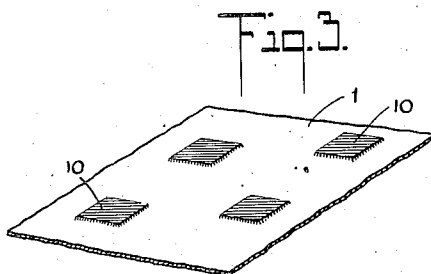
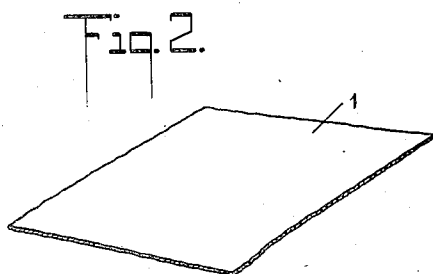
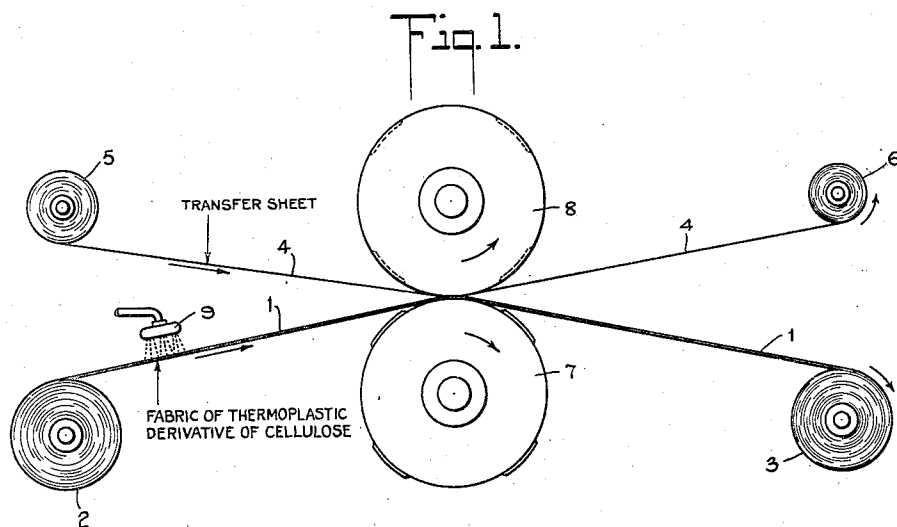


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PROCESS OF PRINTING AND EMBOSSING MATERIALS CONTAINING
THERMOPLASTIC DERIVATIVES OF CELLULOSE
Filed July 11, 1927



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PROCESS OF PRINTING AND EMBOSSEING MATERIALS CONTAINING THERMOPLASTIC DERIVATIVES OF CELLULOSE

Application filed July 11, 1927. Serial No. 205,044.

This invention relates to a new and improved method of printing and embossing materials containing thermoplastic derivatives of cellulose, such as cellulose esters and/or ethers either alone or in admixture with silk, wool, cotton etc. The term printing as used in the specification and claims is to be considered as including within its scope dyeing, printing, stencilling etc.

10 An object of this invention is to simultaneously emboss and print fabrics. Another object of this invention is to effect such printing without the application of gums, pastes, thickeners etc., to the fabric to be printed.

15 Still another object is to print the fabric in such a manner that the embossings will coincide with the printed design thereby accentuating both the color effect and the embossed design. Another object of this invention is to combine a novel method of printing fabrics with a novel method of embossing said fabrics so as to perform both operations at the same time. Other objects will appear from the specification and claims.

25 Processes for printing fabrics containing thermoplastic derivatives of cellulose are well known but these processes necessitate the application of gums, pastes, thickeners etc., to the fabric in order that the latter may be properly printed. Also processes for embossing fabrics are known but these do not yield embossings which are permanent against washing, dry cleaning, etc.

35 The applicant has discovered a new and improved method for printing and permanently embossing, in one operation, fabrics containing thermoplastic derivatives of cellulose such as cellulose acetate, ethyl cellulose, etc. The applicant's discovery results not only in a great saving of time, labor and expense but also in a very much improved product because of the fact that the printing and embossing which result from this process serve to accentuate each other.

45 The applicant's discovery consists in combining into one operation the novel method of embossing fabrics containing thermoplastic derivatives of cellulose described in his U. S. patent application serial No. 167,876, filed February 12, 1927, and the new method

for printing such fabrics by means of a transfer medium as described in his patent application serial No. 202,746, filed June 30, 1927. The two processes above referred to are somewhat modified when combined as in the present process.

