

# UNITED STATES PATENT OFFICE.

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## PROCESS OF WATERPROOFING AND CRAPING PAPER.

SPECIFICATION forming part of Letters Patent No. 670,393, dated March 19, 1901.

Application filed January 19, 1901. Serial No. 43,919. (No specimens.)

*To all whom it may concern:*

Be it known that I, JAMES ARKELL, a citizen of the United States of America, and a resident of Canajoharie, in the county of Montgomery and State of New York, have invented certain new and useful Improvements in Processes of Waterproofing and Craping Paper, of which the following is a specification.

This invention relates to the art of making waterproof crape or crinkled paper, the object of the invention being an expeditious and economical process whereby the paper shall be made both flexible and waterproof. Among the chief difficulties encountered in the production of this paper is that of applying a suitable amount of the waterproofing material uniformly over the fabric in connection with the craping operation without lessening the flexibility of the craped product and with due economy of time, apparatus, and waterproofing material. If the paper is first craped, the wrinkles and corrugations are liable to take up an excessive and unevenly distributed amount of the subsequently-applied waterproofing material. On the other hand, if the waterproofing material is applied before the craping or crinkling operation that operation is liable to break or disturb the continuity and uniformity of the coating or impregnated film of the waterproofing material. In any case it is necessary, from considerations both of economy and utility, to employ the minimum adequate amount of waterproofing material and to properly apply it to the fabric of the paper. Unless properly applied or if the film of waterproofing material be too thick it is liable to crack or flake off in the subsequent manipulation or use of the paper.

My improved process consists in moistening the paper, then coating or impregnating it with a suitable amount of waterproofing material, and then craping and drying the paper, preferably conducting the drying operation at a temperature sufficient to melt the waterproofing material.

In the practical employment of this process I proceed substantially as follows: The paper is first dampened, preferably with water, to a suitable extent, according to the thickness of the paper and according to the extent to which it is desired to impregnate it with the

waterproofing material, the application of which constitutes the next step in the process. This material, which is preferably paraffin, is deposited in any suitable way upon one or both sides of the fabric. My preferred method of conducting these steps of the process is to pass the paper first through a vat of water and then through a vat of melted paraffin. The paper is then passed between rolls, which move to a suitable extent whatever surplusage or excess of water and paraffin may have been taken up. The paper is then craped or crinkled in any well-known way, after which the paper is dried, thus completing the process.

One effect of the craping operation as it is commonly performed is to break up or at least to disturb more or less the continuity or uniformity of the coating or impregnation of paraffin, and in order to restore that continuity and uniformity the drying operation is preferably conducted at a temperature which is sufficient to melt the paraffin, which then flows sufficiently to restore and renew those portions of the waterproofing which may have been removed, cracked, or otherwise disturbed by the craping operation.

When paper of a moderate thickness is dampened on one side only, or so that the dampness penetrates only part way through the paper, the paraffin or other waterproofing material when applied to the other side will enter the paper until it reaches or meets the dampened stratum, which checks the further penetration of the paraffin. Therefore in employing this process upon paper which is to be waterproofed only upon one side the depth of the waterproofing may be determined or regulated by regulating the depth to which the paper is dampened prior to applying the waterproofing material.

The best results of this process are obtained by keeping the water and the paraffin at a fairly high temperature, so as to avoid chilling the latter before it has become properly incorporated with the paper fabric. Where, as is recommended, the paper is passed through a body of water and a body of paraffin, means should be provided for properly and uniformly squeezing out or otherwise removing the surplusage of water and paraffin. I prefer to do this by means of rolls



between which the paper is passed and which operate to squeeze out the said surplusage, means being provided for regulating and maintaining a suitable pressure between the rolls. The paper after passing through the water may pass between one pair of these rolls, then pass through the paraffin, and then through another pair of rolls, or the paper may be passed through water and through paraffin and then through a pair of rolls, which squeezes out the surplusage, both of water and paraffin, at one operation. In many similar ways the details of manipulation may be varied or modified to suit the nature of the work, the apparatus to be employed, or the results to be attained.

Paper of the proper quality when treated by this process shows no visible evidence of paraffin, does not flake or crack, is flexible and elastic, and resists water for a length of time sufficient for practical purposes.

Having described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The process of making waterproof flexi-

ble paper, which consists in dampening the paper, applying thereto the desired coating of waterproofing material, and then craping and drying the paper.

2. The process of making a waterproof flexible paper, which consists in dampening the paper, applying thereto a surplusage of waterproofing material, removing the said surplusage, then craping the paper, and subsequently drying the paper at a temperature sufficient to melt the waterproofing material.

3. The process of making a waterproofing flexible paper, which consists in conveying the paper through water, then conveying it through melted paraffin, then removing the excess of water and paraffin, then craping the paper, and then drying the paper at a temperature sufficient to melt the paraffin and expel the water.

Signed at Canajoharie, New York, this 17th day of January, 1901.

JAMES ARKELL.

Witnesses:

CORNELIA R. SMITH,  
MAGGIE BLOSS.