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OIL AND MOISTUREPROOFING COMPOSITION AND PRODUCTS MADE THEREFROM

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This invention relates to waterproofing and moistureproofing and oilproofing compositions and products made therefrom and it has for its object to provide a cheap but highly efficient means for making moistureproof paper, cardboard, paper board and the like, adapted for use in many relations but particularly for the packaging of any substance of a hygroscopic nature or likely to be injured by the access of moisture thereto or adapted for use in oilproofing containers for oils, especially motor oils.

Many millions of dollars worth of food stuffs are lost annually through the failure of the containers in which they are packed to effectively exclude moisture. Many attempts have been made to provide moistureproof packages for packaging food products and especially those sold at retail over grocers' counters. However, the element of cost has entered into the matter as well as certain other practical considerations, such, for example, as the production of a material for the packages which will be free of objectionable odors, present an attractive appearance, take printing readily, have the proper "feel", be free of any tendency to tackiness and be free of any characteristics which would cause them to hold dust and become dirty.

In the attempt to produce a suitable package within practical limits of cost, paper board has been treated with asphalt, either as a surface coating or as a lamination within the said board. The composition of the present invention produces a material much superior to the asphalt treated papers from the standpoint of efficiency in the repulsion of moisture and as containers for oil.

It has also been attempted to secure the desired moistureproofing results by coating paper or paper board with paraffin or wax. Such products are objectionable in that it is necessary to wax after the printing operation. Further, these materials are brittle, they crack on the folds and they check in cold weather to such an extent as to open up passages through which moisture may penetrate.

The present invention resides in combining common rubber of commerce with a hydrogenated oil and more particularly with a hydrogenated animal or vegetable oil. I find hydrogenated fish oil, in particular, to give practically perfect results in the relation stated, namely, as the principal ingredient of the composition and when brought into complete admixture with the rubber to render the whole a uniform homogeneous mass adapted for use as a surface coating for

paper, paper board, cardboard, and the like, or to be used as the coating of an inner layer of such paper or cardboard or to itself constitute a laminating layer within such paper or cardboard.

While I prefer to use hydrogenated fish oil because I find it so highly efficient, I also contemplate the use of castor oil, cottonseed oil, sun flower seed oil, and any other hydrogenated oil or fat which I find to give the desired results.

For certain purposes and for convenience in handling I frequently find it desirable to emulsify the fish oil and rubber composition. This may be done through the use of any suitable emulsifying agent, such as casein, soap, etc., and vigorous agitation. In carrying out the emulsification step water may be added to the extent necessary to get the desired consistency of the resultant composition.

While I have emphasized the importance of this composition in the manufacture of paper board and like products, it will be apparent that it may be used as a coating composition for oil or waterproofing, in many other relations, and it is to be understood that the invention is not limited to the specific use recited.

As an example only, and not as a limiting disclosure, I may say that in preparing the composition for use we would take 14 parts by weight of finely divided Ceylon Grisley crepe rubber and 86 parts by weight of hydrogenated fish oil. Fish oil, after hydrogenation, approaches the state of a solid of a water repellent nature and one that is very readily liquefiable under temperatures but slightly elevated above normal. The rubber and hydrogenated oil are slowly heated, under conditions which will protect them against damage as, for example, in a double walled kettle, the interior of which is heated by hot water or steam contained between the inner and outer walls of said kettle. The heating is continued until the rubber and the hydrogenated fish oil are melted and brought to such liquefied state that, by suitable agitation, they may be mixed into a completely homogeneous mass. A rubber solvent may be employed if desired but is not absolutely essential. The resultant hydrogenated oil-rubber composition, presenting a solid when the mixture cools, may then be utilized as hereinbefore set forth for the purpose of making a completely waterproof paper adapted for use in the formation of containers and especially food containers. Further, the aforesaid mixture may be made permanently of a pasty or semi-liquid nature by emulsification with the addition of water, as de-

scribed. Whether the emulsified or non-emulsified product is used depends entirely upon the nature of the product being manufactured. I find that when a lamination or layer of paper used in building up a paper board or cardboard is coated with the emulsified product described or when such emulsified product is used as a laminating layer between two layers of paper board, the water of emulsification tends to bring about an actual impregnation of the paper by this composition in a way which would not be possible if it were not for the presence of some substance, such as water, for which the paper has an affinity. This water of emulsification enters the interstices of the paper and leaves what is substantially a continuous and unbroken layer or sheet of the rubber and oil which is absolutely impervious to moisture at all points. Another advantage residing in the use of this composition is that it is inherently adhesive and it serves as the binding means by which the layers of paper board may be united to each other. It has the further advantage that it sets quite rapidly and this permits more rapid operation of the paper board laminating machines than would be possible with a slower drying or setting material. For example, it may be stated that paper board laminating machines, such as those making paper board for the manufacture of paper boxes, travel about 200 feet per minute. When it is attempted to coat the material being manufactured, with paraffin, this rate of travel must be cut to 32 feet per minute because of the slow rate of drying of the paraffin. The same is true in greater or lesser degree of other materials which it has been attempted to incorporate in the board being manufactured.

The necessary plasticity may be imparted to the hydrogenated oil-rubber composition to adapt it to coat paper or paper board plies or other surfaces to be moistureproofed or oilproofed, either by emulsification with water as described or by heating the solid or emulsified semi-solid oil-rubber composition.

