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TEXTILE-DECORATING COMPOSITIONS

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This invention relates to the pigment-decoration of textiles and is particularly concerned with the use in the dyeing and the printing of fabrics and textile materials of a composition comprising an aqueous phase containing a dispersed water-insoluble film-forming resin emulsified in a pigmented lacquer phase in which the dispersed water-insoluble resin is also insoluble. The present application is a continuation-in-part of my copending applications, Serial No. 666,189, filed April 30, 1946, and Serial No. 744,803, filed April 29, 1947, both of which applications are now abandoned.

Compositions comprising an aqueous medium, usually water, emulsified as the inner phase in an outer pigmented lacquer phase containing a pigment binder, generally an organic solvent-soluble thermosetting resin, have gone into extensive use in the printing and the dyeing of textiles and similar fabrics. The application of such a pigmented emulsion in the printing of textile fabrics is disclosed in Jenett, 2,222,581, and 2,222,582; and the application thereof in the dyeing of fabrics is disclosed in Cassel, 2,248,696.

The use of these pigmented water-in-lacquer emulsions in the printing or the dyeing of textiles has obvious advantages in that pigments, which are generally cheaper and more light-resistant than dyestuffs, can be employed, the emulsion provides a low-cost vehicle for the pigment, and the pigmented emulsion can be easily applied to a fabric. In addition, an unusual sharpness of detail is obtained in the resulting printed textile. Moreover, a soft hand is imparted to the printed or dyed fabric because the binder cements the pigment to the structural fibers of the individual yarns of the fabric in the form of completely discontinuous films and does not bridge over the yarns with a continuous film.

The resulting pigment-printed or -dyed textile has the disadvantage, however, that it tends to crock to some extent, i. e., to yield a portion of its color to another material such as another fabric, for example, when the latter is rubbed thereover. Fabrics printed or dyed in deep shades exhibit the greatest tendency to crock, and the full utilization of pigments in the decoration of fabrics is thereby limited.

Various procedures have been suggested heretofore for elimination or reduction of this tendency of such pigment-colored fabrics to crock but all are objectionable for one reason or another. For example, the degree of crocking can be readily reduced by overpadding the pigment-

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printed or -dyed textile material with a solution of a suitable resin in an organic solvent and then heating the fabric to set and cure the resin. This process, however, is expensive and also requires a double treatment of the fabric, an operation that the trade resists. The degree of crocking can also be reduced by incorporating a larger amount of resin in the lacquer phase. This procedure is likewise expensive and, in addition, there is frequently also a loss of color value. Furthermore, both procedures generally result in the production of a finished fabric having an objectionable boardiness or stiffness.

I have now discovered that the crockfastness of such a pigment-printed or -dyed fabric can be unexpectedly and materially improved, without imparting an objectionable hand or boardiness to the finished fabric and with improvement in the color value, by utilizing as the printing paste or the dye bath an aqueous dispersion of a water-insoluble film-forming resin emulsified in an outer pigmented lacquer phase in which the dispersed water-insoluble resin is also insoluble. Advantageously, in carrying out the present invention, I utilize a textile-decorating composition comprising a dispersion of a water-insoluble film-forming elastomeric resin in an aqueous phase emulsified in an outer pigmented lacquer phase comprising a solution of a thermosetting resin in a volatile organic solvent in which the water-dispersed elastomer is also insoluble.

My textile-decorating composition in its simplest form comprises essentially a dispersion of a film-forming water-insoluble resin in an aqueous phase that is emulsified in an outer pigmented lacquer phase in which the dispersed water-insoluble resin is also insoluble. I have obtained especially good results with a composition in which the water-insoluble resin comprises a film-forming elastomer. In its preferred form, my composition comprises a dispersion of a film-forming water-insoluble synthetic elastomer in an aqueous phase emulsified in an outer pigmented lacquer phase consisting essentially of a solution of a pigment-binder, advantageously a thermosetting resin, in a volatile organic solvent in which the elastomer is also insoluble.