As instances of modes of preparing the transfer medium, the following may be given. The dye or dyes with which it is desirable to print the fabric are dissolved in any suitable volatile solvent or diluent, or made into a paste and sprayed or otherwise applied to a transfer medium which may consist of paper, fabric, flexible metal, etc. The transfer medium will thus be impregnated or coated with the dye or dyes, serving merely as a carrying means for the dye. After the solution of the dye or dyes is sprayed or otherwise applied to the transfer medium, the solvent is allowed to evaporate, leaving the dye or dyes either as such or in paste form upon the transfer medium. The dye or dyes selected should be such that they have an affinity or are capable of coloring the particular fabric which is to be printed. Preferably the base for the transfer medium is made of a material that behaves in a different manner towards the dye used than does the fabric to be treated. Where different colors are to be applied, a transfer medium for each color may be utilized or different portions of the transfer medium may have different colored dyes applied thereto.

The fabric which is to be printed and embossed is first wetted with a liquid containing a softening agent for the cellulose derivative present and a solvent for the dyestuff to be employed as a coloring agent. A transfer medium or sheet containing the necessary dye or dyes is prepared in the manner set out in application No. 202,746 above referred to. The fabric may be wetted by spraying the same with the liquid or by passing the fabric through a bath containing the liquid or in any other suitable manner. The excess liquid is removed from the fabric in any desired manner, such as by passing the fabric through rolls, by partial evaporation of the liquid etc.

Where necessary or desirable the liquid which is used for wetting the fabric prepara-

tory to subjecting the fabric to the embossing operation may contain one substance which will act as a softening agent for the cellulose derivative and a second substance which will serve as a solvent for the dyestuff upon the transfer medium. However, where possible it is advisable to select a substance which will act both as a softening agent for the cellulose derivative and as a solvent for the dyestuff. Thus, for example, in the treatment of fabrics containing cellulose acetate, excellent results have been obtained by utilizing an aqueous solution of acetone as a wetting medium, the acetone serving to dissolve the dyestuff and also to act as a softening agent for the cellulose acetate.

The fabric, after the excess liquid has been removed, together with the transfer medium containing the dye or dyes appropriately distributed thereon are then simultaneously subjected to the usual embossing operations. Thus they may be passed through a set of rolls at least one of which contains a design engraved thereon. The fabric and transfer medium, as they pass through the rolls, are subjected to pressure and where desirable the rolls may also be maintained at elevated temperatures. Excellent results are obtained where the rolls are thus heated.

While passing through the rolls the fabric is not only permanently embossed but those portions of the fabric which have been embossed absorb dye from the transfer medium and are correspondingly colored. Those portions of the fabric which come in contact with the unengraved portions of the rolls do not absorb any of the dyestuff from the transfer medium due to the fact that they are not subjected to as great pressure as are those portions which contact with the engraved portions. This coloring of only the embossed portions of the fabric serves to afford a greater contrast than usual between such embossed portions of the fabric and unembossed portions of the fabric. Different portions of the design can of course be differently colored by applying appropriate dyestuffs to different portions of the transfer medium.

A fabric comprising cellulose acetate both in the warp and the filling was sprayed with a 25% aqueous solution of acetone and the excess liquid removed from the fabric in any suitable manner. A real silk fabric was then coated with 1-4 di (monoethylamino)-anthraquinone for use as a transfer medium. The acetone moistened cellulose fabric together with the silk fabric containing the dye were then superimposed and simultaneously passed through embossing rolls, at least one of which has engraved thereon the desired design. Other embossing devices for example, a die and stamp, can be employed instead of the rolls above referred to in order to effect the embossing of the fabric. In order to secure excellent results at least one of the

rolls or other embossing devices used may be maintained at a temperature of about 50 to 60° C.

The cellulose acetate fabric treated above was found to be very effectively and beautifully embossed. Only those portions of the fabric which had been subjected to the high pressure incident to the embossing of the same were colored by the dyestuff on the transfer medium. The embossed and partially dyed fabric upon being washed with soap showed no bad effects upon either the embossed design or upon the dye. This indicates that the dyestuff is not merely superficially deposited upon the cellulose acetate but is actually combined with the cellulose acetate as in the ordinary dyeing of cellulose acetate.

