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TRANSFER OF COLOR DESIGNS TO FIBROUS MATERIALS

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The present invention relates to an improvement relating to the transfer of color designs to fibrous materials and is particularly applicable to textiles and to other fibrous materials such as wood, cardboard and leather.

The present invention provides a method of imbuing in one operation in a fibrous material a design in any number of colors, by causing the design to solve and fuse, and be carried by hot water vapour under pressure, into the fibre of the treated material in such a way that bleeding or flowing or spreading is obviated, and a clean, sharp, outline is obtained.

To this end, a temporary support is coated with a special water soluble and heat fusible preparation as hereinafter described which is used to carry the color design.

The support so prepared is heated and simultaneously subjected to the influence of a stream of hot water vapour, whereby the water soluble, heat fusible matter with which the support is covered, is carried by the vapour into the coloring material, which being also fused by the same source of heat is carried into the fibre of the material under treatment, to form the color design required with a minimum of bleeding, the constituents of the coating and the ink becoming an integral part of the design imbibed by the fibrous material.

The support is preferably flexible and is rendered impermeable to the color design by the preparation coated thereon, which also constitutes the aforesaid water soluble, heat fusible coating.

In one way of carrying the invention into effect, a temporary support of sized paper is used. The sized surface of this support is suitably treated with a compound consisting of a special water soluble, heat fusible material.

In order to facilitate the fusing and solving of the color, the special coloring matter I use is constituted of ordinary good quality lithographic ink admixed with ingredients specially susceptible to the action of heat and water vapour, the combined action of which is to fuse and solve such an ink and drive it into any absorbent, fibrous material upon which it may be pressed. We have found that the softer resins, oleo-resins and resinous gums such as gum mastic, gum elemi and the like, possess these special properties.

The temporary support prepared as above described, and carrying the colored design is preferably dusted with a powdered resin, and is ready for fusing, in for instance, the following manner:—

The coated surface of the support imprinted with any desired design in any desired colors is applied to the surface of the material to be treated, a dampened absorbent material is then laid on the back of the support, and suitable heat and gentle pressure applied; a suitable temperature is 220° F. The support is then taken away, leaving the coloring material imbued and/or forced into the fibre of the material under treatment.

The fusible water solvent compound with which the support is coated is constituted of a fluid mixture, of emulsified or saponified soft resins such as mastic, dammar and the like together with a small amount of ordinary resin with water soluble adhesive gums and the like such as egg or blood albumen, dextrine, starch and the like, the whole of which may be emulsified or more or less saponified with a small quantity of caustic alkali. It has been found that such a product containing the softer resins, oleo-resins and the like, not only provides an impermeable coating to the flexible support, but that it offers a specially susceptible surface for the printing of colored designs by the lithographic or offset process, especially when the inks used in such printing also contain a proportion of such soft resins, oleo-resins and

the like and in particular the coating product substantially prevents "bleeding" of the transferred design, so realizing sharply defined outlines. Such a fusible, water soluble compound is applied to the flexible support at ordinary room temperature by means of the usual coating methods.

By way of example the following coating composition gives satisfactory results:—

Albumen	150 grams.
Gum mastic	250 grams.
Dextrine	1000 grams.
Starch	300 grams.
Water	2000 c. c.
Resin	250 grams.
Caustic soda	40 grams.

The process is carried out as follows:— The temporary support coated after the manner of photographic paper with such fusible and soluble compound and allowed to dry, is printed with the desired design from a lithographic plate or roller, ordinary lithographic color being well suited for the purpose of the present invention. The print so obtained is placed dry, and face down on the fibrous material to be treated. The damp medium, which may be a suitably dampened sheet of felt, is placed on top of the print, and a suitably heated metal surface is applied. An intimate contact is established between the damp medium and the hot surface such that during the duration of the operation, usually about one second, the steam generated should not be able to escape except through the pores of the support into the fibrous material. The steam fuses and solves the preparation on the support and causes such preparation to fuse and to solve and mix with the color, and to carry the whole fused, soluble material into the fibre, thereby producing practically instantaneously the printed design, which comes out perfectly dry, and with good sharp definition.