Any pigment can be incorporated into the lacquer phase of the present composition, but the pigment employed in any particular application should be selected in view of the nature of the finished goods and the expected use thereof; that is, it should be satisfactorily lightfast, if necessary it should not bleed to any substantial extent in dry-cleaning solvents such as naphtha and

carbon tetrachloride, it should be resistant to soap to the degree required, or the like. Typical pigments include the phthalocyanines, various metal oxides, carbon black, water-insoluble vat and azo dyestuffs, and the like.

While the lacquer phase may comprise a simple dispersion of the pigment in a suitable volatile organic solvent in those cases where the wash fastness of the decorated fabric is of no moment, an organic solvent-soluble binder is preferably also incorporated in this phase in order to impart wash- and scrub-resistance to the finished textile material. This binder may comprise any suitable plastic or solid film-forming, water-resistant material such as a cellulose derivative, e. g., ethyl cellulose, or a resin that is soluble in the organic solvents comprising the lacquer phase and insoluble in water (the aqueous phase). Advantageously, however, a film-forming thermosetting resin is utilized as the binder. Various types of water-insoluble, organic solvent-soluble thermosetting resins including urea-aldehyde resins such as urea-formaldehyde resins, melamine-aldehyde resins including melamine-formaldehyde resins, phenol-aldehyde resins including phenol-formaldehyde resins, drying oil-modified alkyd resins, and the like, can be used for this purpose. To be suitable for this purpose, moreover, the thermosetting resin, or other binder, after application of the emulsion to the fabric and heating of the fabric to dry it and, as the case may be, to convert the resin or other binder to a solvent-insoluble state, must be sufficiently resistant to washing and must be substantially insoluble in customary dry-cleaning solvents and must impart no objectionable stiffness to the finished fabric.

The resin dispersed in the aqueous phase of my improved textile-decorating composition may comprise any film-forming water-insoluble resinous material that is also insoluble in the organic solvent or solvents comprising the outer lacquer phase. Typical resins meeting these requirements include various resins formed from acrylic acid and its derivatives such as acrylate resins and methacrylate resins, various vinyl halide resins, especially vinyl chloride polymers and copolymers of vinyl chloride with other polymerizable substances, and various film-forming synthetic elastomers such as rubbery copolymers of butadiene and acrylonitrile, rubbery copolymers of butadiene and styrene, rubbery copolymers of organic dichlorides and alkali polysulfides, and the like. I have obtained an exceptionally high degree of crockfastness with compositions in which a film-forming synthetic elastomer is dispersed in the aqueous phase, and I prefer to employ such a synthetic elastomer as the water-dispersed resin in the present composition. Advantageously, the water-dispersed resin comprises a suitable copolymer of butadiene and acrylonitrile. Two or more film-forming water-insoluble resins may, of course, be dispersed in the aqueous phase if desired; and a particularly good degree of crock-resistance can be obtained with a mixture of a butadiene-acrylonitrile copolymer and an acrylic acid-ester polymer.

(The term "elastomer" as used herein is employed in accordance with the definition thereof generally accepted in the art and given on pages 942 and 944 in the article entitled "Nomenclature of Synthetic Rubbers" by Harry L. Fisher and appearing on page 941 of "Industrial and Engineering Chemistry," vol. 31, No. 8 (August 1939). By the term "elastic" we refer to that property possessed by elastomers of retracting to approximately their original size after having been greatly distorted.)

Such water-dispersed resin may be either a solid or a liquid and may with advantage be prepared initially as an aqueous dispersion for emulsification into the pigment-binder solution comprising the outer lacquer phase of my composition. Many suitable water-phase resins, particularly the synthetic elastomers, can be prepared by emulsion polymerization with the production of a so-called polymer emulsion or, in the case of the synthetic elastomers, a latex comprising a dispersion of the resulting polymeric product in the aqueous polymerization bath. (The term "dispersion" as used herein with reference to the water-phase resin includes a suspension of a solid resin in an aqueous medium and an emulsion of a liquid resin in an aqueous medium.)

