

UNITED STATES PATENT OFFICE.

ISIDOR KITSEE, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR OF ONE-HALF TO CHARLES L. HAMILTON, OF WILLIAM PENN, PENNSYLVANIA.

METHOD OF MAKING PAPER MOISTURE OR GREASE PROOF.

SPECIFICATION forming part of Letters Patent No. 772,103, dated October 11, 1904.

Application filed February 8, 1902. Renewed March 14, 1904. Serial No. 198,112. (No specimens.)

To all whom it may concern:

Be it known that I, ISIDOR KITSEE, of the city and county of Philadelphia, State of Pennsylvania, have invented certain new and useful
5 Improvements in the Methods of Making Paper Water and Grease Proof, (Case No. 101,) of which the following is a specification.

My invention relates to the method of making paper impervious to water or grease.

10 The points of novelty will be designated in the claims concluding this specification, which contains such a full and clear description of my present invention as will enable others skilled in the art to which it appertains to
15 practice the same.

Cases often arise where it is preferred to employ paper proof against moisture or grease. I refer here only to paper bags which inclose
20 meats for shipment and where it is desired that the meat should be protected entirely from outside influence and the grease and moisture of same shall not penetrate the bag; but besides this different occasions have arisen where paper would be substituted for other material,
25 provided the same can be made in a cheap and economical way proof against moisture and grease.

To produce such paper is the aim of my invention.

30 It is well known that if a fibrous material is subjected to the process of nitration—is immersed in a liquid containing nitric acid or any other nitrate—the material loses its cellulose construction and assumes a state where-
35 in it is easily dissolved in an alcohol-ether, acetone, amyl acetate, or acetic acid; but in this state the material becomes entirely amorphous and forms a jelly-like substance with the solvent.

40 In technic the nitrated material is mostly called "soluble cellulose" and the material dissolved is called "dissolved cellulose." These operations are old in the art and are well understood by persons specially versed
45 in the art of making celluloid, celluloidine, and other alike compounds. In carrying out my invention I make use of this property of the fibrous material to become soluble through

the process of nitration; but it is a *sine qua non* with my invention that the process shall
50 not be carried out in its entirety, but should be stopped as soon as the surface has become nitrated enough to be slightly soluble in one or the other of the above-mentioned solvents. Whereas, therefore, in all processes of nitra-
55 tion it is the aim to produce a thoroughly nitrated article, one which readily dissolves in its entirety in the solvents above mentioned, it is the aim of this my invention that the paper as such should not lose any of its strength
60 due to its fibrous condition, but that its surface alone should have changed its structure so as to be enabled to become a soluble cellulose through the application of one of the solvents. 65

The usual liquid for nitrating fibrous material consists of one part of nitric acid to two parts of sulfuric acid by measure, and, as said above, the fibrous material has to be kept in this liquid until it becomes entirely soluble. 70 In this my invention I rather prefer that the liquid should consist of one part of nitric acid and three parts of sulfuric acid, for the reason that the sulfuric acid imparts to the paper a greater strength, as is well known in the process
75 of parchmenting paper. In my experiments, which mostly had for their purpose to produce a paper useful for wrapping or packing, I allowed heavy wrapping-paper made of wood and straw to remain in this liquid (tempera-
80 ture about 60°) only for from one and a half to two minutes. This paper was then washed in a liquid containing ammonia or sometimes containing carbonate of soda and after drying subjected for one minute to the action of one
85 of the above-mentioned solvents.

I found that it is not well to use for this my invention either alcohol-ether or acetone, but that amyl acetate, and specially acetic acid, are to be preferred, and I, to the exclu-
90 sion of all others, now use the same.

The product is rather tougher than the paper before undergoing the process, and that only the surface is made slightly soluble can be seen therefrom that the surface itself has
95 assumed a brownish hue due to the nitrating,

whereas the inner part of the paper has retained its former grayish-white appearance. I do not claim here the nitrating of paper, as such is old, and my claims are limited so as
5 to include only the partial nitration of paper whereby the same is made waterproof and greaseproof without losing its peculiar structure and toughness it originally possessed. Out of the product packing-bags may then be
10 produced, and these bags will not allow the moisture or grease to penetrate; but to produce these bags it is not necessary to use any foreign substance, such as the usual paste, for the purpose of pasting together the edges
15 so as to form a receptacle, for the reason that the surface is before drying sticky enough to perform this function, and it is my purpose to produce these bags out of the paper treated in the manner as described before the
20 surface is dried and is sufficiently moist to hold together. This part of my invention will be more clearly set forth in a separate application.

I have not in this specification stated that
25 the paper after being made waterproof can be carried through rollers for the purpose of smoothing the same and for the further purpose of compressing the moist surface, as the process of carrying papers through rollers,
30 heated or otherwise, is well known by persons versed in the art of paper-making.

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

35 1. The process of making paper water and grease proof which consists in making the surface of said paper soluble and then subject-

ing said surface to the action of a solvent leaving the body of said paper substantially in its original condition. 40

2. The process of preparing sheets of paper so as to be water and grease proof which consists in subjecting said paper to the action of nitric and sulfuric acids for a period necessary to make the surface soluble, but leaving the body of said paper substantially in its original condition as to its solubility, and then subjecting the surface to the action of a solvent. 45

3. The process of producing moisture and grease proof paper which consists in first treating the surface of said paper with a liquid containing a nitrate, and then treating said surface with a material capable of dissolving soluble cellulose. 50 55

4. In the process of producing a moisture and grease proof paper, the following steps, to wit: first, making the surface of said paper soluble, and second, subjecting said soluble surface to the action of a solvent. 60

5. The process of water and grease proofing the surface of paper which consists in providing said surface with a layer of amorphous cellulose through the process of nitration, and subjecting said surface then to the action of a solvent. 65

In testimony whereof I hereby sign my name, in the presence of two subscribing witnesses, this 30th day of January, A. D. 1902.

ISIDOR KITSEE.

Witnesses:

EDITH R. STILLEY,
CHAS. KRESSENBUCH.