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DESIGN EMBOSSED HIGH LUSTER FINISH MATERIAL

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This invention relates to a process for producing high luster finish embossed flexible sheet material and more particularly to a process for producing high luster finish embossed coated textile material.

High luster finishes on such flexible materials as leather, coated fabrics, coated paper, etc., are well known and are in demand by the trade in the various industries. Such materials have been produced largely with a smooth or unembossed surface. Embossing such high luster material usually destroys or mars the high luster of the surface. In certain types of cellulose derivative composition coated fabrics a high luster embossed surface is sometimes obtained by applying an unpigmented cellulose derivative composition to the pigmented cellulose composition previously applied to the fabric, the coated material is then embossed and finally a coating is applied of the same unpigmented cellulose derivative composition as was applied before the material was embossed. This last composition is necessary to restore the luster of the surface which is marred by the embossing operation. The application of the unpigmented cellulose derivative composition after the embossing restores the luster to the depressed as well as the undepressed portions of the embossed design.

This is not always desirable and further the final application of the unpigmented composition adds to the cost of the finished material and the damage hazard is increased in working on a product which is substantially in its finished condition. When such material is damaged in this operation it cannot be easily treated to make it satisfactory for sale as first class material. As indicated above, it is also desirable in many instances to produce a material with an embossed surface which possesses a high luster on the undepressed portion of the design and a dull effect on the depressed portion of the design. The means used in the present state of the art to produce such a dull effect in the depressed portion of the design of the embossing mars or destroys to a greater or lesser degree the high luster which is desired on the undepressed portion of the grain.

This invention therefore has as an object the provision of a process for producing a design embossed surface on a flexible base material as a coated fabric which has a high luster on the undepressed portion of the design and a dull contrasting effect in the depressed portion of the embossed design.

This object is accomplished by applying a film of an unpigmented cellulose derivative-softener composition on a previously applied pigmented cellulose derivative coating on a fabric or similar flexible base material and then superimposing a final coating of a nonpigmented nonsoftened cellulose derivative composition after which the thus coated material is embossed by suitable means so that the relief on the embossing plate just pierces the non-pigmented non-softened cellulose derivative composition film in the depressed portion of the design.

The following example is given as an embodiment but it is understood that the invention is not limited thereby except as indicated in the appended claims.

To a fabric of a so-called sateen weave and weighing approximately 14.3 ounces per linear yard 53 inches in width is applied a plurality of coats of a cellulose derivative composition having the following formula:

Composition No. 1

	Per cent by weight
Cellulose nitrate	13.5
Pigment	15.7
Softener	28.1
Ethyl acetate	17.1
Ethyl alcohol	25.6
	100.0

Several applications are made to deposit approximately 20 ounces of solids of the composition per linear yard of the fabric which corresponds to approximately 35 ounces of the coating composition described. Upon this coating is then superimposed a composition of the following formula:

Composition No. 2

	Per cent by weight
Cellulose nitrate	17.3
Softener	17.3
Ethyl acetate	26.2
Ethyl alcohol	39.2
	100.0

This composition is applied to the extent of approximately 4.3 ounces per linear yard which corresponds to approximately 1.5 ounces of the non-volatile components or solids. As a final coating there is applied a composition of the following formula:

Composition No. 3

	Per cent by weight
Cellulose nitrate	8.3
Ethyl acetate	36.9
Ethyl alcohol	54.8
	100.0

This composition is applied to the extent of approximately one-half ounce of solids per linear yard which is equivalent to approximately 6 ounces of the composition as given above.

