

UNITED STATES PATENT OFFICE.

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COTTON FIBER AND PROCESS OF MAKING SAME.

No Drawing.

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To all whom it may concern:

Be it known that I, EDUARD HEBERLEIN, a citizen of the Swiss Republic, and resident of Wattwil, Switzerland, have invented a new and useful Improved Cotton Fiber and Process of Making Same, of which the following is a full, clear, and exact specification.

The invention relates to improvements on that described in the specification of my United States Letters Patent No. 1,265,082, dated May 7, 1918. In said patent it was pointed out that if cotton goods were treated for a sufficient period with caustic alkali cooled below zero degrees C., and of such concentration as would mercerize the cotton at the ordinary temperature, that is to say, of at least 15° Baumé, specific gravity, the cotton acquires a transparent appearance which is quite different from the mercerization effects hitherto known. It was pointed out in that specification, for example, that if thin cotton fabric was impregnated for one minute with a caustic soda solution of 30° Baumé specific gravity, and having a temperature of -10° C., the cotton acquired a transparent appearance which was not lost even after washing and drying. It was also pointed out that the concentration of the alkali, the temperature and the duration of the action could be varied according to the quality of the material and the desired degree of effect. It was further pointed out that enhanced transparent effects could be obtained by subjecting the fabric to the action of the said caustic soda at low temperature, and also to the action of concentrated sulfuric acid, such for example as acid of the strength of over 50½° Baumé, the acid also if desired being applied at low temperature so as to permit of the longer duration of the action of the acid. It was pointed out that the fabric could be acted upon either first or last by the acid or by cold alkali.

It has been found that the transparent appearance obtained by the action of cold caustic alkali as described in the said specification can be enhanced, while at the same time imparting a quite lustrous appearance to cotton, if the material is mercerized in the normal manner (treatment of cotton with a caustic alkali at ordinary temperature, with or without stretching of the cotton) before or after, or both before and after the treatment with cold alkali, or be-

tween two treatments with said cold caustic alkali.

If any one of these several orders of treatments with alkali be designated a "group of treatments with caustic alkali" or "a group of alkali treatments" such a group of treatments can be substituted for one or more of the treatments with said cold alkali as set forth in the claims of the aforesaid Letters Patent. For example, in the sense of claims 3 to 6 of the said Letters Patent, the cold alkali treatment may occur before or after a treatment with concentrated sulphuric acid of over 50.5° Baumé specific gravity, at ordinary temperature or below 0° C. In such case, in order to obtain the lustrous appearance contemplated by the present invention, the cold alkali treatments of the said claims are replaced by one of said "group of treatments with caustic alkali."

Again, in the United States Patent No. 1,288,885 of Georges Heberlein, a process for producing transparent effects in cotton fabric was described according to which the cotton fabric is treated alternately and repeatedly with a concentrated strong mineral acid, such for example as sulfuric acid of over 50½° Baumé on the one hand, and the caustic alkali on the other hand: as for example acid treatment, alkali treatment, acid treatment; and in my previously referred to Patent No. 1,265,082, it was pointed out that the alkali treatment of said process of Georges Heberlein's Patent 1,288,885 could also be carried out if the treatment with alkali at normal temperature be replaced by treatment with alkali below 0° C.

Here, again, according to the present invention, considerable variations in the several effects may be obtained if in said alternate and repeated treatments of cold alkali and acid; for the cold alkali treatment, there be substituted a "group of alkali treatments," as for example a treatment with caustic alkali at ordinary temperature, a treatment with caustic alkali below 0° C., and a treatment with caustic alkali at ordinary temperature, then the acid treatment, then another "group of alkali treatments."

Finally, patterns can be produced on cotton fabrics according to the present invention by printing reserves on the cotton fabrics before an acid treatment where the acid treatment is used in conjunction with a "group of alkali treatments" or before or

between alkali treatments, the printing with reserves being in this latter case always followed with a treatment with the cold alkali.

The following examples illustrate the invention:

Example 1.

Bleached cotton yarn is impregnated during one minute with caustic soda of 30° Baumé specific gravity at -10° C.; it is then washed and mercerized under tension with caustic soda of 30° Baumé specific gravity in the normal manner. It is finally washed and dried.

Example 2.

Bleached cotton fabric is mercerized in normal manner under tension, washed and dried. It is then printed with a reserve and treated for one minute with caustic soda of 28° Baumé specific gravity at -12° C.; then washed and then once again mercerized in normal manner, washed and dried.

Example 3.

Boiled cotton fabric is impregnated with sulfuric acid of 54° Baumé specific gravity, washed, mercerized in usual manner under tension, again washed and finally treated with caustic soda of 25° Baumé specific gravity at -10° C. for one and a half minutes; it is then washed, bleached and dried.

Example 4.

Bleached cotton fabric is impregnated with caustic soda of 32° Baumé specific gravity at -8° C. for 1½ minute, washed, then mercerized under tension in normal manner, washed, dried and treated with sulfuric acid of 53° Baumé specific gravity at -5° C.; it is then washed and dried.

Example 5.

Boiled cotton fabric is mercerized in normal manner under tension, washed, then subjected to the action of caustic soda of 30° Baumé specific gravity at -12° C. for ¾ of a minute, washed and dried; thereupon it is printed with a reserve and then treated with sulfuric acid of 55° Baumé specific gravity, washed, dyed and dried.

