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GREASEPROOF PAPER

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This invention relates to an improved method of preventing greasy and oily exudations from paper packages of products which tend to give such exudates through paper.

It is well known that many articles of commerce of an oily or greasy nature are ordinarily packaged in special containers which add materially to the cost of the product, but which are made necessary because of the tendency of such products to exude oil or grease through paper or other commercially available packaging or wrapping material. Thus it is the practice to package, for example, peanut butter, lubricating oil, salad oil, shortening, and many other products, in glass or metal containers. Similarly, butter, bacon, soap, and many pharmaceutical products of a particularly oily or greasy nature are customarily wrapped in specially treated paper such as parchment and the like, or are enclosed in multi-layers of wrapping material in an attempt to minimize emission of oil or grease through the container. Most of the commercially available wrapping papers are but partially successful in accomplishing the desired end. It may easily be recognized that it would be highly desirable to be able to package greasy or oily products of all types in paper containers rather than in the more expensive packaging materials now employed.

It is, accordingly, an object of the invention to provide a method whereby greasy and oily products, or products tending to give greasy or oily exudations through paper, may be enclosed in paper containers without danger of giving such exudates therethrough.

It has now been found that the foregoing object may be accomplished by enclosing the above suggested type of greasy and oily products in paper containers bearing a substantially continuous surface coating comprising as the essential ingredient a polyvalent metal salt of cellulose glycollic acid. The packaging material employed may be prepared by coating wrapping paper, cardboard, Bristol board, or box board, with an aqueous alkaline solution of a polyvalent metal salt of cellulose glycollic acid, to be defined more particularly hereinafter. Any of the conventional coating methods may be used for applying and spreading the coating which is normally deposited in such thickness as to insure the enclosure within the coating of any upstanding fibers on the paper surface.

The salt of cellulose glycollic acid used in the present invention is preferably one which is derived from that type of cellulose glycollic acid

whose alkali metal salts are soluble in water. Such cellulose glycollic acid usually contains from about 0.4 to about 0.8 etherifying groups per anhydro-glucose unit. The polyvalent metal salts of this type of cellulose glycollic acid are substantially insoluble in organic solvents and are unaffected by oils and greases of all types, including mineral, vegetable, and animal oils, natural fats, synthetic shortening, and waxes, both of the hydrocarbon and the ester type. The polyvalent metal salts which may be employed include those of aluminum, zinc, titanium, tin, iron, chromium, copper, nickel, cobalt, zirconium, and the like, though, because of the requirement that coating materials for use in connection with foodstuffs be non-toxic, it is preferred to employ aluminum cellulose glycollate, particularly in those packages which are to be employed in conjunction with foodstuffs. Aluminum cellulose glycollate is a colorless, odorless, and non-toxic product, insoluble in water but soluble in dilute aqueous solutions of alkalies. All of the polyvalent metal salts of cellulose glycollic acid suggested above may be brought into solution in an aqueous medium by incorporating in said medium from 0.2 to 1 per cent of an alkali which preferably should be of the volatile type, e. g., ammonia. Coatings deposited on paper from such dilute solutions of the polyvalent metal cellulose glycollates are not only impermeable to greases and oils, but remain unbroken in the presence of water, except when the amount of water present is sufficient to disintegrate the paper base.

When the coating comprising a polyvalent metal cellulose glycollate is applied to a very smooth surfaced paper base under optimum coating conditions, a continuous film of the salt may be only of the order of 0.1 mil thick. When, however, a rough surfaced paper is to be employed it may be necessary to apply a coating of the order of 2 mils or more in thickness in order that it be continuous. All these coatings, including the thick ones, are tough and flexible and remain unbroken after creasing and handling, and consequently retain their impermeability to grease and oil after such treatment.

The following example illustrates the manner in which the preferred packaging materials may be produced and the advantages accruing to the present invention. A solution was prepared by dissolving 4 parts by weight of water-insoluble aluminum cellulose glycollate in 100 parts by weight of 0.5 per cent ammonium hydroxide. The solution was spread on a sheet of paper board with the aid of a doctor knife, at a thickness

sufficient to cover the upstanding surface fibers of the board. The coating was dried and the paper board cut into sections for test purposes to determine the degree of grease proofness afforded by the surface coating. Various oils and greases were pressed upon both flat and folded pieces of the coated paper. The folded pieces employed as a test of the effect of creasing upon grease resistance were made from squares of the paper 2.5 inches on a side, folded to form boxes 1.5 inches square at the base and with sides 0.5 inch high. The boxes employed in the crease test were held in shape by suitable supports. Each of the samples being tested was examined periodically for signs of penetration of oil or grease. Uncoated specimens failed in less than 1 hour in the case of oils such as peanut oil and in less than 24 hours in the case of fats such as butter. The coated specimens both flat and creased were still satisfactory after 120 hours in contact with oil or fats. The foregoing test was conducted at room temperature but similar tests carried out at 70° C. indicated that the coated wrapping materials of the present invention withstand the effects of oil and grease at this elevated

temperature for periods up to 200 hours or more without failure, depending in part upon the thickness of the deposited coating.

Because of the combination of advantageous properties, including resistance both to water and to oily substances, the present invention offers considerable advantage over the use of papers coated with other cellulose ethers heretofore disclosed as having certain grease proofing characteristics.

We claim:

1. The method for grease-proofing a paper sheet which includes: treating at least one surface of the sheet with an aqueous solution of aluminum cellulose glycollate and ammonia; and drying the treated sheet.

2. The method which includes: dissolving aluminum cellulose glycollate in dilute aqueous ammonia; coating a paper sheet with the so prepared solution; and drying the coated sheet.

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