

UNITED STATES PATENT OFFICE

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PRODUCTION OF PATTERN EFFECTS UPON TEXTILE GOODS

No Drawing. Application filed November 11, 1926, Serial No. 147,851, and in Germany March 30, 1926.

This invention relates to the production of pattern effects upon textile goods, and more particularly to a process for the production of pattern effects upon goods made of or containing vegetable fibres, by the action of swelling agents upon the goods, without the necessity of applying such agents by printing with same upon only localized portions of the goods to produce the pattern effects, or of printing upon only localized portions of the goods with a suitable resist composition before subjecting the goods to the swelling agent.

The objects of the invention are to obtain pattern effects in connection with the use of swelling agents in a quick and more economical manner, and to obtain improved color or tone variations in such pattern effects.

The invention consists in the novel features of the method which are herein described according to the preferred manner of carrying out same, and the invention will be more particularly pointed out in the appended claim.

It is known that cotton and other vegetable fabrics may be modified by means of the action of strong alkalis, certain mineral acids and other swelling agents which chemically structurally change one or more natural characteristics of such fabrics, and that advantage may be taken of this modification of such fabrics by swelling agents to produce pattern effects upon the fabrics by localizing the action of the swelling agents on such fabrics to various portions thereof. Many such swelling agents and different processes for producing durable pattern effects upon fabrics by localizing the action of such swelling agents upon the fabrics, are now well known. For example, the following United States Letters Patent disclose various swelling agents and processes that may be used for producing pattern effects.

Patents to Georges Heberlein.—Patent No. 1,141,872, granted June 1, 1915; Patent No. 1,144,655, granted June 29, 1915; Patent No.

1,201,961, granted Oct. 17, 1916; Patent No. 1,288,884, granted Dec. 24, 1918; Patent No. 1,288,885, granted Dec. 24, 1918; Patent No. 1,392,264, granted Sept. 27, 1921; Patent No. 1,392,265, granted Sept. 27, 1921; Patent No. 1,439,513, granted Dec. 19, 1922; Patent No. 1,439,515, granted Dec. 19, 1922; Patent No. 1,439,518, granted Dec. 19, 1922; and Patents to Eduard Heberlein.—Patent No. 1,265,082, granted May 7, 1918; Patent No. 1,439,517, granted Dec. 19, 1922; Patent No. 1,439,519, granted Dec. 19, 1922.

According to these processes as heretofore practiced one may apply the swelling agent to the fabric by printing it directly upon the fabric according to the pattern to be produced, or else one may proceed in a more practical way by printing a resist upon the fabric, and subsequently subjecting the fabric to the swelling agents which will attack the portions not covered by the resist printing.

In my copending application Serial No. 147,850, filed on even date herewith, for production of pattern effects upon textile goods, I have described and claimed a process whereby the resist printing may be replaced by the simpler means of localized pressing of the fabric according to the pattern to be produced, by substantial pressure at elevated temperatures (i. e., of at least 100° C. of the pressure surface), upon such portions of the fabric as are not to be modified or fully modified by the swelling agent, the fabric being subjected to a swelling agent after the localized pressure has been applied. It was found that such portions of the fabric as had been subjected to this pressure at high temperature were either not affected at all by the subsequently applied swelling agent or were not affected to the extent that the unpressed portions were affected, so that by the simple method of first imprinting the pattern upon the fabric under substantial pressure at high temperature and then subjecting the fabric

to the swelling agent, durable pattern effects were produced.

It was found for example, that if a cotton fabric was caused to run under pressure through a goffering calender the imprint cylinder of which is heated to 140° C., there occurred at the pressed spots, in consequence of the effect of the pressure and the heat, such a change in the state of the fabric that the swelling agent or agents which were subsequently applied either did not act on such pressed portions at all, or acted only to a much slighter extent than upon the enlarged or unpressed portions of the fabric, according to the duration of the action of such swelling agents upon the fabric. Thus for example it was found that according to said last invention one could emboss the desired pattern upon the fabric by the heated roller and then subject the fabric to any well known swelling agent for vegetable fibres, such for example as sulphuric acid, phosphoric acid, nitric acid, caustic alkali and other well known swelling agents, which are allowed to act upon the fabric to produce the desired modification of the fabric upon the unpressed portions of the fabric.

According to the present invention the aforementioned resist printing may likewise be replaced by the simpler means of localized pressing of the fabric according to the pattern to be produced, by substantial pressure upon various portions of the fabric, as was done according to the invention of my said copending application, but according to the present invention, instead of effecting the modification of the action of the swelling agent by applying the pressure with heat before the swelling agent has been applied as in said copending application, the pressure is applied at or above said minimum temperature of 100° C., after the swelling agent has acted and has been washed out but before the fabric has been allowed to dry. However, while the pressure must be applied while the fabric is still wet, it can be applied by such heated means as will simultaneously apply the pressure and dry the fabric, so that the fabric, which runs into the pressing means while still wet, may be dried during the pressing operation by the heat of the pressing body. I have found that this pressing of the fabric after the swelling action has taken place and the swelling agent washed out, provided the pressure is applied before drying has taken place, also effects a modification of the fabric in the pressed portions so as to produce pattern effects.

