May 12, 1931. C. DREYFUS 1,804,529

ORNAMENTAL FABRIC CONTAINING DERIVATIVES OF CELLULOSE AND METHOD OF PRODUCING THE SAME

Filed Dec. 16, 1927

Fig. 1

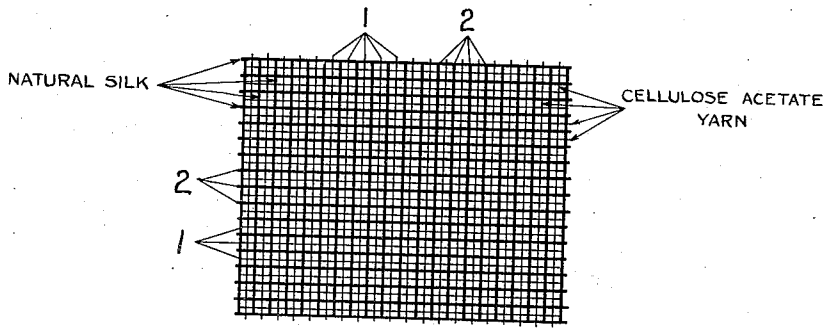


Fig. 2

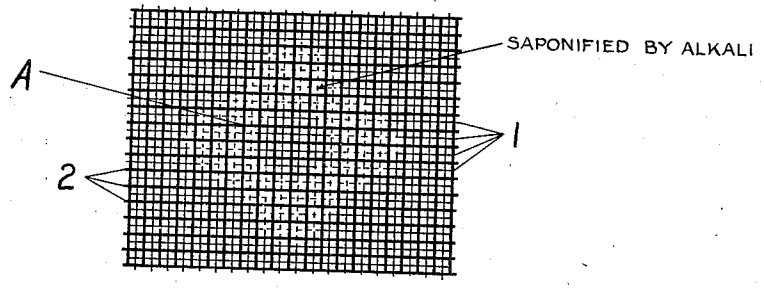
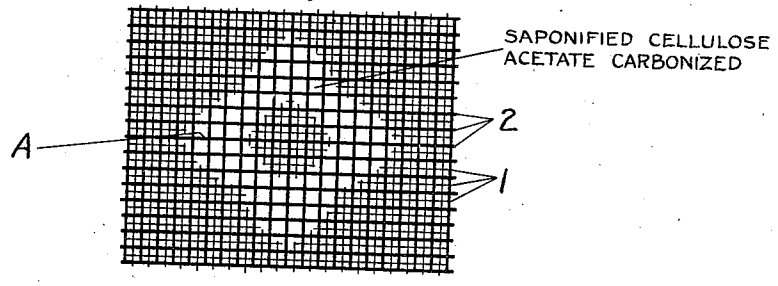


Fig. 3



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UNITED STATES PATENT OFFICE

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ORNAMENTAL FABRIC CONTAINING DERIVATIVES OF CELLULOSE AND METHOD OF PRODUCING THE SAME

Application filed December 16, 1927. Serial No. 240,616.

This invention relates to a method of obtaining ornamental effects on fabrics containing organic substitution derivatives of cellulose by converting the cellulose derivative to cellulose locally, and then removing the converted cellulose.

An object of my invention is to produce patterns on fabrics containing organic substitution derivatives of cellulose by printing the same with a paste containing material of such alkalinity that it saponifies the organic derivative of cellulose to cellulose, and then removing said cellulose. Other objects of my invention will appear from the following detailed description.

In accordance with my invention, a fabric containing yarns of organic substitution derivatives of cellulose is first printed with a paste containing a saponifying agent for the cellulose derivative so that the cellulose derivative is converted into cellulose or a near conversion product of cellulose where the paste has been applied, and then the fabric is given a carbonization treatment, wherein the reconstituted cellulose is destroyed but the original cellulose derivative is unaffected, thus producing many beautiful effects.

The fabric treated may be of any construction, that is it may be a woven, knitted or netted fabric. The fabric may be of ordinary weave or it may be a pile fabric.

The fabric may be made entirely of yarns of organic derivatives of cellulose, in which case the part that has been printed will produce holes in the carbonization process. The fabric may be a mixed fabric containing yarns of organic substitution derivatives of cellulose and other fibres such as cotton, linen, natural silk, wool, etc. Where the other fibres of the fabric are of vegetable nature, holes will be formed in the places where the paste has been applied and likewise the rest of the vegetable fibre will be destroyed in the carbonization process. When the fabric contains yarns of the animal fibres such as wool or silk, these are unaffected by the carbonization process so that the parts printed with the saponifying paste will retain these fibres and thus produce very pleasing effects.

The organic substitution derivative of cellulose used in the fabric may be cellulose esters. Examples of cellulose esters are cellulose acetate, cellulose formate, cellulose propionate and cellulose butyrate. Mixtures of two or more of the above organic substitution derivatives of cellulose may be used.

The saponifying paste may be made in any suitable manner. Such paste may contain the ordinary thickeners used for textile printing pastes such as gum tragacanth or gum arabic, water and an alkaline material such as sodium hydroxide, potassium hydroxide, sodium carbonate, etc.

The paste may be applied to the fabric in any suitable manner such as by means of embossed or engraved rolls or plates or by brushing, spraying, stencilling, etc. The design that is printed may be of any desired configuration.

The carbonization process is carried out in any suitable manner, for instance the fabric is passed through a bath containing an acid such as hydrochloric acid or an acid salt such as aluminum chloride or sodium bisulphate. This bath may be at any desired temperature range from ordinary room temperature to 212° F. After removal of excess solution, the fabric is passed through a carbonizing dryer at an elevated temperature, say from 215 to 250° F., the fabric leaving the chamber bone dry. As a result of this treatment the reconstituted cellulose is destroyed. The fabric may then be given any suitable finishing treatment such as brushing, steaming, dyeing, etc.