The unusually good resistance to crocking and the superior color value exhibited by fabrics decorated in accordance with my invention appear to be due to the use in the aqueous phase of those resins that are both insoluble in water (the aqueous phase of the present composition) and insoluble in the particular organic solvent or solvents forming the lacquer phase of the present composition. The use of a water-soluble resin in the aqueous phase of the present emulsion in place of such a water-insoluble resin, although increasing the crockfastness of the resulting decorated fabric to some extent in certain cases, tends however to induce flocculation of the pigment; and the result is a decreased color value, which can be controlled but only with difficulty and at considerable expense.

While some improvement in crockfastness can also be obtained, on the other hand, with an emulsion containing an elastomer dissolved in the lacquer phase in place of the present water-dispersed resin, the use thereof requires a materially greater amount of such lacquer phase-soluble elastomer to give the same improvement in crockfastness. The color value of the decorated fabric is also impaired especially in deep shades where crock improvement is most needed. In addition, such lacquer phase-soluble elastomers are generally not resistant to dry-cleaning solvents. Moreover, although the elastomers dispersed in the aqueous phase of the present emulsion can be brought into solution through the use of powerful solvents, such solvents are not only costly but are generally incompatible with the diluents and resins customarily employed in a water-in-lacquer textile-decorating emulsion.

It has been my experience, however, that substantially satisfactory results with respect to crock-reduction can be obtained even if the water-phase resin is very slightly soluble in or swellable by the solvents comprising the lacquer phase provided that the dispersed water-phase resin is so protected by the aqueous phase that the actual degree of solubility or swellability is practically negligible; and the use of such a resin in the aqueous phase of my emulsion is contemplated as within the scope of the present invention, the term "insolubility in the lacquer phase" as applied to the water-phase resin also referring to such a resin used under such conditions. Obviously, not all resins of a given class or type may be satisfactory for use in the water phase of my decorating composition.

Resins suitable for dispersion in the aqueous phase of the present composition, moreover, must

be film-forming, i. e., capable of forming a film upon evaporation of the water and the solvents comprising the emulsion. The resulting film should preferably be not too hard and horny and is advantageously elastic and rubbery in nature, and synthetic elastomeric substances such as those specifically mentioned previously are especially adapted for this purpose.

Examination of the finished fabric indicates that the film formed from the water-phase resin appears to reenforce the film that is formed by the pigment binder in the lacquer phase and that binds the pigment to the fabric and, moreover, is unpigmented. In effect, therefore, the water-phase resin of my improved emulsion may be considered to "overpad" the pigment binder without, however, the disadvantageous results obtained in the customary two-step overpadding procedure. Whatever the exact explanation may be, it is certain that a decorated fabric having an exceptional degree of crockfastness can be prepared from the present pigmented emulsion.

As is well known, the customary pigmented water-in-lacquer emulsion contains an amount of binder in the lacquer phase that is generally a compromise among three factors: the amount of binder necessary to insure a relatively good degree of crockfastness, the amount of binder just insufficient to impart an undesirable degree of boardiness to the finished fabric, and the cost of the binder; and the resulting compromise amount is generally insufficient to provide the necessary degree of crockfastness except in relatively light shades. With the present composition, this compromise amount of pigment binder can be maintained or even decreased with the production of a substantially crockfast, full-color, decorated fabric having an unusually soft hand regardless of the depth of shade desired.

The reduction in the degree of crocking accomplished with the instant emulsion can be effected whether a deep or a light shade is desired in the finished fabric; and my invention thus permits the wide application and full utilization of pigments in the decoration of textiles. Fabrics can be colored a deep shade with the present composition, especially one containing a film-forming elastomer, with substantial elimination of dry crock and material reduction of wet crock. Particularly important applications of my improved emulsion lie in blotch printing, i. e., the printing of designs containing large areas of solid color, and in pad-dyeing.

