TREATMENT OF CELLULOSIC FIBERS AND FABRICS.

To all whom it may concern:

Be it known that we, FRANK LESLIE BARRETT and ROBINSON PERCY FOULDS, both British subjects, residing in Manchester, in the county of Lancaster and Kingdom of England, have invented certain new and useful Improvements in the Treatment of Cellulosic Fibers and Fabrics, of which the following is a specification.

This invention relates to improvements in the treatment of cellulosic fibers, yarns and fabrics, which may be generically termed textile materials especially of cotton and more particularly to the process of parch-mentizing such materials.

It is known in the art that treatment with sulphuric acid of 1.49 to 1.55 sp. gr. (which may be termed crépeing for brevity) gives an opaque wool-like effect to cotton, so that it assumes the appearance of “crépe.” This effect is quite different from the more transparent or parchment-like appearance known to be obtained by using sulphuric acid of a specific gravity of over 1.55 which may be termed “parchmentizing” for brevity.

According to the invention, in the process of parchmentizing material we employ as an addition a small quantity of formaldehyde, its polymers, or any derivatives or condensation product of formaldehyde which in contact with the parchmentizing agent will generate formaldehyde or a polymer thereof; thus we include hexamethylene tetramine for example but we exclude phenol-formaldehyde resins which do not appear to evolve sufficient formaldehyde under the conditions of operation.

It has been found that by adding up to 10% or above, of 40% formaldehyde solution, a number of valuable results are obtained. For practical purposes we prefer to employ an addition of from one half to one per cent of formaldehyde solution (40%) but we do not limit ourselves to the use of these quantities. The operations of parchmentizing of fibers, yarns and fabrics as distinct from paper are usually performed at 10—16° C., and we prefer not to exceed a temperature of 20—25° C. as otherwise there is danger of the material being tendered.

Although it is convenient to apply the reagents simultaneously, they may be used alternately if the conjoint action is thereby obtained, e. g. if a mixture is by any means produced in contact with the fabric.

The invention is specially useful where the material to be treated is wholly or partly immersed in the chemical agent or a solution thereof, but is also of value where the parchmentizing acid is applied locally to produce pattern effects.

Various advantages are obtained by the process, the chief of these being:

(a) The fabric or other material may be exposed to the action of the agent for a longer period of time without fear of damage.

(b) The penetrative properties of the active agent are very considerably increased.

The cellulosic material employed in the treatment may be in the form of fibers, yarns or fabrics of cotton linen or other similar substances, artificial silk or other artificial products, and the like. It is also possible to apply it to mixed yarns or union fabrics composed of any of the above in conjunction with wool, silk, hairs, or other fibers for the production of specific effects on the cellulosic constituents of each material, provided that the animal fiber of other admixtures are not appreciably affected by the chemical agents employed.

In the case of fabrics, it may be necessary or desirable to employ preliminary or subsequent mechanical or chemical treatment for the production of specific effects, and any such additional treatments may be employed in conjunction with the process according to the present invention.

The precise effect to be obtained by parchmentizing may be varied by the time of exposure to the acid. Effects difficult or impossible to obtain by the usual parchmentizing process without damage to the fabric may be produced by lengthening the time of the treatments. Effects similar to those resulting from the usual parchmentizing treatment may be obtained by the process with less fear of damage as greater latitude in the treatment is allowed. On the other hand, it is possible by giving treatments for shorter periods of time, to obtain varied effects. Light cloths treated for these short periods are much softer than those subjected to the usual parchmentizing practice but retain the characteristic transparency, and on embossing or calendering etc. (after being
suitably conditioned) with a cold or hot surface, show characteristic effects.

The use of formaldehyde in these connections thereby facilitates the carrying out of a “limited” acid treatment, whereby novel and valuable effects may be obtained.

The mercerizing properties of yarns and fabrics treated by the new process may differ from those of similar material treated by ordinary agents, for example, on mercerizing parchmentized fabric, the cloth usually assumes a hard transparent character. While it is possible to obtain this effect by mercerizing cloth treated by the new method, mercerization usually takes place more slowly than is otherwise the case, and may be retarded if larger quantities of formaldehyde are used in the acid mixtures during pretreatment.

On compressing parchmentized fabric by such processes as embossing, calendering or schreinering etc., new effects are obtained when formaldehyde has been employed. These processes produce on fabrics which have been treated long or short periods of time, a better covering than is otherwise obtainable, with production of a better defined pattern or more marked all-over effect. The parts subjected to pressure or temperature and pressure may vary in appearance from dull white to highly lustrous or glazed, according to the conditions of mechanical treatment. Compression may be performed before or after acid treatment.

By this invention it is possible to treat fibers and yarns of cellulosic materials with greater ease. Hitherto, this has been a very difficult proceeding owing to the rapidity of the action of sulphuric acid on these materials. Fabric or other forms of cellulosic material may be subjected according to the invention to consecutive treatments using crepeing or parchmentizing mixture or a combination of these or other chemical treatments, when an increased effect is obtained.

We declare that what we claim is:

1. The process of treating cellulosic textile materials with sulphuric acid of not less than 1.55 spec. grav. in presence of formaldehyde.

2. The process of treating cotton fabrics with sulphuric acid of not less than 1.55 spec. grav. in presence of formaldehyde as such.

3. The process of parchmentizing cellulosic textile materials with strong sulphuric acid in presence of formaldehyde.

4. The process of treating cellulosic textile materials with sulphuric acid of not less than 1.55 spec. grav. in presence of formaldehyde so that a limited acid treatment is effected.

5. The process of treating cellulosic textile materials with sulphuric acid of not less than 1.55 spec. grav. in presence of formaldehyde at temperatures not higher than 25° C.

6. The process of treating cellulosic fabrics in which the fabrics are treated with sulphuric acid of not less than 1.55 spec. grav. in presence of formaldehyde and also compressed but not during said treatment in addition to such treatment.

7. Cellulosic textile materials parchmentized with strong sulphuric acid in presence of formaldehyde.

In witness whereof, we have hereunto signed our names this 8th day of April, 1924, in the presence of two subscribing witnesses.

FRANK LESLIE BARRETT.
ROBINSON PERCY FOULDS.

Witnesses:

MARGOT DE L'ORT, HUBERT VENN.