

UNITED STATES PATENT OFFICE.

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FIREPROOFING AND BLEACHING OF FABRICS AND THE LIKE.

1,224,145.

Specification of Letters Patent.

Patented May 1, 1917.

No Drawing.

Application filed June 4, 1915. Serial No. 32,060.

To all whom it may concern:

Be it known that I, THOMAS JOHN IRELAND CRAIG, a subject of the King of Great Britain and Ireland, and a resident of Manchester, in the county of Lancaster, England, have invented new and useful Improvements in and Relating to the Fireproofing and Bleaching of Fabrics and the like, of which the following is a specification.

This invention relates to improvements in the treatment of unbleached or partly colored unbleached textile fabrics and the like to render them less inflammable and subsequently bleaching them or their uncolored portions without material deterioration of the fireproofing of the fabric and without injuring the colors when such are present.

As examples of how these improvements may be carried into effect we may describe their application, to the fireproofing and bleaching of flannelette as produced from gray cloth, and also to the fireproofing and bleaching of striped flannelette.

In ordinary usage cotton cloth, for example, that which is commonly known as gray cloth, is subjected to a number of processes before it is finally finished as flannelette. It is usually first partly raised, then treated to remove starchy matter and washed, subjected to boiling soda liquor and washed, treated with calcium hypochlorite solution and washed, acted on by dilute acid and washed, then dried and further raised by which or similar means it is converted into white flannelette which may be afterward treated by dyeing or finishing it or for rendering it less inflammable. Where a certain process is utilized to render the fabric less inflammable, which process will be later described, it has been found that this treatment has the property, in the case of natural unbleached cotton fabrics, of rendering such fabrics capable of being readily bleached by simple treatment with a bleaching agent, for instance a comparatively weak solution of sodium hypochlorite in the production of white flannelette from gray cloth, and with a solution containing hydrogen peroxid, when dealing with goods containing colors (e. g. striped flannelette) which are affected by hypochlorites.

By first fireproofing and then bleaching

the fabric in the case of producing white flannelette for example, we eliminate a number of operations which are necessary when the bleaching is done before the material is fireproofed, and thus we effect a considerable saving in labor, time and materials. We may thus, for example, practically fully instead of partially raise the fabric thus rendering a final raising unnecessary. We may also eliminate the boiling treatment with soda solution and subsequent washing, also the "souring" process with weak acid and the following wash.

In the case also of partly colored unbleached goods (e. g. striped flannelette) the present improvements render the unbleached and uncolored portions of the material (e. g. the weft of striped flannelette) capable of being readily bleached by simple treatment with a bleaching agent, for example a comparatively weak solution of sodium hypochlorite when the colors (e. g. vat dyes) are such as will not be deteriorated thereby, or where the use of hypochlorite is inadmissible, with a solution containing hydrogen peroxid.

By my process I may suitably proceed as described in the two following examples:—

Example 1: Unbleached material, for instance, that known as "gray cloth", is first raised, then treated by known means to remove starchy matter and then washed and dried. The fireproofing process described in the specification filed with the application for British Patent No. 16153 of 1914 is now applied to the raised, de-starched, washed and dried unbleached cloth.

This fireproofing process consists in impregnating the cloth or the like with a solution of an alkaline aluminate and then, with or without any intermediate treatment, treating it with a liquid or solution which furnishes a supply of carbonic acid.

In carrying this process into effect the fabric is suitably treated with an aluminate, preferably sodium aluminate, having a specific gravity of about 1.15 and at ordinary temperature. The aluminated cloth is then dried and subjected to the action of more or less pure carbonic acid gas in the presence of moisture. The required comparatively small amount of moisture may be left in the cloth when drying it. The temperature

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at which the treatment takes place may be about 50° C. and the time of treatment for a large batch of cloth is about one hour or longer according to the supply of carbonic acid gas. The cloth is then acted upon with a solution which furnishes a supply of carbonic acid. Acid sodium carbonate solution of about 1.18 specific gravity at about 90° to 100° C. and at ordinary or at a pressure of 10 lbs. per square inch or thereabout may be used and the treatment continued for about two or three hours. While the fabric or the like is undergoing treatment with the acid sodium carbonate liquor carbon dioxid gas may be passed into such liquor to replace the carbon dioxid taken up by the material during the treatment. The cloth may then be washed and treated with a bleaching agent, *e. g.* a solution of sodium hypochlorite of 1.015 specific gravity and at ordinary temperature and pressure. The treatment should be continued for about one hour or longer if necessary to obtain the desired bleaching effect. There may be added to the bleaching solution a proportion of alkali bicarbonate preferably sodium bicarbonate. The cloth may now be washed and dried or dyed in any suitable shade or pattern in the usual way or treated in any other desired manner.