An important advantage of my invention is that curing of the wet decorated fabric, where a thermosetting resin is included in the lacquer phase, can be largely eliminated. All that is necessary, in drying the wet fabric, is to subject it to the conventional treatment, for example, passage over the customary bank of steam-heated drying cans or other equipment, to evaporate the water and the solvent content of the emulsion. These cans are generally maintained at a temperature ranging from 210° to 250° F., which is sufficient to initially set the thermosetting resin but insufficient to completely cure it. Despite the lack of cure of the thermosetting resin, the resulting fabric exhibits improved crock-fastness and possesses a good degree of washfastness, which increases on aging as the resin further polymerizes and cures itself. By reason of the elimination of the curing step required with previously suggested procedures for the reduction of crocking and with the use of customary emulsions, the speed at which a pigment-decorated fabric is produced can be materially increased; and I have been successful in decorating textiles at a rate as high as 200 yards per minute in accordance with the present invention. Curing of the initially set resin can, of course, be practiced but requires the installation of special heating and curing equipment.

As is the case with the pigment binder of the lacquer phase, the water-dispersed resin is deposited on the fabric in discontinuous films that do not bridge over the individual yarns. No appreciable boardiness, accordingly, is imparted to the decorated fabric, which retains substantially its initial hand. Moreover, despite the deposition of an additional discontinuous film of resin on each fiber, the resulting fabric possesses generally a deeper, fuller color value. In comparison, a pigmented emulsion containing an increased amount of resin in the lacquer phase imparts a marked boardiness to the resulting decorated fabric, the color value of which, especially in the deeper shades, is also adversely affected.

The organic solvents forming the lacquer phase of my emulsion must be readily volatile so that they can be evaporated by passage of the wet fabric over the conventional drying equipment and, of course, must be insoluble in the water phase of the emulsion. In addition, the organic solvents must be chosen with respect to their insolubility for the water-dispersed resin. Typical solvents (without regard to their insolubility for all resins suitable for dispersion in the aqueous phase of the present emulsion) include turpentine, mineral spirits, pine oil, high-aromatic hydrocarbon solvents, e. g., a fraction having a boiling range of 310 to 375° F., and the like.

In the preparation of my improved fabric-decorating composition, a color concentrate can be first prepared by dissolving the pigment binder in the organic solvent, dispersing the pigment in the resulting lacquer desirably in a suitable mill, and then emulsifying an aqueous dispersion of the water-insoluble resin into this lacquer. The pigment may contain a suitable dispersing agent and, in the case of organophilic pigments, may be prepared in the form of a thick paste in an appropriate organic solvent. The aqueous resin dispersion may be prepared by suitably dispersing the resin in water or may be obtained as such in the manufacture of the resin. An emulsifier such as organic solvent-soluble ethyl cellulose, aluminum stearate, calcium palmitate, or a drying oil-modified alkyd resin may be incorporated in the lacquer. The resulting water-in-lacquer emulsion can then be cut to the desired printing or dyeing consistency by adding further organic solvent thereto and then emulsifying additional water thereinto.

Advantageously, however, a vehicle concentrate is simultaneously prepared by emulsifying water, which may contain an emulsion stabilizer such as common salt, into a suitable organic solvent, which may contain an emulsifying binder such as an alkyd-type resin dissolved therein. This concentrated water-in-lacquer emulsion can then be cut with additional organic solvent, and further water can be emulsified thereinto to provide a vehicle or clear having the desired printing or dyeing consistency. The color concentrate can now be cut with this vehicle in the proportions necessary to produce the specified shade.

