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PRODUCTION OF COATED FABRICS

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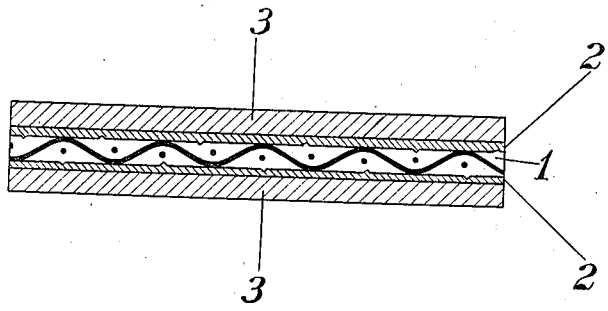

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PRODUCTION OF COATED FABRICS

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This invention relates to the production of coated fabrics, and more particularly, to the production of shade cloth for window shades, and the like, of improved properties.

Shade cloth comprising a fabric coated with a cellulose ester base composition has been known in the art from 12–14 years and has been developed to a point where it is fairly satisfactory. It occupies a position in the upper range of shade cloth lines, both with respect to quality and price. Two serious objections have developed in this type of shade cloth which are technically referred to as "tendering" and "curling". By "tendering" is meant that a shade cloth loses after exposure to sunlight for a period much of its original tensile strength, and by "curling" is meant that the vertical edges of the shade cloth tend to turn over. Both of these defects might be overlooked in a low priced type of shade cloth, but present serious objections in high grade material.

An object of the present invention is to provide an improved shade cloth. A further object is to provide a shade cloth of the cellulose ester coated type that will have great resistance to "tendering" and "curling". A further object is to provide a simple and economical method of making shade cloth.

The above objects are accomplished according to the present invention broadly by coating both sides of a fabric sheet with a composition comprising a cellulose ester, a softener, and leaded zinc oxide. More specifically, the invention comprises applying to both sides of a fabric sheet a film of a composition comprising cellulose nitrate, a solvent softener, preferably dibutyl phthalate, and leaded zinc oxide, passing the material while the composition is still plastic through a plate press or pressure rolls, and then subsequently applying a second film of the composition to both sides of the coated fabric.

In the single figure of the accompanying drawing is shown a cross sectional view of a piece of shade cloth prepared according to the preferred method of this invention. The sheet of textile fabric 1 has applied to both sides a cellulose ester coating composition 2 which, as shown in the drawing, is forced into the fabric 1 to some extent and presents a smooth, uniform outer surface due to the pressure treatment. Reference numeral 3 denotes the second film of cellulose ester coating composition which is applied to both sides of the coated web after subjecting same to the pressure treatment.

The following example is given to illustrate a specific embodiment of the invention, although it is to be understood that the invention is in no way limited to this particular example. Parts are given by weight:

Example 1.—To a suitable sheeting, such as one weighing 2.7 ounces per square yard and having a thread count of approximately 68 x 68, is applied on one side a total of from 0.2 to 0.8 ounces, dry weight, per square yard of a suitable coating composition, the preferred amount being 0.4 ounces. The product herein described may be either a so-called translucent shade cloth material or opaque shade cloth material, which may be either the same color on both sides or a different color on the two sides. In the case of translucent shade material, the coating composition is as follows:

	Parts
Cellulose nitrate	53.8–40.6
Dibutyl phthalate	18.0–28.0
Leaded zinc oxide	28.2–31.4

The preferred composition for translucent shade cloth has the following formula:

	Parts
Cellulose nitrate	44.9
Dibutyl phthalate	23.3
Leaded zinc oxide	31.8

For the so-called opaque shade cloth, a composition as follows is used:

	Parts
Cellulose nitrate	43.0–25.0
Dibutyl phthalate	12.0–18.7
Leaded zinc oxide	45.0–56.3

The preferred composition of the opaque material is as follows:

	Parts
Cellulose nitrate	33.3
Dibuty' phthalate	16.7
Leaded zinc oxide	50.0

The same amount of coating composition is applied to the reverse side of the fabric. The coated fabric is then subjected to a pressure treatment while the coating composition is still in the plastic state. This may be accomplished by passing the material through the ordinary plate press used for embossing purposes, or through pressure rollers. The plates or rollers may be either smooth or have shallow engravings upon them, such as a Skiver grain, or the like. The material is then finished by having applied to both sides a sufficient amount of the coating composition to give a total dry weight of approximately 1.5 ounces per square yard on each side of the material. The coating composition is ap-

plied by means of a doctor knife, or other well known means in this art.

In the above example the material is given a pressure treatment, prior to finishing, and it is preferred to prepare the material in this manner as the finished material has a greater uniformity of translucency, a very desirable property. However, the pressure treatment is by no means essential and may be omitted.

