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UNITED STATES PATENT OFFICE.

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FABRIC MAKING.

No Drawing. Application filed November 27, 1926, Serial No. 151,258, and in Germany December 5, 1925.

My invention relates to improvements in fabric making, and more particularly to fabrics with pattern effects. Dense patternings on a relatively light weight ground or foundation fabric have heretofore been produced by providing a fabric having some threads therein which before weaving have been treated with a carbonizing agent, so-called, and after weaving protecting portions of these threads with a resist according to a predetermined pattern and destroying the remaining portions of the treated threads with the aid of heat, leaving the other portions thereof still woven in the fabric and forming a pattern effect therein. Such a method is disclosed in United States Patent No. 1,425,520, granted August 15, 1922.

According to the method of said prior patent, however, it has been found that as a practical commercial matter difficulties arise in practice resulting in a loss of yarn unless great care is taken. Under that process the yarns were dried at low temperature in an endeavor to reduce loss, but even so some loss occurred. This is due to the fact that the yarns when treated with sulphuric acid are partially destroyed while drying. Waste has also been experienced in moisture getting to the yarns in transmission from the yarn or spinning mill to the weaving mill. The old process also involved the necessity of using a beating machine or the like after the carbonization had taken place to remove the carbonized fibres.

According to the present invention more or less similar pattern effects are obtained without such carbonization of the threads.

The new process is simpler, much more reliable, and avoids the losses under the old process.

In carrying out the invention in a preferred form thereof, I produce a fabric having a foundation or ground work of any suitable threads, but preferably of cotton or other threads of vegetable or cellulosic matter (including artificial silk), said ground work having interwoven therein threads of nitrated vegetable or cellulosic material such as nitrated cotton threads. These nitrated threads may be in the warp or in the woof or may run in both directions with the unnitrated threads which form the foundation. The nitrated threads may alternate singly or in numbers with the untreated threads of the foundation or the nitrated threads may be twisted with the unnitrated foundation threads or some of them.

After such a fabric has been produced with nitrated threads associated therewith, I preferably cause an alkali, such as a solution of caustic soda, to act on the nitrated threads in various spots or places according to a predetermined design or pattern, and where the alkali is thus brought into contact with the nitrated threads it dissolves or decomposes the same, so that the portions of the nitrated threads so attacked are destroyed and may be easily removed in any suitable manner, such as by washing. This leaves only the ground work or foundation at these places so that the remaining portions of the fabric containing the unattacked nitrated threads presents a raised pattern effect on the foundation. The action of the alkali on the nitrated threads may be accelerated by dry heat or steaming during the operation.

The localized action of the alkali, on the nitrated threads may be effected preferably by printing a relatively thick alkali solution on the fabric according to the predetermined design. Or if desired a resist that will immunize the threads against the alkali may be printed on the fabric according to a predetermined design and then the fabric passed through an alkali solution. In this way only the portions of the nitrated threads not protected by the resists are decomposed or destroyed. Also substantially the same result may be obtained but in a less satisfactory manner by printing a denitrating agent on the fabric according to a predetermined design thereby rendering portions of the nitrated threads inert to the alkali, and thereafter passing the fabric through the alkali solution whereby only the portions of nitrated threads which have not been denitrated are destroyed. Similarly but also in a less satisfactory manner a resist to the denitrating agent may be printed on the fabric according to a predetermined design and then the fabric passed through the denitrating agent to denitrate the unprotected portions of the nitrated threads, after which the resist may be removed and the fabric subjected to the alkali solution to destroy the portions of the nitrated threads which remain nitrated, so that the undecomposed or unattacked portions of the nitrated threads terminate at various points or along various lines in the

fabric and thereby produce a pleasing pattern effect in a simple manner. That is, in the places where no denitration has taken place the nitrated threads are decomposed and removed.

In this application I claim the invention generically and I also claim that specie of the invention above described as the preferred one, i. e., where the reagent is printed on the fabric, whereas, other features of the invention are claimed in my copending divisional application Serial No. 292,922, filed July 14, 1928, for fabric making.