Variations of these methods of preparation can, of course, be utilized. For example, the aqueous resin dispersion, instead of being emulsified into the color concentrate, can be added to the vehicle

concentrate as it is being cut with additional organic solvent. In such event, the color concentrate may consist simply of a dispersion of the pigment in the solution of the pigment binder in the organic solvent.

Moreover, the vehicle concentrate can with advantage be prepared by emulsifying the aqueous resin dispersion into the organic solvent, which may have dissolved therein an alkyd-type resin as an emulsifying binder. A vehicle or clear having the desired printing or dyeing consistency can then be prepared as indicated above; and the color concentrate, which may comprise either a pigmented lacquer or a pigmented water-in-lacquer emulsion, can now be cut with this vehicle in the proportions necessary to produce the desired shade. If desired, part of the water-insoluble resin may be contained in the aqueous phase of the water-in-lacquer color concentrate.

Care should be observed in the preparation of these emulsions that coagulation of the particles of the water-dispersed resin on standing is substantially prevented or eliminated, particularly in the case of the color concentrate as prepared with the water-insoluble resin in the aqueous phase. For example, as already indicated, the solvents of the lacquer phase should be insoluble in water; and any water-soluble solvents such as butanol, which may be contained initially in the organic solvent-soluble resin, should be eliminated as completely as possible to avoid coagulation of the water-dispersed resin. Again, certain pigments appear to have a tendency to cause coagulation of the water-dispersed resin particularly if they are not prepared with a sufficient degree of purity; and stabilizing agents such as the sodium salts of alkyl aryl sulfonates have been found helpful in such cases in counteracting this undesirable effect of such pigments.

Where the present composition is to be utilized in the printing of a fabric, it can be applied in any convenient manner as from an intaglio cylinder. Where it is employed in the dyeing of a fabric, it can be applied by means of a pad-dyeing operation; or it can be deposited on the fabric in the form of a thin film by transfer from a roll-coating machine. The decorated fabric can be conveniently dried by passage over conventional drying equipment such as a bank of steam-heated drying cans maintained at a temperature in the range of 210 to 250° F.; and the dried fabric, if it is desired to do so, can be passed through a curing chamber maintained at a temperature of 300 to 350° F. to cure the thermosetting resin, where it comprises the pigment binder, although such curing operation is not necessary to obtain the greatly improved crockfastness possible with my emulsion.

The proportions of the several ingredients of the present composition may vary widely and depend largely on the requirements of the finished fabric and the nature of the particular application. Generally, in printing with the present emulsion, the aqueous phase comprises a higher percentage of the total composition than in dyeing therewith since, as is well known, the emulsification of an increasing amount of water into such an emulsion tends to thicken it. The depth of color desired obviously governs the amount of pigment used. The water-dispersed resin should be sufficient in amount to render the finished fabric satisfactorily crockfast; and the amount of pigment binder should similarly be sufficient to impart the necessary degree of washfastness to the finished fabric.

Advantageously, the water-dispersed resin, especially when it comprises an elastomer, and the pigment are present in a ratio ranging from about 0.25:1 to 100:1 by weight. Although some increase in crock-resistance can be obtained with a lower ratio, satisfactory improvement in crockfastness first becomes appreciably noticeable when the elastomer and the pigment are present in about the indicated minimum ratio. There is not much to be gained in utilizing the elastomer and the pigment in a ratio greater than the indicated maximum since the shade of the resulting decorated fabric is then so light that crocking no longer presents a problem.

