

UNITED STATES PATENT OFFICE.

WALTHER MATHESIUS AND MORITZ FREIBERGER, OF CHARLOTTENBURG, GERMANY.

BLEACHING PROCESS.

1,061,392.

Specification of Letters Patent.

Patented May 13, 1913.

No Drawing. Original application filed December 28, 1911, Serial No. 668,315. Divided and this application filed July 23, 1912. Serial No. 711,111.

To all whom it may concern:

Be it known that we, WALTHER MATHESIUS, a subject of the King of Prussia, and MORITZ FREIBERGER, a subject of the Emperor of Austria-Hungary, both residing at Charlottenburg, near Berlin, Germany, have jointly invented a new and Improved Bleaching Process, of which the following is a specification.

10 This invention relates to an improved process for bleaching cotton goods in rope form and constitutes subject matter divided out from our concurrent United States patent application Serial No. 668315 filed December 28th, 1911.

15 The essential feature of the present invention is that the fabric is kept in continuous forward motion and subjected to alkaline bleaching, washing and acid treatments in immediate succession.

20 It has heretofore been proposed to carry out successive alkaline and acid bleaching processes, but such processes have hitherto not been successful either because it was not deemed advisable to depart from the old principle of storing the fabric in a suitable vessel after passing it through the bleaching solution, leaving it for some time in the storage vessel to the action of the bleaching solution, it having hitherto been assumed that if this is not done, the fabric would not be sufficiently bleached, or because it had been deemed advisable to raise the strength of the bleaching solution and then thoroughly wash it in hot water before treating it with acid to neutralize the bleaching action. The latter process, however, damages the fabric without appreciably improving the bleaching.

40 According to the present invention the fabric is moved slowly but continuously through the vessels containing the liquids for treatment, such vessels being preferably of the type described in the specification of our aforesaid concurrent patent application, the fabric requiring from 10 to 25 minutes to pass through the alkaline and acid bleaching vessels. The fabric is first of all subjected to the action of a warm alkaline bleaching liquid, such as hypochlorite of lime, in the first vessel, which decomposes the greater part of the coloring substances remaining in the fabric from the scouring tank. The fabric is moved slowly and continuously through the alkaline bleaching

liquid for a period of about 10 to 25 minutes and immediately upon leaving the bleaching liquid is passed through a rinsing tank containing a weak hypochlorite of lime solution, so that a certain definite amount of bleaching liquid remains on the fabric after it leaves the rinsing tank. The fabric is thereupon immediately passed through another vessel containing an acid solution, the fabric being moved slowly and continuously through this vessel for a period of 10 to 25 minutes and upon leaving the acid containing vessel, the fabric may be finally washed. In order to accelerate the action of the liquids, the latter may be slightly heated, but it is essential that the liquids be not heated to such a temperature as would cause partial or entire decomposition. It is therefore impossible to inject steam into the bleaching liquids or to heat the liquids by means of steam-heated tubes as has heretofore been proposed. It is essential that heating tubes or other suitable heating surfaces be employed which are not heated to an essentially higher temperature than that to which the bleaching liquids are to be raised, and for this purpose a fluid such as warm water of the requisite temperature is therefore circulated through the heating tubes or the like.

It will be noted in the foregoing process that the fabric is not left for some time to the action of the bleaching liquid in the first tank nor is it thoroughly washed before being treated with acid. By using a warm bleaching liquid in the first tank it is possible to considerably accelerate the passage of the fabric through this tank and to carry out the removal of the larger quantity of the coloring matters to such an extent that the acid bleaching action can be effected when only a small quantity of the alkaline bleaching solution remains in the fabric. The bleaching process is thus divided into two steps, the first step, the alkaline bleaching, being intentionally not carried out to the extent hitherto usual, so that only those coloring matters are removed which are easily capable of being oxidized without danger, while it has the advantage that the alkaline bleaching is not carried so far as to run the risk of the formation of oxycellulose. On the other hand, little bleaching remains to be done by the acid which in itself is dangerous to the fabric so that very weak acid solutions may be used and the fabric

only subjected for a short time thereto. Moreover, not only are those substances removed which are only capable of being decomposed by the acid, but also the rest of those substances which are indeed capable of being decomposed by the alkaline solution but which would require such intensive action on the part of the alkaline solution that oxycellulose would be formed. The improved process moreover results in a saving of time and enables a pure and durable white to be obtained.

We claim:—

1. The method of bleaching cotton goods in rope form which consists in continuously moving the fabric forward and effecting in immediate succession partial alkaline bleaching in a warm alkaline bleaching solution, partial rinsing in a rinsing liquid and completion of the bleaching in an acid solution.

2. The method of bleaching cotton goods in rope form which consists in continuously moving the fabric forward and effecting in immediate succession partial alkaline bleaching in a warm alkaline bleaching solution, partial rinsing in a rinsing liquid and completion of the bleaching in a warm acid solution.

3. The method of bleaching cotton goods in rope form which consists in continuously but slowly moving the fabric through a warm alkaline bleaching solution for a period of from 10 to 25 minutes, so as to effect partial alkaline bleaching thereby, immediately thereupon partially rinsing the fabric so as to leave a little alkaline bleaching solu-

tion thereon, and immediately thereupon and in continued slow forward movement passing the fabric through an acid solution for a period of from 10 to 25 minutes to complete the bleaching.

4. The method of bleaching cotton goods in rope form which consists in continuously moving the fabric forward and effecting in immediate succession, partial alkaline bleaching in an alkaline bleaching solution, partial rinsing in a rinsing liquid and completion of the bleaching in an acid solution, and simultaneously heating said solutions by means not heated to an essentially higher temperature than that to which the solutions are to be raised.

5. The method of bleaching cotton goods in rope form which consists in continuously moving the fabric forward and effecting, in immediate succession, partial alkaline bleaching in an alkaline bleaching solution, partial rinsing in a rinsing liquid and completion of the bleaching in an acid solution, and simultaneously heating said solutions by passing a fluid of a temperature not essentially higher than that to which the solutions are to be raised, through said solutions without direct contact therewith.

In testimony whereof we have hereunto affixed our signatures in presence of two witnesses.

WALTHER MATHESIUS.
MORITZ FREIBERGER.

Witnesses:

WOLDEMAR HAUPT,
HENRY HASPER.