The nitration of the cellulosic or vegetable threads, may be effected in any well known or suitable manner, for example, with a suitable mixture of sulphuric and nitric acids. It is generally not necessary to nitrate very strongly, but according to the kind of threads employed and the method of carrying out the alkaline or decomposing treatment, the degree of nitration may vary within wide limits. But it will be understood, of course, that in no case is the nitration carried to the extent where it will materially reduce the tensile strength of the threads or yarn so that they would not have the necessary tensile strength for weaving. The degree of nitration is therefore different from that practiced in the nitration of fibres in other cases where nitration is carried on for other purposes without the requirement of maintaining the necessary degree of tensile strength of the fibres for weaving. Even by the use of nitric acid alone (without the use of sulphuric acid) it is often possible to obtain a nitration that is sufficient for the purposes in question.

After the removal of the portions of the nitrated threads which have been destroyed by the alkaline treatment or by dissolving action, if the remaining portions of the nitrated threads have not already been denitrated as above explained, I preferably then denitrate the same. This is especially expedient in the case of relatively highly nitrated products and puts the completed fabric in a condition such that it will not thereafter be subject to attack by alkalies as would be the case if threads were left therein in a nitrated condition; and the denitration also improves the dyeing qualities of the goods.

The invention may be applied to fabrics of many different kinds, such for example as to fabrics composed of vegetable threads only, or of mixtures of vegetable, animal and artifical threads, or of any two of them, or to artificial silks and to embroidery materials. The nitrated threads may be produced from any suitable vegetable or cellulosic fibres, such for example as from ordinary vegetable fibre threads or artificial silk threads.

Thus while I have described my improvements in detail and with respect to certain preferred forms, I do not desire to be limited to such details or forms since, as will be understood by those skilled in the art after understanding my invention, many changes and modifications may be made and the invention embodied in widely different forms without departing from the spirit and scope thereof in its broader aspects, and I desire to cover all modifications, forms and embodiments coming within the language or scope of any one or more of the appended claims.

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

1. The method of producing fabrics with pattern effects which consists in weaving a fabric with unnitrated threads and nitrated vegetable threads, and decomposing portions of the nitrated threads with alkali according to a predetermined pattern.

2. The method of producing fabrics with pattern effects which consists in producing a fabric having a foundation of unnitrated threads and with nitrated threads of cellulosic material interwoven therein, and decomposing with alkali and heat, portions of the nitrated threads according to a predetermined design.

3. The method of producing fabrics with pattern effects which consists in producing a fabric having unnitrated threads and nitrated vegetable threads therein and decomposing portions of the nitrated threads according to a predetermined pattern and thereafter denitrating the remainder of the nitrated threads.

4. The method of producing fabrics with pattern effects which consists in producing a fabric having a foundation of unnitrated threads and with nitrated threads of cellulosic material interwoven therein, and decomposing with alkali and heat, portions of the nitrated threads according to a predetermined design, and thereafter denitrating the remainder of the nitrated threads.

5. The method of producing fabrics with pattern effects which consists in producing a fabric having unnitrated threads and nitrated vegetable threads therein and denitrating portions of the nitrated threads according to a predetermined design, the other portions of the nitrated thread being decomposed.

6. Method of producing fabrics with pattern effects which consists in producing a fabric with unnitrated threads and nitrated cellulosic threads therein, applying to the fabric according to a predetermined design, a reagent which will decompose the nitrated threads with which it comes into contact and denitrating the remainder of the nitrated threads.

7. Method of producing fabrics with pattern effects which consists in producing a

fabric with unnitrated threads and nitrated cellulosic threads therein, printing upon the fabric according to a predetermined design, a reagent which will decompose the nitrated threads with which it comes into contact, and removing the decomposed threads.

8. Method of producing fabrics with pattern effects which consists in producing a fabric with unnitrated threads and nitrated cellulosic threads therein, printing upon the fabric in the presence of heat and according to a predetermined design, a relatively thick alkali substance which will decompose nitrated cellulosic fibres with which it comes into contact, and removing the decomposed threads.

9. Method of producing fabrics with pattern effects which consists in taking for treatment a fabric containing unnitrated threads and cellulosic threads and decomposing and removing portions of the nitrated threads according to a predetermined design.

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

ALBERT BODMER.

CERTIFICATE OF CORRECTION.

Patent No. 1,688,798. Granted October 23, 1928, to

ALBERT BODMER.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 3, line 20, claim 9, before the word "cellulosic" insert the word nitrated; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 14th day of April, A. D. 1931.

(Seal)

M. J. Moore,
Acting Commissioner of Patents.

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