In this connection, it should be borne in mind that the percentage of pigment in the present composition and the nature of the emulsion itself place a practical limit on the percentage of elastomer that can be incorporated therein in any given instance. Obviously, in a composition containing a relatively high amount of pigment, the practical maximum ratio of elastomer to pigment is less than the corresponding maximum ratio when the composition contains a relatively low amount of pigment. Since the actual textile-decorating emulsion itself is usually prepared by cutting a color concentrate containing a water-dispersed resin with a suitable vehicle or clear in proportions to produce the desired depth of shade, obviously the percentage of pigment in the resulting composition decreases the more the color concentrate is cut with the clear while the ratio of elastomer to pigment remains the same. If the vehicle also contains an elastomer dispersed in its aqueous phase, then the ratio of elastomer to pigment obviously increases the more the color concentrate is cut. Moreover, the ratio of the water-dispersed resin to the pigment is also governed to some extent by the particular pigment selected; for example, copper phthalocyanine blue requires a larger amount of elastomer than copper phthalocyanine green for a given degree of crockfastness.

Various types of fabrics can be decorated by means of my improved composition and the application of my invention is not limited to the decoration of any particular fabric. Excellent resistance to crocking and excellent color value without boardiness of the finished fabric are obtained equally well whether the fabric being decorated is composed of natural fibers such as cotton, flax, wool, and hair fibers, of synthetic fibers such as regenerated cellulose, cellulose acetate, polyamide, protein polymer, vinyl polymer, and the like fibers, of inorganic fibers such as glass, mineral, or metal fibers, or of mixtures of such fibers. Furthermore, the application of my invention is not limited to the usual types of woven or knitted fabrics but may also be used to decorate pile fabrics, paper, or fabrics made by processes such as combing, matting, or felting, e. g., a fabric composed of loosely meshed cotton fibers bonded together by the localized application of a resin. The present invention, moreover, is equally applicable whether a light or a heavy fabric is being decorated. (The term "fabric" as used in the claims includes all these various types of materials as well as yarns, to the decorating of which my invention is also applicable.)

The following examples are typical illustrations of color concentrates suitable for use in carrying out my invention:

EXAMPLE 1

A color concentrate containing a benzidine yellow is prepared by mixing together, in a suitable mixer, the following ingredients (parts by weight in this and other examples):

Turpentine	56.6
50% solution of hydrophobic melamine-formaldehyde resin in an equal admixture of butanol and xylene (e. g., Melmac 245-8)	10.0
Benzidine yellow pigment (tetrazotized dichlorobenzidine coupled with acetoacet-o-toluidide)	10.0
Ethyl cellulose (highly ethylated)	0.4

and emulsifying into the resulting pigmented lacquer:

40% aqueous dispersion of an emulsion copolymer of 55% 1,3-butadiene and 45% acrylonitrile (e. g., Hycar OR-15)	23.0

The butadiene-acrylonitrile copolymer is insoluble in the turpentine forming the lacquer phase of the resulting water-in-lacquer emulsion.

EXAMPLE 2

A lacquer containing dispersed copper phthalocyanine green is prepared by suitably mixing the following ingredients:

Mineral spirits	42.2
Pine oil	1.0
Ethyl cellulose (highly ethylated)	0.8
Copper phthalocyanine green	6.0

Into this pigmented lacquer is emulsified the following aqueous resin dispersion:

12% aqueous dispersion of hydrophobic melamine-formaldehyde resin (e. g., Ciba No. 40)	50.0

Mineral spirits is selected as the solvent for the lacquer phase of the resulting water-in-lacquer emulsion because of its poor solvent power for the water-dispersed melamine-formaldehyde resin.

EXAMPLE 3

A blue color concentrate is prepared by mixing the following ingredients:

Turpentine	57.6
Hydrophobic melamine-formaldehyde resin solution of Example 1	9.0
Pine oil	3.0
Ethyl cellulose (highly ethylated)	0.4
Copper phthalocyanine blue	6.0

and emulsifying into the resulting pigmented lacquer:

50% aqueous dispersion of copolymerized ethylene dichloride and sodium polysulfide (e. g., Thiokol A)	24.0

EXAMPLE 4

A pigmented lacquer is prepared by mixing:

Mineral spirits	52.2
Pine oil	2.0
Ethyl cellulose (highly ethylated)	0.8
Red oxide of iron	20.0

A color concentrate is prepared by emulsifying into this lacquer:

40% aqueous dispersion of an emulsion copolymer of 67% 1,3-butadiene and 33% acrylonitrile (e. g., Hycar OR-25)	25.0

EXAMPLE 5

The following ingredients are mixed to form a pigmented lacquer:

Turpentine	54.6
Hydrophobic melamine-formaldehyde resin solution of Example 1	9.0
Ethyl cellulose (highly ethylated)	0.4
Copper phthalocyanine blue	6.0

which lacquer is emulsified with the following aqueous resin dispersion to produce a water-in-lacquer color concentrate:

30% aqueous dispersion of a butyl methacrylate polymer (e. g., Methacrol BP)	30.0

The following example is a typical illustration of a vehicle concentrate suitable for cutting the color concentrates of Examples 1 to 5:

Example I

A vehicle concentrate is prepared by forming a lacquer from the following:

Mineral spirits	25
70% drying oil-modified phthalic-glyceride alkyd resin (e. g., Beckasol No. 18)	25

and emulsifying thereinto:

Water	45
Sodium chloride	5

The alkyd resin has a viscosity of V to X on the Gardner scale and an acid number of 10 to 15.

This vehicle concentrate can then be cut by the addition of further mineral spirits and water in the proportions necessary to give either a printing or a dyeing vehicle having the body and the viscosity desired:

Example II

A printing vehicle is prepared by adding mineral spirits to the vehicle concentrate and emulsifying water thereinto in the following proportions:

Vehicle concentrate of Example I	6
Mineral spirits	20
Water	74

Example III

A typical pad-dyeing vehicle is prepared by addition of mineral spirits to the vehicle concentrate and emulsifying water thereinto in the following proportions:

Vehicle concentrate of Example I	6
Mineral spirits	40
Water	54

Printing pastes and pad-dyeing liquors can be prepared by cutting the color concentrates of Examples 1 to 5 with the printing vehicle and the pad-dyeing vehicle of Examples II and III, respectively. The proportions in which the color concentrate and the respective vehicle are mixed depend, of course, on the depth of shade desired in the finished fabric. Typical examples of a printing paste and of a pad-dyeing liquor are illustrated by the following:

EXAMPLE A

A printing paste giving a deep shade is prepared by cutting a color concentrate with the printing vehicle in the following proportions:

Color concentrate of Example 1	1
Printing vehicle of Example II	2

A textile such as cotton percale printed with this

paste exhibits substantially no crocking, possesses a soft hand, and has a full, even color value.

EXAMPLE B

A pad-dyeing liquor giving a medium shade is prepared by cutting a color concentrate with the pad-dyeing vehicle in the following proportions:

Color concentrate of Example 4	1
Pad-dyeing vehicle of Example III	10

When a textile such as rayon is dyed with this liquor, it is extremely crockfast, exhibits no particular increase in stiffness, and has a good color.

In both cases the decorated fabric need only be dried in the conventional manner to produce the finished material.

The following example is typical of a vehicle concentrate having the water-insoluble resin dispersed in its aqueous phase:

Example IV

A vehicle concentrate is prepared by emulsifying:

Emulsion copolymer dispersion of Example 4	25.0
Water	7.5

into:

50% solution in xylene of a phenolated 41% soya bean oil-modified phthalic-glyceride alkyd (e. g., Beckasol P27)	67.5

This vehicle concentrate can then be cut by the addition of further solvent and water in the proportions necessary to give a printing or a dyeing vehicle or clear having the desired consistency:

Example V

Solvent is added to this vehicle concentrate and water is emulsified thereinto in the following proportions to produce a printing vehicle:

Vehicle concentrate of Example IV	5
Mineral spirits	20
Water	75

A typical color concentrate that can be cut by such printing vehicle is illustrated by the following example:

EXAMPLE 6

A pigment dispersion is prepared by flushing:

20% aqueous paste of copper phthalocyanine green	60

into

Highly aromatic solvent naphtha having a boiling range of 310 to 365° F.	15

The water is separated, and a pigment binder and additional solvent are admixed with the pigment dispersion to reduce the pigment concentration to 20%:

Pigment dispersion (water-free)	45
Solvent naphtha (as above)	35
Hydrophobic melamine-formaldehyde resin solution of Example 1	20

The resulting lacquer is emulsified with an elastomer latex to produce a color concentrate containing 15% pigment:

Pigmented lacquer	75
Emulsion copolymer dispersion of Example 4	25

A printing paste can be prepared by cutting the color concentrate of Example 6 with the vehicle or clear of Example V:

EXAMPLE C

A printing paste giving a medium shade is prepared by cutting such color concentrate with such printing vehicle in the following proportions:

Color concentrate of Example 6	1
Printing vehicle of Example V	10

A textile such as cotton printed with this paste is remarkably free from wet crocking, has a soft hand and presents an evenly colored appearance.

I claim:

1. A textile decorating composition comprising a continuous organic phase containing a volatile organic material consisting essentially of water-immiscible liquid, said organic phase having dispersed therein a water-insoluble pigment color, water, and a water-insoluble, linear, rubber-like diolefin polymer which is dispersed in said water and is substantially insoluble in said organic liquid and is adapted to reduce removal of said pigment, through rubbing, from cloth decorated with the composition.

2. A textile decorating composition comprising a continuous organic phase consisting essentially of a volatile water-immiscible organic solvent solution of a thermosetting resin, having dispersed therein a water-insoluble pigment color, water, and a water-insoluble, linear, rubber-like diolefin polymer which is dispersed in said water and is substantially insoluble in the organic solvent and is adapted to reduce removal of said pigment, through rubbing, from cloth decorated with the composition.

3. A textile decorating composition comprising a continuous organic phase containing a volatile organic material consisting essentially of water-immiscible liquid and a dispersed water-insoluble pigment color, and a dispersed aqueous phase containing a water-insoluble, linear, rubber-like diolefin polymer which is substantially insoluble in said organic liquid, and is adapted to reduce removal of said pigment, through rubbing, from cloth decorated with the composition.

4. A textile decorating composition comprising a continuous organic phase consisting essentially of a volatile water-immiscible organic solvent solution of a thermosetting resin and a dispersed water-insoluble pigment color, and a dispersed aqueous phase containing a water-insoluble, linear, rubber-like diolefin polymer which is substantially insoluble in said organic solvent and is adapted to reduce removal of said pigment, through rubbing, from cloth decorated with the composition.

5. A textile decorating composition comprising a continuous organic phase consisting essentially of a volatile water-immiscible organic solvent solution of a thermosetting resin and dispersed water-insoluble pigment color, and a dispersed aqueous phase containing a water-insoluble, linear, rubber-like butadiene-acrylonitrile copolymer which is substantially insoluble in said organic solvent and is adapted to reduce removal of said pigment, through rubbing, from cloth decorated with the composition.

6. A textile decorating composition comprising a continuous organic phase consisting essentially of a volatile, water-immiscible organic solvent solution of a thermosetting resin and a dispersed water-insoluble pigment color, and a dispersed aqueous phase containing a water-insoluble, line-

ar, rubber-like butadiene-acrylonitrile copolymer which is substantially insoluble in said organic solvent and is adapted to reduce the removal of said pigment, through rubbing, from cloth decorated with the composition, and wherein the ratio of said copolymer to pigment is 0.25:1 to 100:1 by wegiht.

7. A textile decorating fabric having thereon the dried product of claim 1.

8. A textile fabric having thereon the dried product of claim 5.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
2,383,937	Kienle et al.	Sept. 4, 1945

FOREIGN PATENTS

Number	Country	Date
349,903	Great Britain	May 27, 1931
349,988	Great Britain	May. 27, 1931