UNITED STATES PATENT OFFICE.

CLARENCE L. COLE, OF THE UNITED STATES ARMY; CLARA HOFF COLE EXECUTRIX OF SAID CLARENCE L. COLE, DECEASED.

METHOD OF DYEING AND PRESERVING FABRICS.


To all whom it may concern:

Be it known that I, CLARENCE L. COLE, major, United States Army, a citizen of the United States, residing at Fort Logan, H. Roots, in the county of Pulaski and State of Arkansas, have invented certain new and useful Improvements in Methods of Dyeing and Preserving Fabrics, of which the following is a specification.

This invention relates to preserving fabrics from the action of mildew and like organic growths, and the general object of the invention is to provide a method which will protect canvas, yarns, or other textile fabrics from the action of mildew by forming copper tannate in the canvas.

A further object of the invention is to provide a method of protecting canvas from destruction by the effects of mildew which is very simple and which has been tested and found thoroughly effective.

It is a well known fact that copper is destructive to the life of algae and fungi, which are low forms of life present in stagnant pools and in moisture, and, therefore, it is the design of this invention to provide means whereby canvas, yarns, or other textile fabric may be impregnated with copper. I have found, by experiment, and proved by thorough tests that by using tannic acid and copper sulfate, a chemical combination, copper tannate results, which renders the textile fabric so treated entirely immune to the action of mildew. I have further found that not only does this copper tannate have a destructive effect upon these low forms of life, but that it colors canvas or like material, producing indeed a khaki color, which is particularly valuable where the canvas is to be used for making tents and other shelters.

The method is as follows:—The yarn, canvas, or tent cloth is immersed in a cold solution of water and 2% of tannic acid, C₇H₆O₆. The temperature of the solution is then raised to 180° F. and the solution then allowed to cool. When the solution is cooled, the yarn, canvas, or tent cloth is immersed in a bath formed by suspending 65% of calcium carbonate in a 5% solution of copper sulfate. The textile fabric is allowed to remain in this solution until a complete reaction has occurred. The cloth is then removed from the solution and thoroughly washed to remove the deposited carbonate and then dried. When dry, the previously white canvas cloth or yarn has acquired a "khaki" color.

When cloth which has been previously impregnated with a solution of tannic acid is placed in the sulfate of copper bath, two distinct chemical reactions take place, one between the copper ion and the tannate radical, and the other between the calcium ion and the tannate radical. Thus the copper tannate dye, which is the primary dye, is made more uniform and more stable by the secondary dye. In other words, the primary dye is reinforced by the secondary dye. The excess CaCO₃ immediately combines with and neutralizes any H₂SO₄ which may be formed in the bath.

Canvas treated as above described and submitted to conditions suitable to the growth of micro-organisms, such as mildew and other forms of fungi, show no evidence of mold growth or apparent deterioration in tensile strength. As tannic acid is a common mordant used in dyeing, the copper tannate produces a fast color and hence the method above described is particularly serviceable as a dye for yarn and in the manufacture and treatment of cotton fabrics.

It will further be noted that the method above described produces no poisonous effects which would be injurious to mill operatives in treating the canvas in the bolt or in treating the yarn previous to weaving the canvas.

It may be said that this method has been carefully tested by Army officials detailed for this purpose and has been found to be of particular value. It is also to be understood that the term "fabric" as used in this specification and claims is intended to include not only a woven fabric, but the yarn, threads, or other elements of which the fabric is composed.

The action of the tannic acid is that of a mordant, and the copper ions combine with the tannic acid to form an insoluble compound the primary dye, copper tannate, which preserves the canvas through the inhibitory action of the copper on low forms of life, such as molds which it destroys.

While the tannic acid and copper sulfate are in all cases used, yet I have also found that the addition of potassium dichromate gives a different shade to the fabric. I have also found that boiling the fabric with a...
solution of sodium bicarbonate gives a pleasing olive green shade.

Having now described my invention, what I claim is:

1. The method of treating textile fabrics consisting in treating the fabric with a solution containing tannic acid and subsequently immersing the fabric in a bath formed by suspending calcium carbonate in a solution of copper sulfate.

2. The method of treating textile fabrics to preserve the same, consisting in immersing the fabric in a solution containing tannic acid and subsequently immersing the fabric in a bath formed by suspending an excess of calcium carbonate in a solution of copper sulfate.

3. The method of treating textile fabrics to preserve them, consisting in first immersing the fabric in a solution containing tannic acid and subsequently immersing the fabric in a bath formed by suspending calcium carbonate in a 5% solution of sulfate.

4. The method of treating textile fabrics to preserve them, consisting in first immersing the fabric in a solution containing tannic acid and subsequently immersing the fabric in a bath formed by suspending calcium carbonate in a 5% solution of sulfate, the calcium carbonate being in excess in the bath.

5. The method of preserving textile fabrics, consisting in immersing the fabric in a cold solution of water and tannic acid, heating the solution and subsequently permitting the solution to cool, and withdrawing the fabric from the solution and immersing the same in a bath formed by suspending calcium carbonate in a solution of copper sulfate.

6. The method of preserving textile fabrics, consisting in immersing the fabric in a cold solution of water and tannic acid, heating the solution and subsequently permitting the solution to cool, and withdrawing the fabric from the solution and immersing the same in a bath formed by suspending calcium carbonate in a solution of copper sulfate, the calcium carbonate being in excess in the bath.

7. The method of treating textile fabrics to preserve them against the action of mildew, consisting in immersing the fabric in a 2% solution of tannic acid and then immersing the fabric in a bath formed by suspending 65% of calcium carbonate in a 5% solution of copper sulfate.

8. A method of treating textile fabrics to preserve them against the action of mildew consisting of treating the fabric with a solution of tannic acid and a bath formed by suspending in a solution of copper sulfate an excess of calcium carbonate.

9. The method of treating textile fabrics to preserve them against action of mildew, consisting in treating fabric with a 2% solution of tannic acid and a bath formed by suspending 65% of calcium carbonate in 5% solution of copper sulfate.

In testimony whereof I hereunto affix my signature in the presence of two witnesses.

CLARENCE L. COLE.

Witnesses:

FRANK M. BLAISDELL
GEORGE F. LULL.

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