Further to clarify the description of this application, reference is had to the accompanying drawing showing one form of carrying out my invention.

In the drawings:—

Figure 1 is a diagrammatic view of an apparatus to carry out the process,

Figure 2 is a perspective view of a piece of fabric as it appears prior to treatment, and

Figure 3 is a perspective view of the fabric as it appears after having been subjected to the process.

Referring to Figure 1, the fabric 1 containing yarn of thermoplastic derivatives of cellulose, such as cellulose acetate, is passed from the roll 2 to the roll 3. During its passage, the transfer sheet 4 having dyestuff thereon is superposed on the fabric 1, and this transfer sheet is passed from the roll 5 to the roll 6. In their passage, the fabric 1 and transfer sheet 4 pass between the embossing rolls 7 or 8, one or both of which are heated by suitable means such as by steam that is injected into the interior of the rolls. In order to obtain the simultaneous embossing and printing, the roll 7 preferably has a design thereon in relief, while the roll 8 has a design intaglio, thus forming male and female embossing members.

In Figure 3, the fabric 1 is shown having the design 10 thereon, which design is both colored and embossed, thus standing out in relief.

The above illustration is of course not to be considered as limitative. Any other suitable softening agent can be substituted for the acetone solution employed, but it must also be one which will act as a suitable carrier to bring the cellulose acetate and the dyestuff into intimate contact in order to effect the proper dyeing of the cellulose acetate. Other thermoplastic derivatives of cellulose can be employed in the place of the cellulose acetate and in like manner other dyestuffs can replace the dyestuff employed above. The only requirements with reference to the dyestuff employed is that it must be a dye which has

an affinity for the particular fabric being treated and that it be soluble, at least to some extent, in the softening agent which is utilized in the process.

5 Having described my invention what I claim and desire to secure by Letters Patent is:—

10 1. A process of simultaneously embossing and printing fabrics containing thermoplastic derivatives of cellulose which comprises transferring a dyestuff from a transfer sheet to a fabric containing such cellulose derivatives and simultaneously imparting a design in relief to the fabric.

15 2. A process of simultaneously embossing and printing fabrics containing thermoplastic derivatives of cellulose which comprises transferring a dyestuff from a transfer sheet to a fabric containing such cellulose derivatives and simultaneously subjecting the fabric to pressure between embossing rolls, whereby a design in relief is imparted to the fabric.

25 3. A process of simultaneously embossing and coloring fabrics containing thermoplastic derivatives of cellulose which comprises transferring a dyestuff from a transfer sheet to a fabric containing such cellulose derivatives and simultaneously subjecting the fabric to pressure between heated embossing rolls, whereby a design in relief is imparted to the fabric.

30 4. A process of simultaneously embossing and coloring fabrics containing thermoplastic derivatives of cellulose which comprises wetting the fabric with a liquid which acts as a softening agent for the thermoplastic derivative of cellulose and a solvent for the dyestuff to be utilized, simultaneously contacting, under heat and pressure, said wetted fabric with a transfer sheet containing the dye to be applied and an embossing device containing the desired design.

35 5. A process of simultaneously embossing and printing fabrics containing thermoplastic derivatives of cellulose which comprises wetting the fabric with a liquid which acts as a softening agent for the cellulose derivative to be treated and a solvent for the dyestuff to be utilized, subjecting the fabric to pressure between rolls, at least one of which has a design engraved thereon, and simultaneously contacting predetermined portions of the fabric with a transfer sheet containing a dye capable of dyeing the cellulose derivative, whereby only said portions of the fabric are dyed.

40 6. A process of simultaneously embossing and printing fabrics containing thermoplastic derivatives of cellulose which comprises wetting the fabric with a liquid which acts as a softening agent for the cellulose derivative to be treated and a solvent for the dyestuff to be utilized, subjecting the fabric to pressure between heated rolls, at least one of

which has a design engraved thereon, and simultaneously contact predetermined portions of the fabric with a transfer sheet containing a dye capable of dyeing the cellulose derivative, whereby only said portions of the fabric are dyed. 70

7. A process of simultaneously embossing and printing fabrics containing thermoplastic derivatives of cellulose which comprises wetting the fabric with a liquid which acts as a softening agent for the cellulose derivative and a solvent for the dyestuff to be utilized, subjecting the fabric to heat and pressure between rolls, at least one of which has a design engraved thereon, passing a transfer medium containing the dye to be applied through the rolls simultaneously with the fabric. 75

