

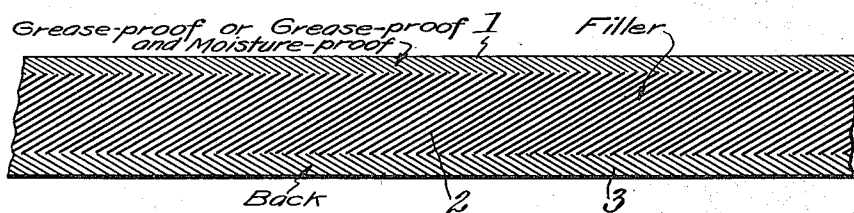
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Inventors:

John J. Gannon
Louis W. Makle
Fred B. Wells

by W. H. Finckel

Attorney

UNITED STATES PATENT OFFICE.

JOHN J. GANNON, LOUIS W. MAHLE, AND FRED B. WELLS, OF RITTMAN, OHIO, ASSIGNORS TO THE OHIO BOXBOARD COMPANY, OF CLEVELAND, OHIO, A CORPORATION OF OHIO.

PAPER.

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In packaging certain merchandise, such as lard, butter, and other greases and fats, it is desirable to have a container which is made of a grease-proof material; also, in packaging materials, which are, from their inherent nature, apt to absorb moisture from the atmosphere, it is advisable to provide a container which is made of a moisture-proof material; it is also advisable, in packaging materials which deteriorate in a humid or moist atmosphere, and which are, moreover, of a greasy or oily nature, such as nuts and soaps, to provide a container which is both grease-proof and moisture-proof; and it is the object of our invention to produce a material, in the nature of a boxboard, which is grease-proof, or both grease-proof and moisture-proof.

Various types of papers, and of boxboard and cardboard, have been produced for providing a material suitable for the construction of grease-proof, moisture-proof, or both grease-proof and moisture-proof containers. Some of such materials comprise a base of ordinary paper, or cardboard or boxboard, to one surface of which is affixed, by pasting or cementing, a sheet of ordinary paraffine or wax or other suitable pergameneous paper. This type of material is more or less expensive to manufacture, and must, necessarily therefore, be sold at a rather high price, due to the fact that in its production at least three distinct operations are necessary, namely, production of the paper, cardboard or boxboard, production of the moisture-proof or grease-proof paper, and combination of these two to form the finished, laminated material.

Moisture-proof material has been produced also by pasting together two or more sheets of paper, cardboard or boxboard with asphalt or water glass (sodium silicate) or the like as the adhesive. This type of material, although effective to prevent penetration of water or moisture through it, is also relatively expensive to manufacture.

As distinguished from papers and boards of the types last above mentioned, our invention contemplates the incorporation with a boxboard of ordinary type, of a grease-proof or both grease-proof and moisture-proof material integrally with the main body of the boxboard in a single paper making operation.

The invention consists in a paper, cardboard, boxboard, or the like, comprising, essentially, a filler of ordinary boxboard stock, such as is made from old newspapers, having combined with it, preferably as a layer or coating, formed during manufacture as an integral part of the finished sheet, a grease-proof material produced by treatment of sulphite pulp in a particular manner, as will be hereinafter pointed out; this combined sheet being provided, if desired, with a back of ordinary type, formed of a slightly higher grade of paper stock than the filler; and the invention consists also in the incorporation with the grease-proof material of water or moisture-proofing agents, as we will proceed now to explain and finally claim.

The drawing represents diagrammatically a cross sectional view upon a greatly exaggerated scale, of a piece of boxboard made in accordance with our invention and having a surface layer or coating 1 of grease-proof or both grease-proof and moisture-proof material, a filler 2 and a back 3.

The stock for forming the filler is produced in the ordinary manner by working old newspapers and the like in an ordinary beater, and the stock for the back is similarly produced, but has added to it agents or materials for making it of a higher grade and better color than the filler.

The grease-proof stock, for forming the layer or coating 1, is produced in the following manner:—Pure sulphite pulp is worked in a beater having, as distinguished from the ordinary beater, a roll of stone, preferably of basalt lava, which, in its operation upon the stock, crushes the fibers of the sulphite pulp instead of cutting them, as distinguished from the operation of the ordinary beater having a roll with steel fly bars. This crushing of the fibers of the stock, hydration of same incident to the beating action, and the mechanical working of the stock by the stone roll, so breaks up and macerates the sulphite pulp that it forms a grease-proof product. This operation and the stock used (sulphite pulp) are the same as are employed in the manufacture of one well-known type of pergameneous paper.