The different characteristics of swelling agents to produce any particular modification of the vegetable fibres, as well as the strengths of such swelling agents, the temperature at which they should be used to produce desired effects, and the duration of the action of such agents upon the fabrics, are

now well known to those skilled in the art and therefore need not be given here in detail. The effects of such swelling agents upon the unpressed portion of various vegetable fibre fabrics according to this invention will be the same as their effect upon fabrics according to known processes for producing all over or pattern effects according to other prior inventions including those disclosed in the patents above mentioned.

This invention contemplates the use of any and all suitable swelling agents in connection with the embossing at ordinary or elevated temperature, depending upon the particular pattern effect desired. The fabric may be subjected to the swelling agents by immersion or otherwise. The relief-like pressing is wholly or partially caused to disappear by a subsequent washing process whereas the patterned effect that has resulted from the difference in the structural changes that have taken place in the unpressed portions of the fabric, as contrasted with the pressed portions, remains to define the pattern effect. The pressing itself may be effected in the customary manner by means which operate on the principle of roller printing or of the flat engraved plate. After the production of the patterned effect all of the customary subsequent or improvement processes, such as bleaching, dyeing, printing, etc., may be applied to the fabric. By dyeing the goods before the pressed condition of the embossed portions of the fabric has been eliminated, there are produced, in consequence of the partially changed condition of the fibres that have been altered at such portions or spots, the well known tone-in-tone effect, i. e., patterns which are formed in different tones of the same color merely by brighter and darker effects of such general color.

The invention may be applied to all fabrics composed of natural vegetable fibres or of artificial fibres containing cellulose such as the artificial silks, or of mixtures of such natural or artificial fibres, or of mixtures of one or both of such fibres with animal fibres. Not only spun yarns but also any arrangement of fibres, and all forms of fabrics knitted, woven and embroidered goods or the like may have this process applied thereto.

It will be understood that when there are present in a fabric, fibres that are not normally susceptible to the swelling agent or agents used, these will not have their characteristic altered in the portions subjected to pressure, from the characteristic of such fibres in the unpressed portions, in the same manner as the vegetable fibres in such pressed portions will have their characteristic altered with respect to such vegetable fibres in the unpressed portions, and this fact will add to the variety of effects that may be produced in such mixed fabrics by the application of this invention.

It is now well known that after a fabric has been treated with one or more swelling agents to produce a certain desired effect, such fabric may be additionally treated with one or more swelling agents to enhance, modify or alter the previously attained finish, and according to this invention, after the application of pressure as aforesaid, the fabric may be subjected to one or more further treatments with swelling agents. It will be understood that as is known in the art, a treatment or treatments of the fabric with the swelling agent or agents may be accomplished with or without stretching of the fabric.

The following are concrete examples of two methods of procedure according to the present invention:

Example 1.—One may take a previously bleached cotton fabric and treat it in accordance with the above-mentioned United States Patent No. 1,265,082, with caustic soda solution of 30° Bé at -10° C. and then squeeze out the excess of the caustic solution after the development of the transparent effect produced thereby, then wash the fabric and then pass the continuous strip of fabric into a goffering or embossing machine where a pattern is pressed into the still plastic fabric under powerful pressure (approximately 700 lbs. per square inch with the rolls at a temperature of approximately 140° C.) and thereafter the fabric may be dyed in customary manner.

Example 2.—One may take a previously mercerized fabric and treat the same in accordance with the above-mentioned United States Patent No. 1,141,872, with sulphuric acid of 50° Bé., after which the fabric is washed and is subjected while yet in a moist state, to pressure by passing it through heated embossing rolls under high pressure (for example, a pressure of approximately 700 lbs. per square inch with the rolls at a temperature of approximately 140° C.) the fabric leaving the heated rolls in a substantially dry condition due to the heat.

While I have described my invention in connection with the preferred manner of practicing the same, and have cited certain particular patents in the prior art describing certain particular swelling agents and methods of utilizing same to produce permanent finishes upon fabrics, it will be understood by those skilled in the art, after understanding my invention, that these are given merely by way of illustration, and that there may be various changes, modifications and substitutions made without departing from the spirit and scope of my invention, and I aim in the appended claim to cover all such changes and modifications as come within the spirit of my invention.

Having thus described my invention, what

I claim as new and desire to secure by Letters Patent, is:

1. Process for the production of pattern effects upon goods comprising vegetable fibres, which comprises subjecting the goods to a swelling agent for vegetable fibres, then treating the goods to eliminate further action of the swelling agent, and before the goods have become dry subjecting certain portions of the goods, according to the pattern to be produced, to substantial pressure at a temperature of at least 100° C.

In testimony whereof I have signed my name to this specification.

GEORGES HEBERLEIN.