8. A process of simultaneously embossing and coloring fabrics containing organic derivatives of cellulose which comprises transferring a dyestuff from a transfer sheet to a fabric containing such derivatives of cellulose and simultaneously subjecting the fabric to an embossing operation which produces a design in relief. 80

9. A process of simultaneously embossing and coloring fabrics containing organic derivatives of cellulose which comprises transferring a dyestuff from a transfer sheet to a fabric containing such derivatives of cellulose and simultaneously subjecting the fabric to pressure between embossing rolls, which produces a design in relief. 85

10. A process of simultaneously embossing and printing fabrics containing organic derivatives of cellulose which comprises wetting the fabric with a liquid which acts as a softening agent for the cellulose derivative and a solvent for the dyestuff to be utilized, subjecting the fabric to heat and pressure between rolls, at least one of which has a design engraved thereon, passing a transfer medium containing the dye to be applied through the rolls simultaneously with the fabric. 90

11. A process of simultaneously embossing and printing fabrics containing cellulose acetate which comprises transferring a dyestuff from a transfer sheet to a fabric containing cellulose acetate and simultaneously subjecting the fabric to an embossing operation which produces a design in relief. 95

12. A process of simultaneously embossing and coloring fabrics containing cellulose acetate which comprises wetting the fabric with a liquid which acts as a softening agent for the cellulose acetate and a solvent for the dyestuff to be utilized, simultaneously contacting, under heat and pressure, said wetted fabric with a transfer sheet containing the dye to be applied and an embossing device containing the desired design. 100

13. A process of simultaneously embossing and printing fabrics containing cellulose 105

- acetate which comprises wetting the fabric with a liquid which acts as a softening agent for the cellulose acetate and a solvent for the dyestuff to be utilized, subjecting the fabric to heat and pressure between rolls, at least one of which has a design engraved thereon, passing a transfer medium containing the dye to be applied through the rolls simultaneously with the fabric.
- 10 14. A process of simultaneously embossing and coloring fabrics containing thermoplastic derivatives of cellulose which comprises wetting the fabric with an aqueous solution of acetone, simultaneously contacting, under heat and pressure, said wetted fabric with a transfer sheet containing the dyestuff to be applied and an embossing device containing the desired design.
- 15 15. A process of simultaneously embossing and printing fabrics containing a thermoplastic derivative of cellulose which comprises wetting the fabric with an aqueous solution of acetone, subjecting the fabric to heat and pressure between rolls, at least one of which has a design engraved thereon, passing a transfer medium containing the dyestuff to be applied through the rolls simultaneously with the fabric.
- 20 16. A process of simultaneously embossing and coloring fabrics containing cellulose acetate which comprises wetting the fabric with an aqueous solution of acetone, simultaneously contacting, under heat and pressure, said wetted fabric with a transfer sheet containing the dyestuff to be applied and an embossing device containing the desired design.
- 25 17. A process of simultaneously embossing and printing fabrics containing cellulose acetate which comprises wetting the fabric with an aqueous solution of acetone, subjecting the fabric to heat and pressure between rolls, at least one of which has a design engraved thereon, passing a transfer medium containing the dyestuff to be applied through the rolls simultaneously with the fabric.
- 30 18. A process of simultaneously embossing and printing fabrics containing cellulose acetate which comprises wetting the fabric with an aqueous 25% solution of acetone, subjecting the fabric to heat and pressure between rolls, at least one of which has a design engraved thereon, passing a transfer medium containing the dyestuff to be applied through the rolls simultaneously with the fabric.
- 35 19. Method of simultaneously embossing and printing fabrics containing cellulose acetate which comprises wetting the fabric with a liquid that is capable of softening said cellulose acetate and also of at least partially dissolving the dyestuff to be used, and then contacting said fabric with a transfer sheet by means of an embossing device.
- 40 20. Method of simultaneously embossing and printing fabrics containing cellulose acetate which comprises wetting the fabric with a liquid containing acetone and then contacting said fabric with a transfer sheet by means of a heated embossing device under pressure.
- 45 21. Method of simultaneously embossing and printing fabrics containing cellulose acetate which comprises wetting the fabric with a liquid containing acetone and then contacting said fabric with a transfer sheet by means of an embossing device.
- 50 In testimony whereof, he has hereunto subscribed his name.
- 55 CAMILLE DREYFUS.
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