Example 6.

Bleached cotton fabric is mercerized in normal manner under tension, washed and then treated with caustic soda of 25° Baumé specific gravity at -12° C. for 1½ minute, washed, dried, subjected to the action of sulfuric acid of 53° Baumé specific gravity, washed, treated with caustic soda of 28° Baumé specific gravity at -10° C. for 1 minute, washed, mercerized in normal manner and washed and dried.

As heretofore pointed out, for the sake of brevity and clearness, I have used the ex-

pressions "group of treatments with caustic alkali" or "group of alkali treatments" to designate the various groupings of treatments with cold alkali and normal mercerization. For example (1) a treatment with cold alkali and then a treatment with alkali at ordinary temperature; (2) a treatment with alkali at ordinary temperature and then a treatment with cold alkali; (3) a treatment with alkali at ordinary temperature, a treatment with cold alkali, and then another treatment with alkali at ordinary temperature; (4) a treatment with cold alkali; a treatment with alkali at ordinary temperature, and then another treatment with cold alkali, the alternate treatments in Examples Nos. 3 and 4 being further continued if desired.

It will appear from the above that each "group of alkali treatments" comprises at least one treatment with alkali at ordinary temperature, or normal mercerization treatment with or without stretching, and at least one treatment with the caustic alkali of at least 15° Baumé and having a temperature below 0° C.; and in the appended claims where I use the terms "group of treatments with caustic alkali" or "group of alkali treatments" I wish to be understood as meaning any such group of treatments, which group shall comprise always at least a normal mercerization and a treatment with caustic alkali of at least 15° Baumé specific gravity at a temperature below 0° C.

What I claim is:

1. Process of treating cotton goods, which comprises treating the cotton goods with a "group of treatments with caustic alkali."

2. Process of treating thin cotton fabric for imparting thereto a transparent and lustrous appearance, which comprises treating said thin fabric with a "group of treatments with caustic alkali."

3. Process of treating thin cotton goods to impart thereto a transparent and lustrous effect, which comprises subjecting the goods to a plurality of chemical treatments, one a treatment with caustic soda of at least 15° Baumé at a temperature below 0° C., another a treatment with concentrated sulfuric acid, and a third a mercerization treatment at ordinary temperature.

4. Process of treating thin cotton goods to produce a transparent and lustrous effect, which comprises subjecting the goods to a plurality of chemical treatments, including a "group of treatments with caustic alkali" and a treatment with a suitable concentrated strong mineral acid, to produce in conjunction with said group of alkali treatments, said transparent lustrous effect.

5. Process of treating thin cotton goods to produce a transparent and lustrous effect, which comprises subjecting the goods to a

plurality of chemical treatments, including a "group of treatments with caustic alkali" and a treatment with concentrated sulfuric acid to produce in conjunction with said group of alkali treatments, said transparent lustrous effect.

6. Process of treating thin cotton goods to produce a transparent and lustrous effect, which comprises subjecting the goods to a plurality of chemical treatments, including a "group of treatments with caustic alkali" and a treatment with concentrated sulfuric acid to produce in conjunction with said group of alkali treatments, said transparent lustrous effect, and washing the goods after the acid treatment.

7. Process of treating thin cotton goods to produce a transparent and lustrous effect, which comprises subjecting the goods to a plurality of chemical treatments, including a "group of treatments with caustic alkali" and a treatment with concentrated sulfuric acid to produce in conjunction with said group of alkali treatments, said transparent lustrous effect, and washing the goods after the said group of treatments and the said acid treatment.

8. Process of treating cotton goods which comprises treating the cotton goods with a "group of treatments with caustic alkali," one being a treatment with caustic alkali of at least 15° Baumé at a temperature below 0° C., and the other being a normal mercerization treatment, said treatments being applied to the goods alternately and repeatedly in such manner that the application of one treatment to the goods takes place between two applications of the other treatment.

9. Process of treating thin cotton goods to produce a transparent and lustrous effect, which comprises subjecting the goods to a plurality of chemical treatments, including a "group of treatments with caustic alkali" and a treatment with concentrated sulfuric acid, applying said "group of alkali treatments" on the one hand and said acid treatment on the other hand alternately and repeatedly in such manner that at least one takes place between two of the others.

10. Cotton goods (yarns or fabric) having a transparent lustrous effect produced by chemical treatments of the goods, which treatments comprise a "group of treatments with caustic alkali."

11. Cotton goods (yarns or fabric) having a transparent lustrous effect produced by a plurality of chemical treatments of the goods, one a treatment with caustic soda of at least 15° Baumé at a temperature below 0° C., another a treatment with concentrated sulfuric acid, and a third a mercerization treatment at ordinary temperature.

12. Cotton goods (yarns or fabric) having a transparent lustrous effect produced by a plurality of chemical treatments including a "group of treatments with caustic alkali" and a treatment with concentrated sulfuric acid to produce in conjunction with said group of alkali treatments said lustrous effect.

In witness whereof I have hereunto signed my name this 18th day of October, 1921, in the presence of two subscribing witnesses.

EDUARD HEBERLEIN.

Witnesses:

FRANK TIMMKE,
WALTER HEILE.