The compositions are applied by conventional

means known in the art of coating flexible base materials, a convenient means being by a doctor knife. The individual coats are usually subjected to heat to remove the volatile constituent of the compositions before the application of subsequent coatings. The means of applying the compositions and the methods of removing the volatile constituents may be any well known in the art. The coating compositions used may likewise be prepared according to conventional methods. The coated material prepared as described possesses a high luster smooth surface. It is now subjected to an embossing operation to impart a design to the finished product. Just sufficient pressure is applied during the dwell of the embossing plate against the high luster surface to cause the sharp relief on the embossing plate to just pierce the non-softened non-pigmented cellulose derivative film and not pierce the non-pigmented but softened cellulose derivative intermediate coat. The steam pressure in the head of the embossing press should be between approximately 10 and 30 pounds. After the embossing operation the product is finished and a material is obtained with an embossed design in which the undepressed portion has a high luster and the depressed portions are dull, producing a pleasing effect against the high luster portions of the surface of the material.

The embossing step may be carried out by means of rolls instead of plates as indicated above. The principle of the process is the same when rolls are used; that is, the pressure between the rolls must be just enough to cause the sharp relief on the embossing roll to just pierce the non-softened non-pigmented cellulose derivative film and not pierce the non-pigmented, but softened cellulose derivative intermediate coat.

The invention is not limited to the use of the coated sateen fabric noted in the description. Other fabrics such as sheetings, ducks, drills, broken twills and moleskins may be used. Further such flexible base materials as felted fabrics, paper, leather, etc., are satisfactory. The amount of the pigmented and softened coating composition as well as the amounts of the non-pigmented compositions applied to the flexible base may be varied within rather wide limits and such limits will be readily apparent to those skilled in the art of coating flexible bases. The preferred results will however be obtained with a relatively heavy film particularly with respect to the pigmented and softened portion of the film. The amount and kind of the constituents of the various compositions used to produce the coatings may be varied within a range which will be evident to those skilled in preparing and using such compositions.

In producing the embossed design the pressure which is applied to the high luster surface should be just sufficient to break the non-pigmented non-softened upper film of the coated base material. The pressure may of course vary with different types of film, thickness of film, etc., and the optimum pressure to use may be readily determined by experiment. If too great a pressure is used the high luster on the undepressed portion of the design will be marred or destroyed. Just sufficient pressure should be used to produce the embossed design so that the depressed portions will be dull in contrast to the luster of the undepressed portion. A variety of embossed designs may be used. The use of such designs, however, which have relatively large undepressed areas with a rather sharp edge on the contour of the undepressed area produce the most pleasing effects and the most satisfactory results.

In the examples, the invention has been illustrated by cellulose nitrate as the cellulose derivative. It is not limited to this ester since other cellulose derivatives may be substituted for the cellulose nitrate in the formulas in greater or lesser amounts as will be apparent to those skilled in the art. It will likewise be apparent that resins may be included in the formula in which they may function either as a film-forming component or as a softener.

The invention is applicable to the production of embossed designs on high glaze finishes on coated flexible base material. Such materials find extensive use wherever smooth high glaze finishes have been used in the past. Because of the pleasing designs and the effects produced by the process many uses will suggest themselves to those familiar with the application of such products.

It will be seen from the foregoing that a process is presented which does not require the application of any composition or any other treatment to produce a contrast in luster between the depressed portions and the undepressed portions of an embossed design on a high glaze coated flexible base material. Further, the process does not mar or destroy the high luster on the undepressed portions of the design embossed finished product.

It is apparent that many widely different embodiments of this invention may be made without departing from the spirit and scope thereof; and, therefore, it is not intended to be limited except as indicated in the appended claims.

We claim:

1. Process for preparing an embossed coated fabric of high luster on the hills and a dull luster in the valleys which comprises applying to a woven fabric a pigmented composition containing cellulose nitrate, a softener and volatile solvents, the said softener being present in amount about twice that of the cellulose nitrate allowing the said composition to dry and applying thereto a composition containing approximately equal parts of cellulose nitrate and a softener dispersed in a volatile organic liquid, allowing the said organic liquid to evaporate, and applying a surface coat of cellulose nitrate and embossing the said fabric under a pressure of about 10 to 30 lbs. per square inch with an embossing member having sharp relief portions which are relatively small compared to the depression areas, whereby the surface coat only is pierced by the embossing member.

