

UNITED STATES PATENT OFFICE.

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PROCESS OF TREATING VEGETABLE FIBERS, YARNS, AND FABRICS.

1,087,584.

Specification of Letters Patent.

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No Drawing.

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To all whom it may concern:

Be it known that I, JOSEF HIRSCHBERGER, Ph. D., a subject of the Emperor of Germany, residing at Jersey City, in the county of Hudson and State of New Jersey, have invented certain new and useful Improvements in Processes of Treating Vegetable Fibers, Yarns, and Fabrics, of which the following is a specification.

- 10 My invention relates to an improved process of scouring and bleaching vegetable fibers and yarn and woven fabrics made therefrom, and has for its object the novel mode of extracting fatty, waxy, resinous, and oily
15 impurities from these textile materials prior to bowking or boiling the same with alkalis.

- The ordinary process of bleaching vegetable textile materials comprises essentially
20 two main operations, the bowking or boiling with alkalis, and the destruction and removal of the coloring matter, which is usually accomplished by chlorid of lime or other suitable bleaching agents. It is well
25 known that the basis of successful bleaching is an efficient alkali boil. If the goods are not sufficiently "bottomed," they resist the subsequent treatments necessary in bleaching, tinting, finishing, dyeing of light shades,
30 printing, and steaming. To obtain "full whites" unaffected by aging, or for the production of vegetable fabrics suitable for the level dyeing of light shades or for uniform printing effects, in which the white is not
35 affected by the subsequent steaming, it is necessary to treat the fabrics with a very prolonged alkali boil, or generally with a double alkali boil, with a number of operations (washing, souring, washing) between
40 the two boils, especially for such goods which show strong resistance to alkalis, as Egyptian cotton, heavy ducks and drills, linen goods, etc. The long and repeated boiling with alkalis makes the bleaching operation a slow process and acts injuriously
45 on the fabrics, making them harsh and brittle and weakening them.

- The present invention is a process of treatment for eliminating these disadvantages.
50 I have found that by the action of diluted solutions or emulsions of fatty sulfo-acids on textile materials composed of vegetable fibers, the resistant impurities such as the oily, fatty, waxy, and resinous
55 impurities of the fiber are dissolved and altered

in condition so that they may be easily removed in the subsequent operations without prolonged treatment.

Goods which are most difficult to bleach may, after being subjected to my specific
60 treatment as outlined, be thoroughly bottomed and put in condition by bowking or boiling with alkalis from $1\frac{1}{2}$ degrees to $3\frac{1}{2}$ degrees Tw., for about six hours, while they would require, without my treatment, two
65 alkaline boils of about ten hours each, with a number of operations (pulling out of keir, washing, souring, washing, replacing in keir) between the two boils.

By fatty sulfo-acids I means the products obtained by the action of strong sulfuric
70 acid on vegetable or animal oils and fats such as castor oil, olive oil, corn oil, oleic acid, tallow, and other similar compounds or their derivatives. These sulfo-acids can
75 either be directly diluted or emulsified with water and the goods passed through the liquid; or the goods can be passed through a diluted solution of a salt of the fatty sulfo-acids and the fatty sulfo-acids liberated subsequently by passing the goods through a
80 diluted mineral acid.

Although the fatty, waxy, resinous, and oily impurities of the vegetable textile materials are by this treatment removed more
85 thoroughly than is possible by the ordinary bleach, the goods do not lose more weight in the new process than in the ordinary bleaching process.

The new process has the further advantage that it removes not only the natural
90 oils and waxes of the vegetable textile material, and not only the resistant impurities such as the saponifiable fats and oils of the sizing treatment, but also those resistant
95 impurities such as the unsaponifiable fats and oils of the sizing treatment, and further those resistant impurities such as spots of mineral oil which may have stained the goods during the spinning or weaving
100 process.

