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METHOD OF COLORING AND DECORATING TEXTILES

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3 Claims. (Cl. 117—15)

This invention relates to the coloring of textiles, and has particular reference to a new and improved combined dyeing and printing method for fabrics.

Many textile fabrics are decorated by first dyeing the fabric, and then printing over the dyed fabrics, either with or without a discharge agent, or by dyeing a printed fabric. In order to prevent bleeding of the colors into one another, it has always been necessary to completely set the first color chemically, and thereafter to perform the second operation, and set the second color separately. As a result, such fabrics are necessarily much more expensive than fabrics printed on undyed cloth.

I have discovered that dyeing and printing operations on textile fabrics may be carried out in one continuous operation without intermediate drying, by printing the fabric with a pigmented lacquer and pigment-dyeing the fabric with a pigmented lacquer-in-water emulsion.

The pigmented lacquer may be an ordinary printing lacquer, but is preferably a water-in-lacquer emulsion paste of a type recently developed, consisting of a pigmented lacquer thickened to printing consistency by the emulsification of at least 20% of water therein, and containing as a preferred binder a heat-convertible synthetic resin, such as certain types of phenolic resins, short-oil alkyd resins, and urea-formaldehyde resins. I prefer to use these pastes because of the superior printing obtainable with them, and the softness of feel obtainable as compared with ordinary lacquer prints.

The lacquer-in-water emulsions used are preferably of low non-volatile content; if it is desired to maintain a soft hand in the fabric, about 2½% of binder content should not be exceeded. The binders are likewise preferably heat-convertible synthetic resins, since as with the printing pastes, these binders give best resistance to washing and abrasion.

The fabric may be dyed first and then printed; but since difficulties are sometimes encountered when printing on wet cloth, the printing is preferably done first, and the wet print is then passed into the dyeing solution. The fabric is then dried, if desired, at a sufficiently high temperature to set the heat-convertible resin.

The overall coloring may be done by passing the cloth through a bath of the color, removing the excess; or it may be applied by an etched intaglio roller in amount sufficient to impregnate the fabric, on the print machine. This latter method can be used to control migration of color on drying, as disclosed in my co-pending application, Serial No. 351,204, filed August 3, 1940, provided the roller is etched so as to deposit no more than 50% of emulsion, based on the weight of the cloth.

Typical printing pastes which may be used include the following:

EXAMPLE 1

10 parts by weight of hydrophobe urea formaldehyde resin solution (50% resin, 30% butanol, 20% xylol)
15 parts by weight alkyd resin (mixed ester of glycerol, phthalic anhydride and soya bean oil fatty acid corresponding to 25% glycerol phthalate and 75% soya bean oil)
17 parts by weight turpentine substitute (petroleum hydrocarbon)

are stirred together to form the lacquer phase.

10 parts by weight copper phthalocyanine blue pulp (20% pigment, 80% water)

are let down with

48 parts by weight water

and stirred into the lacquer phase in a turbo mixer at a relatively high speed, and the mix is then passed through a colloid mill or homogenizer.

EXAMPLE 2

A lacquer phase of

4.5 parts by weight dewaxed damar gum
3.5 parts by weight xylol
19.0 parts by weight kerosene

and a water phase of

7.5 parts by weight barium lithol toner pulp (20% pigment, 80% water)

let down with

65.6 parts by weight water

are mixed as described above, to produce a textile printing paste containing only 6% binder and pigment which has the desired consistency of soft cold cream.

Typical coloring emulsions which may be used include the following:

EXAMPLE 3

Clear emulsion

5.0 parts by weight solvent-soluble urea-formaldehyde resin solution (50% resin, 30% butanol, 20% xylene)
15.0 parts by weight alkyl resin solution (50% resin, 50% pine oil)
2.5 parts by weight pine oil
27.5 parts by weight Solvesso #2 (hydrogenated petroleum naphtha—boiling range 135–177° C.)

are emulsified by adding slowly, while stirring, to

2.5 parts by weight sodium lauryl sulfate
47.5 parts by weight water

to produce a stable emulsion containing 10% resin solids. The alkyd resin is a 33% soya oil

modified glycerol phthalate, acid number about 5.0.

EXAMPLE 4

Yellow emulsion

6.5 parts by weight of a 20% aqueous pulp of yellow pigment, prepared by diazotizing dichlorbenzidine, and coupling with acetoacetanilide
.25 part by weight of a 35% aqueous solution of sulfonated tannin

are stirred together on a high speed mixer, and added to a mixture of

8.5 parts by weight alkyd resin solution of Example 3
10.0 parts by weight pine oil

The resultant water-in-lacquer emulsion is diluted with

48.0 parts by weight Solvesso #2

and added slowly, on a high speed mixer, to a solution of

2.0 parts by weight sodium lauryl sulfate
24.75 parts by weight water

The emulsion inverts as it enters the water, producing a stable lacquer-in-water emulsion having 1.3% pigment solids, and 5.5% resin solids. This is preferably mixed with four parts of water and one part of the clear emulsion of Example 3, before using. The resultant dyeing solution then carries a maximum of .21% pigment and 2.6% resin solids.

When used in normal fashion, this emulsion migrates badly on drying. When applied by an intaglio plate or roll coating method, so that from 40 to 50% of the cloth weight is absorbed, uniform non-migrating dyeings are obtained.

EXAMPLE 5

Azo Blue

5.5 parts by weight 20% aqueous pulp of blue pigment formed by diazotizing dianisidine, and coupling it with the sodium salt of the ortho toluidide of beta oxy naphthoic acid (Naphthol ASD)
0.5 part by weight triethanolamine
0.25 part by weight oleic acid

are stirred together, and added to

6.25 parts by weight alkyd resin solution of Example 3
10.00 parts by weight pine oil

The water-in-lacquer emulsion is diluted with

50.5 parts by weight Solvesso #2

and the emulsion is inverted by pouring it, with stirring, into a solution of

2.0 parts by weight sodium lauryl sulfate

in

25.0 parts by weight water

This lacquer-in-water emulsion contains 1.1 pigment solids and 4.1 resin solids. On minimum dilution with 4 parts of water and 1 part of clear, the pigment solids of the dyebath is 1.8, and the resin solids 2.3%. Like Example 4, it produces a migrating color by ordinary means, but a satisfactory job when applied by gravure methods.

Migration may also be controlled with these solutions in other ways, as by impregnation of the cloth with an electrolyte to break the emulsion.

The examples may be multiplied indefinitely, without departing from the scope of my invention. As indicated, substantially any lacquer binder may be used, including natural and synthetic resins, rubber and rubber derivatives, cellulose esters and ethers, etc.; and the printing paste need not be emulsified. The use of a lacquer-in-water emulsion for overall coloring, in conjunction with a lacquer printing paste, is what makes the continuous process possible.

I claim:

1. The method of continuously decorating fabric which comprises coloring it overall with a pigmented lacquer-in-water emulsion and printing it locally with a pigmented lacquer without drying between operations, and thereafter drying the cloth whereby a combination overall dyeing and local decorative effect is obtained in a continuous operation.

2. The method of continuously decorating fabric which comprises printing it locally with a pigmented lacquer, then immediately coloring it overall with a pigmented lacquer-in-water emulsion, and then drying the cloth whereby a combination overall dyeing and local decorative effect is obtained in a continuous operation.

3. The method of claim 2, in which the printing lacquer has water emulsified therein.

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