step of temporarily coloring a fiber will therefore be followed, at will, by a step which removes said coloring or otherwise renders it innocuous, after the step or process has been completed, for which the coloring was desired.

For a marking in accordance with this invention may be considered:

Metal-bearing, complex metal salts which are conspicuous in color and of pigmental character, such as the so-called enolates, for instance acetic ester enolates of iron, nickel and cobalt, the acetic acid amide enolates, the corresponding indandion- and pyrazole compounds.

Furthermore complex cyanides, the nickel compounds of dimethyl dioximes and other oximes, iodide of amylum, gold-purple, the blue reduction compound of tungsten-molybdenum-phosphate and similar heteropoly-acids. It is well known that such compounds can easily be rendered colorless by chemical reaction, in some cases by the mere effect of diluted mineral acids.

In a preferred method of this invention manganese dioxide is used, which is either applied as such to the fibers or formed chemically thereon. The removal of the oxide from the fibers is effected by means of reducing agents. In the formation of the manganese dioxide on the fibers, as well as in the reduction and removal thereof from the fibers the bleaching effect of the chemicals offers an added advantage which can be fully utilized in obtaining a desirable bleaching of the material.

In carrying out the marking with manganese dioxide, it is possible to start with manganese bistre, i. e., a more or less colloidal solution of manganese dioxy-hydrate, but solutions of manganates and permanganates can also be used. In the latter instance manganese dioxide is formed on the surface of the fiber, and this alone brings about a harmless bleaching, since the valence of seven or six of the manganese is changed to a valence of four.

After having been applied for marking, this color may be removed by treatment with reducing agents such as sulphurous acid, hydrochloric acid, an acid solution of hydrogen peroxide, and particularly with or in the presence of oxalates. Two-valent manganese-ion is then formed the compounds of which can easily be removed from the fiber.

As an alternative the material may be treated

with grease containing manganese dioxide or by the formation of manganese dioxide on or in greasy fibers. Other dyes than manganese dioxides can be applied to the fibers by means of grease.

The temporary coloration of fiber, as discussed herein, is separate and distinct from, and should not be confused with a dyeing of fiber or textile goods. It might have been contemplated in the past to dye fibers with manganese bister, i. e. in order to provide the fibers with a permanent color. This manganese compound has, however, never been found to be particularly suitable as a dye; and the color is not attractive. It has also been proposed to mark sheep with paste containing manganese dioxide, but exudation of the animal soon destroys the color by reducing the compound.

Naturally manganese dioxide is also known to be useful for bleaching purposes and that manganese dioxide is formed in the process of bleaching with manganates and permanganates. However,—presumptively because it was found to be of little use as a dye,—manganese dioxide as a temporarily marking medium, and its great practical importance in that field has so far not been known. Nor could its particular usefulness be be appreciated unless its simultaneous bleaching effect was recognized.

The mixing of the cellular wool and of similar rayon fibers, for instance staple fiber with wool, cotton or other natural fibers, is of growing, practical import, and experiments have proved that marking according to the present invention can be profitably utilized for such mixing process. The incidental bleaching leaves a fiber in a much better state than that of a fiber which has been subjected to other bleaching methods.

The invention may be further explained by the following examples which are, however, purely illustrative and not limitative.

Example 1

100 parts by weight of wool is steeped in a bath of 20° C. consisting of 2,500 volumes of pure water free of iron in which one part by weight of potassium permanganate has been dissolved, the wool being well stirred in the liquid. After about one hour the wool, now colored brown, is removed and rinsed in water several times whereupon it is dried as usual.

For the particular protection of the material 25 to 75 parts by weight of magnesium sulphate may be added to the bath. The addition of a similar quantity of alum may be of advantage, and sodium bicarbonate may also be added.

After the wool has been worked up together with artificial silk or ramie, the reduction of the manganese dioxide and a simultaneous harmless bleaching of the material is effected in a bath containing for each 100 parts by weight of the wool thus prepared, 2,500 parts by volume of water free of iron, 10 parts by weight of sodium bisulphite in ground or powder form, 25 parts by volume of sodium bisulphite lye of 30° B. and 4 to 6 parts by weight of sulphuric acid of 66° B. The material is left in this bath for a few hours during which it is lightly moved until the desired bleaching effect has been reached. Then the material is washed in cold water and finally dried under moderately increased temperature.

Both baths can be used again for the same purpose after they have been replenished with chemicals. The further treatment of the material is effected in the usual manner.

Example 2

100 parts by weight of cellular wool is treated with a sufficient quantity of an 0.1% solution of sodium or potassium permanganate in water to which some sodium phosphate or bicarbonate may be added. The material is stirred in the liquid. After half an hour the material is taken out of the bath, centrifuged and dried as usual. Thereupon the material is mixed in the usual manner with 300 parts of natural wool until the brown cellular wool has been thoroughly dispersed into the latter, i. e. until a homogeneous shade of color has been obtained.

The color may then be removed either as described in Example 1 or the color compound may be reduced to a manganese salt in some other manner. As suitable reducing substances may be mentioned hydrogen peroxide, chlorine, hypochlorous acid, stannine salts, persulphate and perchlorate, oxalates and the like. In the case of cellular wool, such a bleaching has the advantage that a separate bleaching of the material can be obviated. At all events, only a very short bleaching with chlorine will be required afterwards.

Example 3

Before being converted into sliver, 100 parts by weight of wool are sprayed with a grease consisting of:

32 parts by weight of oleic acid,
6 parts of ammonia,
80 parts of peanut oil,
582 parts of water,

to which is added a solution of

.2 parts by weight of potassium permanganate in
300 parts of water.

By this treatment a distinctly brown material is obtained which can be mixed with cellular wool or other fibers. The mixing can be effected while the material is worked into sliver. The removal of the manganese hydroxide is effected as previously described. The rinsing is prolonged until a sample of the treated material moistened with ammonia shows no tendency to turn brown.

The manganese hydroxide may be replaced in the foregoing examples by nickeldimethylglyoxime or ferrienolate of the acetic acid ester or the nickel or copper compound of the dicyandiamidine or the like. These compounds can easily be rendered colorless by treatment with strong acid in moderate concentration. In this case no bleaching will be effected.

Having thus described and illustrated my invention by way of various examples, yet I do not wish to be limited thereby, except as the state of the art and the appended claims may require, for it is obvious that various modifications and changes may be made in the form of embodiment of my invention, without departing from the spirit and scope thereof.

What I claim is:

1. The method of controlling the mixing of fiber, comprising taking several groups of fiber which are not readily discernible from each other, applying coloring matter to one of said groups so that it is visually distinguished from the other groups such coloring being unaffected by the manufacturing steps to be applied to

said one group but being removable at will without detriment to any of said fibers, mixing the group thus colored with the others, the resulting color effect serving to indicate when the desired mixture has been obtained, and then reducing said coloring matter to a substantially colorless state.

2. The method of controlling the mixing of fiber, comprising taking several groups of fiber which are not readily discernible from each other, applying manganese dioxide to one of said groups so that it is visually distinguished from the other groups, mixing the group thus colored with the others, the resulting color effect serving to indicate when the desired mixture has been obtained, and then reducing said manganese dioxide by treating the mixture with an acid reagent converting the manganese dioxide into a substantially colorless compound.

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