

UNITED STATES PATENT OFFICE

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DISCHARGE PRINTING AND FABRIC PRODUCED THEREBY

No Drawing.

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This invention relates to method of producing differential color effects on fabrics, and particularly fabrics containing organic derivatives of cellulose, by discharge printing with an oxidizing agent.

An object of our invention is to produce discharge prints on fabrics containing organic derivatives of cellulose, and particularly those fabrics which have been colored with dyestuffs that cannot be discharged by the ordinary methods now employed.

A further object of our invention is to discharge print fabrics by means of chromate or dichromate in the presence of an acid. Further objects of our invention will appear from the following detailed description.

The production of designs on colored backgrounds, on fabrics containing organic derivatives of cellulose, particularly cellulose acetate, has heretofore offered serious difficulties, since many of the dyes that color such fabrics cannot be discharged by the ordinary discharge methods that employ reducing agents such as hydrosulphites, formaldehyde-sulphoxylates etc. We have found that many of such dyestuffs may be discharged by the employment of a chromate or dichromate in the presence of an acid.

In accordance with our invention, we discharge print fabrics, and particularly fabrics containing yarns of organic derivatives of cellulose, which have been dyed with a suitable dye, whose color can be discharged by a dichromate or chromate in the presence of an acid. The paste that we employ for discharge printing contains a chromate or dichromate, and in order to effect the discharge of the color, a substance containing an acid is applied to the fabric either before or after the application of the printing paste containing the dichromate or chromate.

While any fabric may be treated in accordance with our invention, it is particularly applicable to the treatment of fabric containing yarns of organic derivatives of cellulose, such as organic esters of cellulose and cellulose ethers. Examples of such organic esters of cellulose are cellulose acetate, cel-

lulose formate, cellulose propionate and cellulose butyrate, while examples of cellulose ethers are ethyl cellulose, methyl cellulose and benzyl cellulose. The fabric may consist wholly of yarns containing one or more organic derivatives of cellulose, or it may be a mixed fabric containing yarns of organic derivatives of cellulose and yarns of other fibres. Examples of such mixed fabrics are mixed cellulose acetate and reconstituted cellulose, mixed cellulose acetate and cotton and mixed cellulose acetate and wool.

The fabric to be treated with the discharge paste is previously dyed or colored with any suitable dye whose color may be discharged by the oxidizing action of the chromate or dichromate in the presence of an acid. When the fabric contains yarns of organic derivatives of cellulose, it is preferably dyed with dyes that are normally insoluble in water, but which are dispersed or solubilized by a dispersing agent such as a sulpho fatty acid, particularly sulpho ricinoleic acid (Turkey red oil). We have found that water insoluble coloring bodies of the anthraquinone series, or alkyl or other nuclear or N-substitution products thereof are particularly amenable to this process. However the fabric may be dyed with other dyestuffs that are dischargeable by oxidation, and such dyestuffs may be of the di- or tri- arylmethane, thiazine, oxazine, azine, azo, xanthene and indigoid series.

The printing paste that is employed for obtaining the discharge prints contains a dichromate or chromate, which is preferably water soluble, such as the chromate of sodium or potassium and the dichromate of sodium or potassium.

In order to effect good discharge, the presence of an acid is necessary. The acid may be employed in the form of a solution which is preferably applied after the application of the discharge paste. However excellent results are also obtained when the acid is applied to the fabric before the application of the discharge paste. Any suitable acid may be used, examples of which are solutions of carboxylic acids such as citric acid, tartaric acid, acetic acid, benzoic acid, or even dilute aqueous solutions of mineral acids such as

hydrochloric acid and sulfuric acid. The acid may be applied to the fabric by padding or in any other suitable manner.

Of the thickening agents that may be employed in making up the paste, it is preferable to employ such agents that are not appreciably affected by the chromates or dichromates. The following are suitable: gum tragacanth, tragasol, British gum or other dextrines, water soluble cellulose ethers, feculose (acetylated starch), agar agar, starches and mineral thickening agents or gelatinous masses, such as those produced by acidifying aqueous solutions of soluble silicates.

If color discharge prints are desired, there may be added to the printing paste, dyestuffs or pigments that are resistant to oxidation. These may be of the pigment type, mineral pigment type, vat dyes of the anthraquinone series which resist the action of oxidizing agents, or other suitable dyestuffs. Examples of such dyestuffs are Methylene blue (Color Index No. 922), Rhodamine 6G Extra (Color Index No. 752), or mineral pigments such as Chrome yellow, Lemon Chrome yellow, Guignet's green and Vermillion. The vat dyestuffs of the anthraquinone series may be incorporated in the discharge paste in the form of esters of leuco compounds, while the mineral pigment colors may be applied in conjunction with albumen or the like.

In order further to illustrate our invention, but without being limited thereto, the following specific example is given.

Example

A fabric consisting wholly of cellulose acetate yarn, which fabric has been dyed blue by an aqueous dispersion of the 1.4 dimethyl diamino anthraquinone in sulpho ricinoleic acid (Turkey red oil) is locally treated by suitable engraved or embossed rolls, plates or blocks with a discharge paste which may be made as follows:

To a solution containing 190 parts of potassium dichromate in 1000 parts of water, sufficient gum tragacanth thickening (30:1) or corn starch thickening is added to make a paste of required consistency.

After printing the fabric with a paste, the fabric has immediately applied thereto by padding or by pin rolls, a solution of oxalic acid or other acid of about 19% concentration, which may or may not have a thickener therein. The fabric is then run over drying drums, and may then be aged for 10 to 15 minutes with steam at 5 lbs. pressure. The fabric may then be given if desired any subsequent finishing treatment, such as scouring, washing, etc. By the use of this process, a fabric having a blue background with a discharge white design is produced.

It is to be understood that the foregoing example is given merely by way of illustration, and that many variations may be made

therein without departing from the spirit of our invention.

Having described our invention, what we desire to secure by Letters Patent is:

1. Method of discharge printing a fabric containing organic derivatives of cellulose, which fabric has applied thereto an anthraquinone dye in the unreduced state, comprising locally applying thereto an oxidizing agent comprising a chromate and an acid.

2. Method of discharge printing a fabric containing cellulose acetate, which fabric has applied thereto an anthraquinone dye in the unreduced state, comprising locally applying thereto an oxidizing agent comprising a chromate and an acid.

3. Method of discharge printing a fabric containing an organic derivative of cellulose, which fabric has applied thereto an anthraquinone dye in the unreduced state, comprising locally applying thereto a chromate and then applying an acid.

4. Method of discharge printing a fabric containing cellulose acetate, which fabric has applied thereto an anthraquinone dye in the unreduced state, comprising locally applying thereto a chromate and then applying an acid.

In testimony whereof, we have hereunto subscribed our names.

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