

UNITED STATES PATENT OFFICE.

WARREN B. HOWE, OF CHICAGO, ILLINOIS.

MOISTURE-PROOF PAPER.

SPECIFICATION forming part of Letters Patent No. 569,874, dated October 20, 1896.

Application filed March 28, 1896. Serial No. 585,186. (No specimens.)

To all whom it may concern:

Be it known that I, WARREN B. HOWE, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Moisture-Proof Paper; and I do hereby declare that the following is a full, clear, and exact description thereof.

This invention relates to an improved construction in paper or straw board, such as is used in making boxes and cartons, for the purpose of rendering the same waterproof or capable of better withstanding the action of moisture.

In the manufacture of paper or straw board according to my invention I first make a liquid solution in the nature of a resin soap, consisting, usually, of resin and soda-ash. This solution is applied to the surface of the paper and allowed to sink into the same, and immediately thereafter a solution of alum is also applied to the paper and the paper then allowed to dry. As a result of these steps the paper is given a waterproof quality and at the same time impregnated or partially filled with alum in its natural or crystalline form. As is well understood, the addition of alum to a resin soap results in the resin therein being coagulated and restored to its natural or insoluble form, and inasmuch as the resin, when combined with the alkali, is absorbed uniformly into the fibers of the paper it follows that when coagulation takes place the resin will remain distributed in the paper or intermingled with the fibers thereof, while at the same time the alum will also remain in the paper, and upon the evaporation of the water therefrom or the drying of the paper will all remain in crystallized form within the paper. The paper thus treated therefore possesses a moisture-resisting character to a considerable degree by reason of the presence of the resin therein, while it will also possess additional body or stiffness by reason of the addition of or the incorporation therewith of the alum. Moreover, inasmuch as alum has the effect of making stronger or brighter any coloring-matter employed in tinting or giving color to the paper-stock, it follows that by an after treatment of the character described paper which when originally made has only a small quantity of coloring-matter added thereto will pos-

sess the strength or intensity of color which could only otherwise be given by additional and much greater quantity of coloring-matter, at a larger expense, to the paper-stock in the process of making the paper.

In the treating of heavy paper or straw board, such as is used in making boxes, I prefer to apply the solutions of resin and alkali and of alum in limited quantities to one side only of the paper, so that the treatment will affect a part only of the thickness of the paper at one side of the same, thereby securing sufficient waterproofing effect for the purposes required, while effecting a large saving in the material used over that which would be necessary to fill the paper with resin and alum throughout its entire thickness. I propose to also subject paper treated in the manner described on one side only to a further treatment on its opposite or untreated side by applying thereto liquid silicate of soda in limited quantities and a surface coating of paraffin in the manner and for the purpose set forth in Patent No. 524,024, granted to me August 7, 1894. Paper so treated with resin and alum on one side and with silicate of soda and paraffin on its opposite side is of special advantage for use in packages used for food products and similar articles of commerce, for the reason that it possesses waterproof qualities to a high degree, while at the same time the outer surface of the package (which will be the one to which the resin and alum is applied) is not injured in appearance, but, on the contrary, improved by the addition of the alum, while at the same time it is adapted to receive paste or other adhesive substances used for applying labels or wrappers to the package.

The special advantage gained by the double treatment of the paper referred to will be better understood from the consideration of the fact that if paper such as is used for making the shells or bodies of packages be treated on its inner surface with silicate of soda and paraffin to exclude moistures and grease, as set forth in said prior patent, and if paste be applied to the outer surface of the shell or body (after the contents of the package have been inserted in the shell or body) for the purpose of pasting the external wrapper thereon, the moisture in the paste will often penetrate the

paper to such an extent as to soften the body or shell, so that it is liable to be thrown out of shape by the weight of the contents before it has an opportunity to become dry.

5 By double waterproofing, in the manner hereinbefore set forth, the inner surface of the paper is waterproofed by paraffin, making it of a character for contact with food products of any kind without liability of injury to the latter, while the external surface is also made waterproof without affecting in any way the capacity of the paper to receive paste or other adhesive substance. Moreover, such external waterproofing excludes moisture from the silicate of soda which is beneath the paraffin at the inner surface of the paper, thereby preventing access of moisture to the silicate of soda from either side of the paper. In the construction described, therefore, the silicate of soda is protected at one side of the paper by the resin deposited therein and at the opposite side of the paper by the waterproof coating of paraffin. Such protection of the silicate of soda at both sides of the paper is of great importance for the reason that if the silicate of soda be decomposed by the action of moisture it no longer has any capacity for withstanding the action of grease or preventing the same from penetrating the paper, so that when the paper is treated on both sides, as described, the liability of the silicate of soda being destroyed by moisture is entirely avoided and the paper retains its desirable qualities of being both grease and moisture proof for an indefinite length of time. In

other words, by the joint action of the two coatings the interposed silicate of soda is preserved and the paper is therefore a much better and more durable one than that described in said prior patent, which is treated with silicate of soda and paraffin only, besides being capable of receiving paste or glue, as hereinbefore set forth. 40

Obviously in place of silicate of soda, which is employed to prevent the passage of oil or grease through the paper, and to limit the quantity of paraffin required (for preventing it from sinking into or being absorbed by the paper) any equivalent material, such as glue or shellac, may be used. 50

I claim as my invention—

A paper or straw board, having incorporated in its surface fibers at one side thereof resin and alum and having its surface fibers at its opposite side saturated with silicate of soda or its equivalent and provided at such opposite side with a surface coating of paraffin whereby the paper is rendered waterproof on both sides and the silicate of soda or other grease-proof material is protected from moisture. 55 60

In testimony that I claim the foregoing as my invention I affix my signature, in presence of two witnesses, this 20th day of March, A. D. 1896.

WARREN B. HOWE.

Witnesses:

C. CLARENCE POOLE,
WILLIAM L. HAY.