The compositions given in the example are merely illustrative. Instead of cellulose nitrate, cellulose acetate or other cellulose esters may be employed, but cellulose nitrate is preferred. Any well known softener may be used in the composition, such as raw castor oil, blown castor oil, blown cottonseed oil, rapeseed oil, or the like, but it is preferred to employ a so-called "solvent softener", such as dibutyl phthalate, dibutyl tartrate, tricresyl phosphate, and the like, because a solvent softener reduces the tendency of the finished material to curl. Dibutyl phthalate has been found to be the most satisfactory solvent softener for this purpose. To obtain the improved results of the present invention, it has been found that leaded zinc oxide must be employed as the pigment, although it will be understood by those skilled in the art that small amounts of other pigments may be employed with leaded zinc oxide without offsetting the advantages of the leaded zinc oxide. Any of the commonly used variations of leaded zinc oxide may be employed, but it is preferred to use the so-called 5% leaded zinc oxide.

The proportions given in the example are merely illustrative and may be varied widely as will be understood by those skilled in the art, the proportions being governed by the desired translucency or opaqueness, flexibility, and such properties of the finished material. The formulas in the example give only the composition of the dried film on the fabric, it being well understood by those skilled in the art that the usual cellulose ester dispersing mediums will be employed to obtain a coating composition of the desired viscosity.

Shade cloth produced in accordance with the present invention is as satisfactory as any shade cloth of this type heretofore produced and, in addition, has two outstanding advantages, the first of which is its resistance to tendering, and the second its resistance to curling. Accelerated light exposure tests have been made on the shade cloth of the present invention and the heretofore known cellulose ester coated shade materials, and it has been found that the percent of loss in tensile strength of the prior art shade cloth has been four to five times as great as that of the shade cloth of the present invention, which means that the shade cloth of the present invention has radically greater wearing properties and a much greater life.

While applicants are not at all sure of the exact reason why the shade cloth of the present invention should be so materially superior to that heretofore known, it is believed that the lead salt in the leaded zinc oxide pigment acts to some extent as a filter to those rays in sunlight which are destructive to cellulose esters and that, as a result, the cellulose ester is not deteriorated with the subsequent liberation of acid which is harmful to the fabric, causing what is known as tendering. The solvent softener, especially dibutyl phthalate, may assist in the protection of the fabric, but it is believed that the chief advantage of the use of a solvent softener is that it gives films having a much lower shrinkage value on ageing than films employing non-solvent softeners such as raw castor oil, and that the reduction in shrinkage reduces the tendency of the material to curl. Regardless of the correctness of the theory given above, the means of accomplishing the present invention have been fully set forth and it is to be understood that applicants do not state the above theory as a proved fact.

In the example, the fabric employed was sheeting and that is the usual type of fabric employed in the manufacture of shade cloth, and the like, although other types of fabric may be employed. The present invention has been described with respect to shade cloth, but it will be apparent that the invention applies to other types of cellulose ester coated fabrics and the term "shade cloth" as used herein and in the appended claims is intended to include cellulose ester coated fabrics in general having properties similar to shade cloth.

As many apparently widely different embodiments of this invention may be made without departing from the spirit and scope thereof, it is to be understood that the invention is not limited to the specific embodiments thereof except as defined in the appended claims.

We claim:

1. In a process of preparing shade cloth wherein a fabric is coated with a composition containing a cellulose derivative and pigment, the improvement which consists of applying directly to the fabric a composition containing leaded zinc oxide as the predominating pigment component and in amounts sufficient to prevent curling and tendering.

2. A non-tendering and non-curling shade cloth comprising a fabric having superposed thereon a film consisting of a cellulose derivative composition, a softener, and a pigment, said pigment containing leaded zinc oxide in predominating amounts sufficient to prevent curling and tendering.

3. Product of claim 2 in which the cellulose derivative is cellulose nitrate.

4. Product of claim 2 in which the cellulose derivative is cellulose nitrate and the softener is of the solvent softener type.

5. Product of claim 2 in which the softener is dibutyl phthalate.

6. Product of claim 2 in which both sides of the fabric have been coated with a film comprising cellulose nitrate, dibutyl phthalate, and leaded zinc oxide, the weight of said film being approximately 1.5 ounces per yard on each side of the fabric.

7. A non-tendering and non-curling translucent shade cloth consisting of a fabric having superposed on both sides thereof a film comprising cellulose nitrate 53.8–40.6 parts, dibutyl phthalate 18.0–28.0 parts, and pigment 28.2–31.4 parts, said pigment consisting of leaded zinc oxide.

8. A non-tendering and non-curling opaque shade cloth consisting of a fabric having superposed on both sides thereof a film comprising cellulose nitrate 43.0–25.0 parts, dibutyl phthalate 12.0–18.7 parts, and pigment 45.0–56.3 parts, said pigment consisting of leaded zinc oxide.

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