In operation, the hot vapour under pressure melts the first layer of fusible soluble matter with which the support has been treated by first penetrating through the pores of the support. The vapour carries the fused compound into the ink and rendering this easily fusible and soluble and melts it and mixes therewith to make a coloring mixture suited to penetrate fibrous material.

The vapour carries this compound under pressure into the fibre to a comparatively substantial depth.

The vapour when released quickly drys the coloring matter, so realizing a quick drying process.

In applying the pressure to the back of the dampened absorbent material such as felt vapour-tight contact should be made by a metal surface so disposed as to constrain the vapour produced by the heat to take the path of least resistance, which is through the support into the fibrous material.

A suitable form of press suited to direct the path of the vapour is one in which a marginally grooved support receives the article to be imprinted within the inner limits of the marginal groove and upon which the transfer and moistened felt are laid in the order stated and over the whole of which is gently pressed a suitably heated hot plate which has a tongue to fit the groove and to nip therein the transfer, thereby stretching the transfer and sealing the whole so that the vapour is forced into the fibres.

In order to facilitate the melting of ordinary lithographic color and its fusing and mixing with the water vapour and thus be driven deeply into the fibrous material on which it is ultimately to be employed, it preferably is mixed with a soft resin, oleoresin or the like, such as mastic, dammar, or elemi gums, to which may be added various fatty or waxy materials such as carnuba wax, vegetable tallow, cocoa butter, Borneo tallow, palm nut oil, or similar fats, a suitable solvent being used to incorporate the whole.

A suitable composition is constituted as follows:—

19 ozs. carnuba wax.
3 ozs. Borneo tallow.
30 ozs. gum elemi.
Half-gallon benzol. (Commercial.)

An example of lithographic color appropriately treated is as follows:—

¾ ordinary unthinned litho ink.
¼ mixture as given in the previous paragraph.

By the present invention, the colors are not simply or superficially transferred from one surface to another as in ordinary transfer processes, but they are heat fused and more or less water emulsified and therefore are forced deeply into the fibre by reason of their particular fluid property.

What I claim is:—

1. The method of transferring color designs to fibrous materials by production of the design in printing ink or the like on a temporary support, conveniently a flexible support, which is coated with a preparation which is fusible and soluble under the combined influence of heat and aqueous vapour and is emulsive with the printing ink or the like; followed by transfer of the design to the fibrous material by the action of hot water vapour under pressure which produces an emulsion of the coating and the ink and forces such emulsion deeply into the fibrous material.

2. The method of transferring color designs to fibrous materials by production of the design in printing ink or the like on a temporary support, conveniently a flexible support, which is coated with a preparation

which is fusible and soluble under the combined influence of heat and aqueous vapour and is emulsive with the printing ink or the like; followed by transfer of the design to the fibrous material by the action of sealed hot water vapour under substantial pressure which produces an emulsion of the coating and the ink and forces such emulsion deeply into the fibrous material.

3. The method of transferring color designs to fibrous materials by production of the design in a printing ink preparation on a temporary support, conveniently a flexible support, which is coated with a preparation which is fusible and soluble under the combined influence of heat and aqueous vapour and which is emulsive with the printing ink preparation said ink preparation being of a composition which has the property of readily forming an emulsion with the coating and hot water vapour followed by transfer of the design to the fibrous material by the action of hot water vapour under pressure which produces an emulsion of the coating and the ink and forces such emulsion deeply into the fibrous material.

4. A transfer for applying designs to fibrous material consisting of a temporary support carrying a heat fusible color design imprinted on a coating which is heat fusible, water soluble and impermeable to and when fused, is miscible and emulsive with the color or ink used in the design said coating being capable when fused in contact with the fibrous material to which it is to be applied of forming an emulsion with the ink and of being deeply carried into the fibres of the material by hot water vapour under pressure so as to form an integral part of the design in the fibrous material.

5. A transfer for applying designs to fibrous materials according to claim 4, in which the coated temporary support carrying the imprinted design is dusted with a powdered resin.

In testimony whereof, I affix my signature.

SAMUEL JAMES COX.