The working of the sulphite pulp in a beater having a stone roll, as described, has

been found to produce a change in the stock, whereby it is rendered grease-proof, or grease-repellent, which is not produced in the same stock by working it in the ordinary beater wherein the ordinary roll with steel fly bars is used. It has been found possible to produce the same change in sulphite pulp stock by working it in a ball mill, or with a mortar and pestle.

This stock, formed from pure sulphite pulp, is, as stated, grease-proof or grease-repellent, and is therefore suitable for incorporation with filler stock to form a grease-proof paper or board. However, if it is desired to produce a paper or board which is both grease-proof or grease-repellent and water or moisture-proof, it is necessary to add to the sulphite pulp stock, preferably during the beating process, a suitable wax, resin size, or other sizing agent, which is miscible with the sulphite pulp stock. In the case of the addition to the stock of a wax, such as paraffine wax, it will be found advisable, in order to produce a homogeneous and inseparable mixture of the wax and the sulphite pulp stock, first to prepare an emulsion of the wax, and then add such emulsion to the sulphite pulp stock.

In forming the paper or board of our invention, we use, preferably, a cylinder machine (although our material may be produced by the Fourdrinier process), and after the stock for the various component parts of the paper, above enumerated, has been suitably beaten, digested and washed, it is deposited by the cylinders of the machine (any number of cylinders being used to produce the required thickness of paper) to form the sheet or web. No particular order of deposition of the various paper stocks in the formation of the sheet is essential, but we have found that the best results are obtained either by depositing first the pure sulphite pulp stock, then the filler, and then the back, or first the back, then the filler, and then the pure sulphite pulp stock. The sheet thus formed is thereafter squeezed, dried and calendered in the usual way.

Paper or board manufacturers would probably say that it would be impossible to incorporate pure sulphite pulp stock treated to form a grease-proof product, as above described, in a board, for the reason that, being a much slower stock, (that is, one through which water is not easily expressed) than stock generally used in board manufacturing, the water could not be driven from the stock effectively, and the finished sheet would contain "blows" or bubbles between the sulphite pulp stock layer or coating and the filler or other layer next adjacent to it; but we have found that all of the water may be driven off in a direction away from the sulphite pulp stock

layer, and a sheet produced which is entirely free from "blows", bubbles or other imperfections.

We have hereinbefore described our invention as applied to a paper or boxboard suitable for the formation of containers for various articles of merchandise, and in thus describing the invention, we have intended that it should be understood that the paper or boxboard is used alone for the formation of such containers and without any strengthening or stiffening backing. However, the paper or board produced in accordance with our invention may be put to a variety of uses. It may be used, for example, as a liner or back for corrugated board or fiber board, or it may be incorporated in what is known as pasted board with asphalt, water glass, glue, or the like, as the adhesive, and will, when thus used, produce a material which, in addition to its other ordinary characteristics, is grease-proof or grease-repellent or both grease-proof and moisture or water-proof.

Reference is made to our copending application for patent for improvement in paper making, filed April 6, 1925, Serial No. 21,221 which covers the process by which the hereinbefore described paper is produced.

The invention is susceptible of various modifications within the scope of the following claims.

What we claim is:—

1. Paper having incorporated with it a definite layer of grease-proof material forming an integral part of it.
2. Paper having incorporated in it during its formation in the paper making machine, a layer of grease-proof material forming an integral part of it.
3. Paper having incorporated in it a grease-proof material formed of pure sulphite pulp stock forming an integral part of it.
4. Paper having incorporated in it a layer of grease-proof material formed of pure sulphite pulp stock forming an integral part of it.
5. Paper having incorporated in it a layer of grease-proof material comprising sulphite pulp stock treated as specified, forming an integral part of it.
6. Paper having incorporated in it a layer of grease-proof material formed of pure sulphite pulp stock deposited therein during the paper making process and forming an integral part thereof.
7. Paper having incorporated in it a layer of pergamenous material forming an integral part of it.
8. Paper having incorporated in it a layer of pergamenous material deposited therein during the paper making process and forming an integral part of it.
9. Paper having incorporated in it as a

surface layer during the formation of the paper web a grease-proof material forming an integral part of said web.

5 10. Paper having incorporated in it as a surface coating a layer of pergameneous material deposited thereon during the paper making process and forming an integral part thereof.

10 11. Paper having incorporated in it during the formation of the paper web a layer of grease-proof and moisture-proof material forming an integral part of said web.

12. Paper having incorporated in it during the formation of the paper web a layer of grease-proof and moisture-proof material 15 comprising pure sulphite pulp stock and a moisture-proofing agent forming an integral part of the web.

In testimony whereof we have hereunto set our hands this third day of April A. D. 20 1925.

JOHN J. GANNON.
LOUIS W. MAHLE.
FRED B. WELLS.