UNITED STATES PATENT OFFICE.

ALBERT JOHN HILL, OF TWICKENHAM, ENGLAND.

PROCESS OF MANUFACTURING IMPROVED CELLULOSE FABRICS.

SPECIFICATION forming part of Letters Patent No. 705,244, dated July 22, 1902.

Application filed April 21, 1902. Serial No. 104,049. (No specimens.)

To all whom it may concern:

Be it known that I, ALBERT JOHN HILL, a subject of the King of England, residing at Twickenham, county of Middlesex, England, have invented a certain new and useful Process for the Manufacture of an Improved Cellulose Fabric, of which the following is a specification.

Cotton fabrics and other cellulose fabrics produced by the methods heretofore in general use will not permanently retain forms given to them in, for instance, the operation of crimping. On the other hand, it is well understood that a fabric of raw silk could be given permanent crimp, because of the natural gum on the silk fibers, which enables them to combine or aggregate into single stretchable threads which can be permanently set in stretched condition with the aid of heat or of heat and moisture.

The object of the present invention is the production of cellulose fabrics which shall have been so improved by the treatment hereinafter described as to have become capable of permanently retaining forms given to them as in, for instance, the operation of crimping aforesaid.

According to this invention a yarn or fabric of cellulose previously hydrated—that is to say, previously subjected to a process such, for example, as one or other of the well-known forms of mercerizing process, but without the usual amount of stretching, in which caustic soda, zinc chlorid, or sulfuric or phosphoric acid is used—is converted into a waterproof crimpable fabric by the process following: The hydrated cellulose material is first immersed in or sprayed with a proteid in solution, which solution may be evenly distributed over the material by passing the latter while wet with it between rollers. When the fibers are dry, the proteid should be present upon them in the proportion of about ten to twenty-five parts, by weight, in every hundred parts, by weight, of the proteidized fibers. The preferred proteid for use in this portion of the present invention is albumen; but other proteids—for instance, casein—may be employed. The process of producing a waterproof crimpable fabric is completed according to this invention by varnishing it. This varnishing is effected by dipping the fabric in or coating it with a waterproofing solution composed of a gelatin or proteid mixed with a small proportion of the known insoluble formaldehyde compounds which under the action of heat decompose and set the formaldehyde free. The waterproofing agents in this solution assist in maintaining the crimp and are brought into action by the application of heat to the fabric, as by the hot rollers which subsequently crimp it.

If desired, the waterproofing of the fabric by the gelatin or proteid and formaldehyde solution may be dispensed with, for the fabric will be capable of receiving a permanent crimp and will be found to be fairly waterproof after being crimped.

The fabric, crimped by hot rollers either before or after the application of the above-mentioned waterproofing solution to it, will hold the crimp by reason of the setting action of the heat of the rolls on the substances with which it has been treated in conjunction with the dehydrating effect of the heat on the hydrated thread.

The proteid solution in which the hydrated cellulose fabric is first immersed may be made up as follows: albumen, twenty parts, by weight; water, seventy-nine parts, by weight; borax, one part, by weight. The temperature of this solution should not exceed 65° centigrade; or it may be made up of casein, fifteen parts, by weight; water, eighty-four parts, by weight; carbonate of soda, one part, by weight. The temperature of this solution should not exceed 65° centigrade.

The waterproofing solution in which after treatment with the proteid solution the fabric may be immersed can be constituted as follows—for example, gelatin, ten parts, by weight; water, 89.9 parts, by weight; paraformaldehyde, 0.1 part, by weight.

In some cases it is preferred to subject the hydrated cellulose fabric to a preliminary treatment with a solution of cellulose before it is immersed in or sprayed with the proteid solution, the cellulose being precipitated by drying or treatment with reagents, such as alcohol or sal-ammoniac, and the solvent removed by washing in water or dilute acids. For example, a solution having the following approximate proportions may be used: cel-

lulose, 2.6 parts, by weight; calcium chlorid, 1.3 parts, by weight; chlorid of zinc, of 1.8 density, 96.1 parts, by weight. This mixture is preferably made at a temperature of about 80° centigrade and used at about 50° centigrade.

If the above solution is employed, the cellulose is precipitated on the fabric by treatment with alcohol and the solvent removed by washing in water.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The process of producing a crimpable cellulose fabric consisting in coating the fibers of a hydrated cellulose fabric with a proteid in solution drying the fabric and applying to it a varnishing solution containing an insoluble formaldehyde compound.

2. A process of producing a crimpable cellulose fabric consisting in applying a solution of cellulose to the fibers of a hydrated cellulose fabric, precipitating the cellulose and washing out the solvent, and coating the fibers with a proteid in solution.

3. A process of producing a crimpable cellulose fabric consisting in first coating the fibers of a hydrated cellulose fabric with albumen in solution, drying the fabric and then applying to it a varnishing solution containing an insoluble formaldehyde compound.

4. A process of producing a crimpable cellulose fabric consisting in coating the fibers of a hydrated cellulose fabric with a proteid in solution.

5. A process of producing a crimpable cellulose fabric consisting in coating the fibers of a hydrated cellulose fabric with albumen in solution.

6. A hydrated cellulose fabric having a proteid coating thereon.

7. A hydrated cellulose fabric having a coating of albumen thereon.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ALBERT JOHN HILL.

Witnesses:
W. A. E. CROMBIE,
WALTER J. SKERTEN.