Example 2: Partly colored, for instance striped fabrics, may be first "raised" and then the earlier stages of the fireproofing process up to the point at which the fabric is to be treated with acid alkali carbonate solution described in Example 1 are applied. The thus treated striped flannelette is then wet out with acid sodium carbonate liquor of about 1.18 specific gravity at about 90° C. and then subjected to the action of carbonic acid gas at about 100° C. and at ordinary or suitably increased pressure until sufficient carbonic acid has been absorbed. Or the aluminated and dried fabric may first be treated with carbon dioxid gas as hereinbefore described and then treated by immersing it in a suitable solution of acid sodium carbonate at about 90° C. at ordinary pressure for two or three hours, or at an increased temperature and pressure if the colors are such as will not thereby be deteriorated. Carbon dioxid gas may be passed into the acid sodium carbonate liquor during the treatment to replace that absorbed by the fabric.

The flannelette may now be washed and then treated with a bleaching agent. In cases where the colors used (such as vat dyes for example) are not appreciably acted on by hypochlorites we may carry out the bleaching as described in Example 1. In cases, however, where the use of hypochlorite is inadmissible owing to its deleterious action on the colors in the goods under treatment, a solution containing hydrogen per-

oxid and acid alkali carbonate, preferably acid sodium carbonate, gives excellent results. The hydrogen peroxid and acid alkali carbonate bleaching solutions may be employed at ordinary temperature or they may first be used cold and gradually raised to a suitable temperature while they are acting on the material. The hydrogen peroxid and acid alkali carbonate solution may be suitably prepared by dissolving sodium peroxid in a solution of sodium bicarbonate in water, *e. g.* about one part of sodium peroxid conveniently being used to about six parts of sodium bicarbonate. The material after having been bleached to the extent required may be washed and dried and finished in any desired manner. The herein described operations may obviously be varied and it is not the intention to be limited to the precise details of the methods and processes herein described which serve as examples of the manner in which these methods and processes may be carried out, the scope of the invention being set forth in the appended claims.

What I claim is:—

1. The improved method of fireproofing and bleaching textile fabrics, which comprises impregnating the fabric with an alkali aluminate solution, treating it with carbonic acid and then with a bleaching agent.
2. The method of fireproofing and bleaching textile fabrics which comprises impregnating the fabric with an alkali aluminate solution, treating it with carbonic acid, and then treating it with a solution containing hydrogen peroxid.
3. The method of fireproofing and bleaching textile fabrics which comprises impregnating the fabric with an alkali aluminate solution, treating it with carbonic acid, and then treating it with a solution containing hydrogen peroxid and an alkali bicarbonate.
4. The method of fireproofing and bleaching textile fabrics which comprises treating the fabric with an alkali aluminate solution, drying, subjecting the fabric to carbonic acid gas, then wetting the fabric out with a solution furnishing a supply of carbon dioxid, subjecting the thus wetted fabric to carbonic acid gas, and finally treating the fabric with a bleaching agent.
5. The method of fireproofing and bleaching textile fabrics which comprises treating the fabric with an alkali aluminate solution, drying, subjecting the fabric to carbonic acid gas, then wetting the fabric out with a solution furnishing a supply of carbon dioxid, subjecting the thus wetted fabric to carbonic acid gas, and finally treating the fabric with a solution containing hydrogen peroxid.
6. The method of fireproofing and bleaching textile fabrics which comprises treating the fabric with an alkali aluminate solution,

8. BLEACHING & DYEING; FLUID
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5 drying, subjecting the fabric to carbonic acid gas, then wetting the fabric out with a solution furnishing a supply of carbon dioxid, subjecting the thus wetted fabric to carbonic acid gas, and finally treating the fabric with a solution containing hydrogen peroxid and an alkali bicarbonate.

In witness whereof I have hereunto set my hand in the presence of two subscribing witnesses.

THOMAS JOHN IRELAND CRAIG.

Witnesses:

GEORGE NAHL,
JOHN O'CONNELL.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."