I designedly avoid the use of any rubber substitutes containing resins because resins are likely to impart such increased brittleness as would lend to the product a tendency to cold check and crack and open up interstices through the protective film which would destroy its moisture and oilproofing characteristics. While I have laid considerable stress upon the moistureproofing characteristics imparted to the paper products by the use of this invention, the oilproofing characteristics likewise imparted to such product are of importance. I have impregnated or internally coated quart paper bottles with this composition and have found them capable after such treatment, of retaining mineral oils such as motor oils, over a period of many weeks, without seepage or leaking of such oils. This is of importance since it will render possible the substitution of paper containers for the glass or metal containers now used for the retailing of motor oils. While I have emphasized the importance of the exclusion of moisture in the packaging of certain products, the retention of moisture is of equally great importance in the packaging of other products. For example, in the packaging of crackers, small cakes, and the like, moisture must be excluded, because such products as these tend to become soggy when moist. Upon the other hand, in the packaging of such products as coconut, soap flakes, and the like, it is just as important to retain the moisture.

Otherwise, when the housewife opens the package of soap flakes, she will be aggrieved at finding it half empty and the soap flakes hard. This condition is brought about by the escape of moisture from the soap flakes, which causes them to shrink and become dry and hard.

I wish it to be understood that the invention is not limited to the proportions of materials named but that it includes within its purview such reasonably fair equivalents thereof as fall within the terms or the spirit of the appended claims.

Having described my invention, what I claim is:

1. A composition for moistureproofing paper products comprising a homogeneous mixture of a hydrogenated oil and rubber, the rubber being substantially free of brittle constituents.

2. A moistureproof composition for paper products comprising a homogeneous aqueous emulsification of a hydrogenated oil and rubber, the rubber being substantially free of brittle constituents.

3. A composition for moistureproofing paper products comprising a homogeneous mixture of a hydrogenated fish oil and rubber, the rubber being substantially free of brittle constituents.

4. A moistureproofing composition for paper products comprising a homogeneous aqueous emulsification of a hydrogenated fish oil and rubber, the rubber being substantially free of brittle constituents.

5. A moistureproofing composition for paper products comprising a homogeneous aqueous emulsification of a hydrogenated non-mineral oil and rubber, the rubber being substantially free of brittle constituents.

6. A paper product impregnated with a composition consisting of a hydrogenated fish oil and rubber, the rubber being substantially free of brittle constituents.

7. A paper product impregnated with an emulsified composition consisting of a hydrogenated fish oil and rubber, the rubber being substantially free of brittle constituents.

8. A paper product impregnated with a composition consisting of a hydrogenated non-mineral oil and rubber, the rubber being substantially free of brittle constituents.

9. A paper product impregnated with an emulsified composition consisting of a hydrogenated non-mineral oil and rubber, the rubber being substantially free of brittle constituents.

10. A laminated paper product at least one of the laminations of which is impregnated with and secured to another by a composition comprising a hydrogenated oil and rubber, the rubber being substantially free of brittle constituents.

11. A laminated paper product at least one of the laminations of which is impregnated with and secured to another by a composition comprising a hydrogenated fish oil and rubber, the rubber being substantially free of brittle constituents.

12. A laminated paper product at least one of the laminations of which is impregnated with and secured to another by a composition comprising emulsified hydrogenated fish oil and rubber, the rubber being substantially free of brittle constituents.

13. A laminated paper product at least one of the layers of which is impregnated with and secured to another layer by a moistureproofing composition comprising a hydrogenated oil and

rubber, the whole being emulsified with water, the rubber being substantially free of brittle constituents.

14. An adhesive and moistureproofing composition for paper products, consisting of the following ingredients combined in substantially the proportions stated, to wit: a hydrogenated oil, substantially 86%, and a rubber product 14%.

15. An adhesive and moistureproofing composition for paper products, consisting of the following ingredients combined in substantially the proportions stated, to wit: a hydrogenated oil substantially 86%, and a rubber product 14%, the whole being emulsified by the addition of an emulsifying agent.

16. A laminated paper product, the laminations of which are impregnated with and secured to each other and waterproofed by an adhesive composition comprising an adhesive, non-brittle, rubber and a hydrogenated oil, the oil and rubber being brought into intimate and homogeneous admixture prior to the application of the same to the laminations of the paper product, the proportion of rubber to hydrogenated oil being such as to render the whole adhesive, and the composition being free of ingredients which would destroy the adhesive nature of the composition.

17. A moistureproofing composition for paper products, comprising a homogeneous emulsification of a hydrogenated fish oil, rubber and water, the whole being of such a degree of liquidity as to adapt it to coat and waterproof paper board.

18. A composition of the character described, comprising a homogeneous mixture of a hydrogenated oil and rubber, of such consistency as to adapt it to constitute a uniting adhesive for the laminations of paper board, in the manufacture of the latter.

19. A composition of the character described, comprising an emulsification of a hydrogenated oil and rubber, of such a degree of liquidity as to adapt it to coat and waterproof paper board.

20. A composition of the character described, comprising an aqueous emulsification of a hydrogenated oil and rubber, of such a degree of liquidity that when applied to the laminations of laminated paper board, its water of emulsification will intimately engage in the pores of the paper board and leave an unbroken layer of the rubber and hydrogenated oil to adhesively unite the laminations of the paper board.

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