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PROCESS FOR IMPROVING VEGETABLE
TEXTILE MATERIALS

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The known mercerization of vegetable textile materials, particularly cotton fibres and fabrics, by means of a solution of an alkali sulphide at ordinary temperature, or by means of a dilute solution of an alkali sulphide at a raised temperature, produces an increase in the strength of the fibre and a silky lustre which are considerably less pronounced than those which can be attained by means of solutions of caustic alkali.

This invention is based on the discovery that by mercerizing textile fibrous material by means of an alkali sulphide solution containing not less than 25 per cent. of alkali sulphide (calculated as Na_2S), at a high temperature, the strength of the material both in the dry and in the wet condition is increased in a surprising degree, and the material acquires an excellent silky lustre which is appreciably superior to that obtainable by mercerization in known manner.

The treatment is preferably applied to the material in stretched condition; however, even when stretching is not applied, or is applied only in a slight degree, appreciable advantages are attained, the spun or woven material acquiring a wool-like character and an increased strength.

The following examples illustrate the invention:—

Example 1.—Cotton yarn is treated in the stretched condition for 5 minutes in a solution of crystallized sodium sulphide of 100 per cent. strength (prepared by melting the crystallized sulphide in its own water of crystallization) at a temperature of 115°C .; it is then passed through boiling water, acidified, washed and dried.

The yarn thus treated has a fine silky lustre and in comparison with untreated yarn its strength in the dry state has increased by 66 per cent. and in the wet state by 59.34 per cent. The same yarn, when mercerized in the usual manner with a caustic soda solution of 22.5 per cent. strength has increased in strength in the dry state by only 16.5 per cent. and in the wet state by 17.3 per cent.

It is thus apparent from this example that the increase in strength which can be attained by the invention is several times greater than that which can be attained by the customary processes of mercerization.

Example 2.—A suitable cotton fabric is treated in stretched condition with a solution of crystallized sodium sulphide of 100 per cent. strength at 115°C . for $\frac{1}{2}$ to 5 minutes, after which it is passed through boiling water, acidified, washed and dried.

Example 3.—The procedure is as in Example 1 or Example 2, with the exception that the treatment is conducted at 100°C .

Example 4.—The procedure is as in Example 1 or Example 2, with the exception that there is used a solution of crystallized sodium sulphide of

84 per cent. strength (calculated as $\text{Na}_2\text{S} \cdot 9\text{H}_2\text{O}$) and the treatment is conducted at 100°C .

Example 5.—The procedure is as in Example 1 or Example 2, with the exception that there is used a solution of sodium sulphide of 58 per cent. strength (calculated as Na_2S) and the treatment is conducted at 100°C .

Example 6.—The procedure is as in any of the preceding examples, with the exception that stretching is not applied to the material, so that during the treatment with the hot sodium solution, the fabric is free to contract both in the longitudinal and in the transverse direction.

In the foregoing examples any of the additional materials customary in the art of mercerization may be added to the sodium sulphide solutions therein prescribed. Instead of sodium sulphide, an equivalent quantity of another alkali sulphide, such as potassium sulphide, may be used.

In the present process alkali sulphide solution of any strength from 25 per cent. (calculated as crystalline $\text{Na}_2\text{S} \cdot 9\text{H}_2\text{O}$) to solutions saturated at the temperature desired for the treatment may be used. And as to the temperatures, such of from 100 to 180°C . may be used, provided that, if high temperatures, for instance such exceeding 120°C . are used, the time of treatment is accordingly abbreviated.

The expression "textile fibrous material" as used in the specification and claims is intended to include wherever the context permits, all vegetable fibrous material, such as flax, linen, hemp, ramie, jute and particularly cotton, whether in the form of pure vegetable material, such as pure cotton fabric, or in the form of mixed material, and whether in the form of yarn in skeins or cops, or in the form of warps, or in the form of woven material.

I claim:—

1. A method of treating vegetable fibrous material which comprises contacting the same with an alkali metal sulphide solution of not less than 25 per cent. strength at a temperature of not less than 100°C .

2. A process as in claim 1, wherein said material is treated while subjected to tension.

3. A process which comprises treating vegetable fibrous material with a solution made by heating crystalline alkali metal sulphide at a temperature of approximately 115°C .

4. A process which comprises treating vegetable fibrous material with an alkali sulphide solution of not less than 25 per cent. strength at a temperature of not less than 100°C .

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