Without in any way limiting my invention but merely as illustrative of one mode of carrying out my invention, the following specific example is given.

A woven fabric containing yarns of cellulose acetate and also containing yarns of natural silk both in the warp and in the weft is printed by means of engraved rollers with a saponifying paste containing a substantial amount of caustic soda. After ageing to permit the caustic soda to thor-

oughly saponify, the cellulose acetate fabric is washed in a slightly acid bath to neutralize the alkali and then in hot water to remove the paste. The fabric may be then dried or it may be passed directly to the carbonizing bath. When the carbonizing bath contains aluminum chloride, it is preferably of 6 to 13° Bé. gravity and at a temperature of 90° F. When the bath contains hydrochloric acid a solution of 1 to 2% concentration at a temperature of 120° F. is used. The execss of the solution is then removed by pressing or squeezing the fabric on a jig after which the fabric is hydro-extracted. After hydro-extraction the fabric is passed through a carbonizing dryer at 235° F., the fabric coming out bone dry. The fabric is then passed through a weak alkaline solution, washed and dried. The cellulose acetate that has been saponified is thus removed leaving a beautiful print produced by the removal of the cellulose acetate yarn in the printed design. The fabric is then dyed either in solid color or it may be cross dyed to accentuate the printed effect.

The accompanying drawings illustrate the steps described in the foregoing example. On the drawings

Figure 1 shows a piece of fabric woven with cellulose acetate yarn 1 and natural silk yarn 2 alternating in the warp and weft.

Figure 2 shows an area A of the fabric wherein the saponified paste containing a substantial amount of alkali has been locally applied, whereby that part of the cellulose acetate yarn within the area is saponified.

Figure 3 shows the removal of the saponified cellulose acetate yarn within the area A by carbonization.

It is to be understood that this invention is not limited to the foregoing detailed description but that many variations may be made therein without departing from the spirit of this invention.

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

1. Process of treating fabrics containing organic substitution derivatives of cellulose comprising applying a saponifying material locally to said fabric to convert at least part of said organic substitution derivative of cellulose into a saponification product and then removing said converted cellulose derivative by carbonization.

2. Process of treating fabrics containing cellulose acetate comprising applying a saponifying material locally to said fabric to convert at least part of said cellulose acetate into a saponification product and then removing said converted cellulose acetate by carbonization.

3. Process of treating fabrics containing organic substitution derivatives of cellulose comprising applying a saponifying material locally to said fabric to convert at least part of said organic substitution derivative of cellulose into a saponification product and then removing said converted cellulose derivative by applying a carbonizing solution to said fabric and heating.

4. Process of treating fabrics containing cellulose acetate comprising applying a saponifying material locally to said fabric to convert at least part of said cellulose acetate into a saponification product and then removing said converted cellulose acetate by applying a carbonizing solution to said fabric and heating.

5. Process of treating fabrics containing organic esters of cellulose comprising applying a saponifying material locally to said fabric to convert at least part of said organic substitution derivative of cellulose into a saponification product and then removing said converted cellulose ester by applying an acidic material to said fabric and heating.

6. Process of treating fabrics containing cellulose acetate comprising applying a saponifying material locally to said fabric to convert at least part of said cellulose acetate into a saponification product and then removing said converted cellulose acetate by applying an acidic material to said fabric and heating.

7. Process of treating a mixed fabric containing organic substitution derivatives of cellulose and an animal fibre comprising saponifying at least part of said organic derivative of cellulose to convert the same into a saponification product and then removing said converted cellulose derivative by carbonization.

8. Process of treating a mixed fabric containing cellulose acetate and an animal fibre comprising saponifying at least part of said cellulose acetate to convert the same into a saponification product and then removing said converted cellulose acetate by carbonization.

9. Process of treating a mixed fabric containing organic esters of cellulose and silk comprising saponifying at least part of said organic derivative of cellulose to convert the same into a saponification product and then removing said converted cellulose ester by carbonization.

10. Process of treating a mixed fabric containing cellulose acetate and silk comprising saponifying at least part of said cellulose acetate to convert the same into a saponification product and then removing said converted cellulose acetate by carbonization.

11. Process of treating mixed fabric containing organic substitution derivatives of cellulose and animal fibres comprising print-

ing the same with a paste containing an alkaline material capable of saponifying said organic derivative of cellulose, treating with an acidic solution, removing excess of solution and heating to a temperature of 215 to 250° F., whereby the saponified cellulose derivative is removed.

12. Process of treating a mixed fabric containing cellulose acetate and animal fibres comprising printing the same with a paste containing an alkaline material capable of saponifying said cellulose acetate, treating with an acidic solution, removing excess of solution and heating to a temperature of 215 to 250° F., whereby the saponified cellulose acetate is removed.

13. Process of treating a mixed fabric containing cellulose acetate and silk comprising printing the same with a paste containing an alkaline material capable of saponifying said cellulose acetate, treating with a solution of aluminum chloride, removing excess of the solution and heating to a temperature of 215 to 250° F., whereby the saponified cellulose derivative is removed.

14. Process of treating a mixed fabric containing cellulose acetate and silk comprising printing the same with a paste containing an alkaline material capable of saponifying said cellulose acetate, treating with a solution of aluminum chloride, removing excess of the solution and heating to a temperature of 215 to 250° F. whereby the saponified cellulose derivative is removed and then dyeing the same.

In testimony whereof, I have hereunto subscribed my name.

CAMILLE DREYFUS.