2. The process of preparing high luster embossed coated fabrics which comprises applying to a suitable fabric a composition having the approximate following formula:

	Per cent by weight
Cellulose nitrate	13.5
Pigment	15.7
Softener	28.1
Ethyl acetate	17.1
Ethyl alcohol	25.6
	100.0

allowing the thus coated fabric to dry, applying to the first coating a composition having the approximate formula:

	Per cent by weight
Cellulose nitrate	17.3
Softener	17.3
Ethyl acetate	26.2
Ethyl alcohol	39.2
	100.0

allowing the resultant to dry, applying over the second coat a surface coat of a composition having the approximate following formula:

	Per cent by weight
Cellulose nitrate	8.3
Ethyl acetate	36.9
Ethyl alcohol	54.8
	100.0

allowing the resultant to dry and thereafter embossing, the embossing being carried out under such pressure that only the surface coating is pierced by the embossing member.

3. The product obtainable by applying to a suitable fabric a composition having the approximate following formula:

	Per cent by weight
Cellulose nitrate	13.5
Pigment	15.7
Softener	28.1
Ethyl acetate	17.1
Ethyl alcohol	25.6
	100.0

allowing the thus coated fabric to dry, applying to the first coating a composition having the approximate formula:

	Per cent by weight
Cellulose nitrate	17.3
Softener	17.3
Ethyl acetate	26.2
Ethyl alcohol	39.2
	100.0

allowing the resultant to dry, applying over the second coat a surface coat of a composition having the approximate following formula:

	Per cent by weight
Cellulose nitrate	8.3
Ethyl acetate	36.9
Ethyl alcohol	54.8
	100.0

allowing the resultant to dry and thereafter embossing, the embossing being carried out under such pressure that only the surface coating is pierced by the embossing member.

4. The product obtainable by applying to a suitable fabric a composition having the approximate following formula:

	Per cent by weight
Cellulose nitrate	13.5
Pigment	15.7
Softener	28.1
Ethyl acetate	17.1
Ethyl alcohol	25.6
	100.0

in an amount approximating 35 ounces per linear yard of base fabric 53 inches wide, allowing the thus coated fabric to dry, applying to the first coating a composition having the approximate formula:

	Per cent by weight
Cellulose nitrate	17.3
Softener	17.3
Ethyl acetate	26.2
Ethyl alcohol	39.2
	100.0

in an amount approximating 4.3 ounces per linear yard of base fabric 53 inches wide, allowing the resultant to dry, applying over the second coat a surface coat of a composition having the approximate following formula:

	Per cent by weight
Cellulose nitrate	8.3
Ethyl acetate	36.9
Ethyl alcohol	54.8
	100.0

in an amount approximating 6 ounces per linear yard of base fabric 53 inches wide, allowing the resultant to dry and thereafter embossing, the embossing being carried out under such pressure that only the surface coating is pierced by the embossing member.

5. The product obtainable by applying to a suitable fabric a composition having the approximate following formula:

	Per cent by weight
Cellulose nitrate	13.5
Pigment	15.7
Softener	28.1
Ethyl acetate	17.1
Ethyl alcohol	25.6
	100.0

in an amount approximating 35 ounces per linear yard of base fabric 53 inches wide, allowing the thus coated fabric to dry, applying to the first coating a composition having the approximate formula:

	Per cent by weight
Cellulose nitrate	17.3
Softener	17.3
Ethyl acetate	26.2
Ethyl alcohol	39.2
	100.0

in an amount approximating 4.3 ounces per linear yard of base fabric 53 inches wide, allowing the resultant to dry, applying over the second coat a surface coat of a composition having the approximate following formula:

	Per cent by weight
Cellulose nitrate	8.3
Ethyl acetate	36.9
Ethyl alcohol	54.8
	100.0

in an amount approximating 6 ounces per linear yard of base fabric 53 inches wide, allowing the resultant to dry and thereafter embossing under a pressure of 10 to 30 pounds per square inch.

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