The material to be bleached is passed through this solution, care being taken that the time of immersion is not less than ten
105 seconds, the temperature being between 100 degrees F. and 150 degrees F. It is then squeezed out or extracted so that the weight of liquor remaining in the material is equal to the original weight of the goods. After this treatment the material is washed with
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water or with diluted alkali of about $\frac{1}{2}$ degree Tw., and is ready to be bowked or boiled with a diluted alkaline solution for a relatively short period, and then, if desired, can be subjected to the action of any usual bleaching agent. This method of treatment gives effects and results which cannot be obtained by any previously known process. After being passed, as above described, through a bath which contains about 1 per cent. of fatty sulfo-acids dissolved or emulsified in water and subsequently boiled for about six hours with caustic lye of the usual strength of about 2 $\frac{1}{4}$ degrees Tw., the goods are turned out fully "bottomed" and so far cleansed that after washing, souring, and washing, they are sufficiently bleached for those purposes where only half-bleached material is required. Where "full whites" or the so called "madder bleach" is wanted, one subsequent treatment with weak calcium hypochlorite, with subsequent washing, souring, and washing, gives the desired results. Being a bottom-bleach, the white will stand aging, the goods can be evenly tinted, dyed level in light shades, printed evenly and steamed without turning yellow. Similar results can be obtained by a modification of my process of bleaching with fatty sulfo-acids, by passing the goods through a solution of a salt of the sulfo-acids and then liberating the sulfo-acids by passing the goods through a weak solution of a mineral acid, as for instance, sulfuric acid of 1 degree Tw.

I have found that effects as described above can be obtained by employing the sulfo-acids of the fats and oils, whether of vegetable or animal origin, and by the sulfo-acids of their derivatives. These sulfo-acids can either be directly diluted or emulsified with water, or they can first be mixed with volatile solvents like carbon-tetrachlorid, turpentine oil, petroleum, etc., and then dissolved or emulsified with water; or the sulfo-acids can be employed in the form of their salts, either alone or mixed with volatile solvents, with a subsequent liberation of the free sulfo-acids.

The following is a specific example of the mixture of the sulfo-acid and a volatile solvent: 100 parts of fatty sulfo-acid are warmed to about 85 degrees F., and mixed with 20 parts of carbon-tetrachlorid. 125 parts of this mixture are emulsified with 1000

parts of warm water and the goods passed through this solution.

I do not limit myself to the exact ingredients, proportions, temperatures, or strengths of solution mentioned above, as it is evident that they may be varied without departing from the essence of my invention.

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

1. The process of treating vegetable fibers, yarns, and fabrics, which comprises subjecting the same preparatory to the bowking, to the action of a substance containing a fatty sulfo-acid radical, and subsequently washing, whereby the resistant impurities of the fiber are rendered easily removable, substantially as described.

2. The process of treating vegetable fibers, yarns, and fabrics, which comprises subjecting the same preparatory to the bowking, to the action of a substance containing a fatty sulfo-acid radical and a volatile solvent, and subsequently washing whereby the resistant impurities of the fiber are rendered easily removable, substantially as described.

3. The process of treating vegetable fibers, yarn, and fabrics, which comprises subjecting the same preparatory to the bowking, to the action of a substance containing a fatty sulfo-acid radical by treating the goods first with a solution of a salt of a fatty sulfo-acid and afterward with a weak solution of a mineral acid, and subsequently washing whereby the resistant impurities of the fiber are rendered easily removable, substantially as described.

4. The process of treating vegetable fibers, yarn, and fabrics, which consists in subjecting the same preparatory to the bowking, to the action of a substance containing a fatty sulfo-acid radical and a volatile solvent, by treating the goods first with a solution of a salt of a fatty sulfo-acid and a volatile solvent and afterward with a weak solution of a mineral acid, and subsequently washing whereby the resistant impurities of the fiber are rendered easily removable, substantially as described.

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

JOSEF HIRSCHBERGER.

Witnesses:

PHILIP L. CLARKSON,
WM. C. BALL.