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PAPER AND PROCESS OF MAKING SAME.

No Drawing.

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My invention relates to an improved paper and the method of making the same, and has for one of its objects the provision of an improved method for producing a grease proof paper.

A still further object of my invention is the provision of a method for increasing the grease proof characteristics of paper commonly referred to in the paper industry as grease-proof paper.

For the sake of clarity I may say that the term "grease-proof" as employed in the paper industry is inaccurate in that these so-called grease-proof papers are not actually grease-proof but will withstand the action of grease for a longer period than papers which are not said to be grease-proof. It is an object of my invention, therefore, as above stated, to increase the grease-proof characteristics of the so-called grease-proof papers.

Briefly my improved process consists in treating the various so-called grease-proof papers now in the market so as to increase their grease-proof characteristics, the method of my invention being extremely simple and relatively inexpensive so that paper produced by me in accordance with the present invention may be sold at a commercially practicable cost to the consumer.

Different types of paper may be treated by my improved process, as for example, vegetable parchment, which is a paper made by treating a nearly pure cellulose paper with a certain concentration of sulfuric acid, followed by thorough washing and drying. I find that even better results are obtained, however, by treating commercial grease-proof parchment paper, and if desired, a poor quality of such parchment paper. Such a parchment paper is made from wood pulp, bleached or unbleached, and owes such grease-proof characteristics as it possesses to the fact that a part of the cellulose has been converted to cellulose hydrate by severe beating and jordaning to such a degree that the sudden application of heat to the parchment, such as the flame of a match, for example, will cause blisters to form on the surface of the parchment. Except for this severity of treatment, which gives a stock which parts with its water with difficulty, containing more or less gelatinous material derived from the pulp and often termed cellulose mucilage, the methods em-

ployed in making such paper are those usually employed in paper making.

My improved process consists in taking any of the papers above referred to by way of example, or any other suitable paper, and before the same has been dried or after it has been partially dried passing the paper through a starch solution, maintained at a temperature depending upon results desired. In other words, the hotter the solution the more the penetration obtained. I have obtained satisfactory results by maintaining temperatures varying from 120° F. to 212° F. After treatment in the starch solution bath the paper is passed between squeeze rolls, to limit the amount of solution left on the sheet and to assist penetration. The paper is then dried in any suitable manner, as by passing the same over heated rollers or in any other convenient manner. This completes the process, subsequent calendering being optional.

The starch solution employed is variable depending upon the grades of starch employed as well as upon the results desired. For example, I have obtained excellent results by using starch giving a rather viscous solution with concentration as low as two per cent. On the other hand, good results have been obtained by employing a twenty per cent solution of a "thin-boiling" starch. In employing one grade of starch, the higher the concentration the greater is the retention of starch on the paper being treated, with a proportionate increase in grease-proof characteristics. From actual observation, I would say that a solution of from eighteen to twenty per cent concentration of a "thin-boiling" starch known as a starch gum or dextrine is probably the most satisfactory. However, I do not wish to be limited to the exact solutions mentioned, inasmuch as I believe higher concentrations will be found satisfactory and commercially practicable, which will reduce drying costs, and possibly produce a better quality of paper.

I wish it to be understood also that throughout the description and claims of this application, the expression "starch" is to be interpreted to mean not only starch, but modified starches, or starch products, as dextrine, etc.

In some instances it is desirable to employ additional materials to impart other char-

acteristics to my improved paper, and it is to be understood that the use of such additional materials is within the purview of my invention. For example, I may desire to increase the softness and flexibility of the finished product and such results can be obtained by the addition of hygroscopic substances to the starch solution, such as magnesium chloride, calcium chloride, glycerine, etc. The water resistance of the paper may be increased by the addition of rosin size and aluminum sulfate to the starch solution, while formaldehyde benzoate of soda, etc., may be added as preservatives and phenol, etc., as antiseptics.

What I claim is:—

1. As an article of manufacture, a paper containing starch, a part of the cellulose of the paper having been converted into cellulose hydrate.

2. As an article of manufacture, a paper containing not less than substantially two per cent (2%) by weight of starch and in which paper a part of the cellulose has been converted into cellulose hydrate.

3. The process which consists in beating and jordaning pulp to convert a part of its cellulose to cellulose hydrate and passing the resulting product through a starch solution bath.

4. The process which consists in beating and jordaning pulp to convert a part of its cellulose to cellulose hydrate, passing the resulting product through a starch solution maintained at a temperature ranging from 120° F. to 212° F., pressing, and then drying.

This specification signed this 12th day of August, 1925.

HAROLD A. SMITH.