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PRODUCTION OF IMPROVED EFFECTS ON CELLULOSIC FABRICS

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5 Claims. (Cl. 8—20)

This invention relates to the production of improved effects on woven, knitted or other fabrics composed wholly or partly of yarns consisting of or comprising filaments of materials having a fibrous cellulosic origin, such for example as unmercerized and mercerized cotton and linen and/or of regenerated cellulose such for example as viscose-rayon and cuprammonium rayon. The particular nature of the effects concerned is that involving operations (hereinafter called mechanical operations or mechanical treatments) which alter the surface conformation of the material, such as embossing, schreinering, glazing, beetling and the like.

Hitherto the effects produced on the aforementioned fabrics have had the defect of not being resistant to washing, laundering, hot damp pressing and like operations to which the fabrics may be subjected. The object of the present invention is to overcome this defect.

According to the invention the fabric is treated, for example wetted, damped or impregnated with an aqueous solution of formaldehyde and with an acid reacting catalyst as hereinafter defined After such treatment of the fabric any excess liquor is removed and then, before or after drying, the particular mechanical operation concerned is effected in the known manner. It is preferred to dry the fabric prior to the said mechanical operation, and this drying is carried out under such conditions as will not bring about the complete reaction as described below. A suitable temperature is, for example, 50° C. to 70° C. The dried fabric may be conditioned either naturally or by any known means in order to restore the natural moisture content prior to the mechanical treatment. It may be possible to dispense altogether with drying in some cases, more particularly in the case of heavy cloth. It is important that the mechanical operation concerned shall take place before the complete reaction takes place.

After the mechanical operation the fabric is subjected to a heat treatment at a temperature of the order of 110° C. and above in order to cause the complete reaction to take place. The preferred range of temperature is 120° C. to 160° C., the time of heating required to bring about the complete reaction being longer at the lower temperatures than at the higher temperatures, but care must be taken not to use such a high temperature that the cellulose is decomposed.

It will then be found that the embossed, glazed, beetled or other mechanically produced effect on the fabric will be highly resistant to washing, laundering, hot damp pressing etc. and this is obtained without substantially changing the "feel" of the fabric.

The precise nature of the reaction of the cellulose is not at present known, but there is a definite reaction as is evidenced by the fact that the cellulose becomes insoluble in the customary copper-ammonia solution. Continued heating, after this change has occurred, would not appear to produce any further reaction until actual decomposition of the cellulose takes place, due to the effect of the acid or to charring. Accordingly, by the term "complete reaction" is to be understood that the cellulose has reacted to the point where it is no longer soluble in the customary copper-ammonia solution.

The treated material usually retains an odor of formaldehyde and for removing traces of the latter it may be necessary to subject the treated material to a washing operation, for example, with ammonia and/or soap solution.

The heat treatment may be accomplished in a heated chamber or by passing the fabric over heated cylinders or rollers or by a passage through a hot flue or chamber.

There may be incorporated in the wetting, damping or impregnating liquid other materials ordinarily used as fillers, such as starch, dextrine, glue, china clay, etc.

Catalysts employed in the present process are such substances as are not volatile under the temperature conditions of the treatment and which are acid in reaction, or capable of becoming acid under the conditions of the treatment, or capable of liberating an acid under the conditions of the treatment, e. g. organic acids such as oxalic and tartaric acids, acid salts of organic acids such as sodium acid tartrate, and potassium tetroxalate, mineral acids, such as sulphuric acid and phosphoric acid, acid salts of mineral acids such as sodium bisulphate and di-hydrogen sodium phosphate, and salts of acids where the acid is stronger than the base and which dissociate in water solution to give an acid reaction, such as ammonium sulphocyanide. The catalysts need only be used in the proportion of .1% to 1% of the impregnating liquid.

According to a modified form of the present invention a yarn can be treated with the reagents specified, dried, if necessary conditioned, and woven to a fabric which is then subjected to mechanical treatment as above described, followed by the final heat treatment. In this case care may have to be taken not to delay the weaving

of the treated yarn in order that the effect shall not be lost.

The following examples illustrate the invention:—

Example 1

A viscose fabric to be treated is impregnated with a 10% solution of formaldehyde in water containing 0.6% of oxalic acid and after thorough wringing the solvent is removed at a temperature of about 60° C. The dried fabric is then embossed and afterwards heated to a sufficiently high temperature, 130° C. to 140° C., until the reaction is completed.

Example 2

A fabric comprised of viscose is after dyeing and drying soaked in a liquor containing 10% of formaldehyde and 0.6% of ammonium sulphocyanide for 15 minutes. During the soaking the liquor is maintained at a temperature of from 40° to 50° C. After soaking the excess liquor is removed by any known means and the fabric dried at a temperature of 60° C. After conditioning, which is done by known means, the fabric is embossed and then heated to a temperature of 130° C. for 10 minutes.

Example 3

A cotton fabric is impregnated on the pad with an aqueous solution of formaldehyde containing 6% formaldehyde and 0.6% ammonium sulphocyanide. After drying at 50° C. and conditioning so that the fabric contains 15% of moisture, the fabric is subjected to mechanical treatment, e. g. glazing, beetling or embossing. A heat treatment follows by means of hot cylinders so that the fabric is heated to 140° C. for 7 minutes. A passage through a dilute ammonia solution is given, followed by drying to complete the operations.

What we claim is:—

1. Process for producing improved effects on fabrics composed wholly or partly of cellulosic materials, comprising the steps of causing the fabric to contain formaldehyde and an acid reacting catalyst, the amount of the acid reacting catalyst being small as compared with the amount of formaldehyde, mechanically treating the fabric by compression to alter the surface conformation of the material, and then heating to a temperature of the order of 110° C. and above.

2. Process for producing improved effects on fabrics composed wholly or partly of cellulosic materials, comprising the steps of impregnating the fabric with an aqueous solution of formaldehyde containing an acid reacting catalyst, the amount of the acid reacting catalyst being small as compared with the amount of formaldehyde, mechanically treating the fabric by compression to alter the surface conformation of the material, and then heating to a temperature of the order of 110° C. and above.

3. Process as claimed in claim 2, in which the fabric after impregnation is freed from excess liquid and dried before the mechanical treatment.

4. Process for producing improved effects on fabrics composed wholly or partly of cellulosic materials, comprising the steps of impregnating the fabric with an aqueous solution of formaldehyde containing an acid reacting catalyst, the amount of the acid reacting catalyst being small as compared with the amount of formaldehyde, removing excess liquor, drying, mechanically treating the fabric by compression to alter the surface combination of the material, and then heating to a temperature of 120–160° C.

5. The process for producing improved effects on fabrics composed wholly or partly of cellulosic materials, comprising the steps of mechanically treating such fabric carrying formaldehyde and an acid reacting catalyst, the amount of the acid reacting catalyst being small as compared with the amount of formaldehyde, to alter the surface conformation of the material by compression, and then heating to a temperature of the order of 110° C. and above.

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