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ANTISTICK SURFACE COATING

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This invention relates to the coating of surfaces to reduce the tendency of those surfaces to stick to other surfaces. Uses for the invention arise particularly with such materials as asphalt, bitumen, and more solid pitches. It is also applicable in the handling of a molasses product known in the trade as "hard molasses," and which is in reality a highly concentrated molasses which has some physical characteristics much like a fairly high melting asphalt. Tacky rubber surfaces also present the problem of stickiness.

Such materials as asphalt, bitumen, highly concentrated molasses, and tacky rubber present the problem of sticky surfaces in the handling and shipment of the substances themselves.

I have found that it is possible to produce a non-sticky surface which can be used in conjunction with the above mentioned adhesive substances and which will permit other substances or other articles to be readily enough removed from the surfaces of said substances to produce commercial satisfaction in the handling of the substances. I do this by the utilization of the aqueous dispersions of materials commonly referred to as pectates.

Accordingly, an object of my invention is the production of relatively non-sticky surfaces for use in conjunction with the otherwise adhesive surfaces of asphalt, bitumen, more solid pitches, highly concentrated molasses, tacky rubber, and analagous substances.

In applying the invention to the handling and shipping of the above substances, it may be desirable to employ containers and under present practices to coat the containers. For example, bags may be formed from heavy paper and then filled with the substance which has been rendered fluid as by the application of heat. In such practice it is, of course, necessary to remove the paper container from the solidified contents before the contents can be again heated or otherwise utilized. Of the substances specifically mentioned above, rubber, of course, will not ordinarily in commercial practice be rendered fluid by the use of heat.

Now the surface of an ordinary heavy paper which is available and useful for this purpose actually presents a multitude of projecting fibers, and, if the surface of the paper be not coated, the fibers become thoroughly entrapped in the molten material, and when the material is solidified, it is found to be practically impossible to remove the paper relatively completely, as must be done for satisfactory commercial practice.

In applying my invention in preferred form to the use of a paper container, I employ crude pectated pulp of the type described in my Patent 2,132,065. I make an aqueous dispersion from the crude pectated pulp as follows:

The desired quantity of the crude pectated pulp is mixed with approximately 7% of its weight of $Na_4P_2O_7$ and approximately 5% of its weight of Na_2CO_3. This mixture is stirred into an appropriate quantity of hot, and preferably boiling water, to give the concentration of pectate desired in the dispersion. I prefer to boil the dispersion with rapid agitation for five minutes. The dispersion is then ready for use or may preferably be somewhat cooled before application. It may be applied to the surface of the container or to the surface of the material of which the container is to be formed, in any desired manner, as by means of spraying, dipping, brushing or rolling.

The amount of material to be applied and the method of application will, to some extent, govern the concentration desired. I do not ordinarily prefer to apply the pectate in amounts smaller than about one-half pound of pectate per 1000 square feet of paper, and I may suitably employ as much as one and one-half to two pounds per 1000 square feet. The upper limit will ordinarily be a matter of economics.

When applying the pectate dispersion to a surface of paper or the like as by means of rolls, I have found that a dispersion containing 2% of the pectate by weight flows on very readily, and gives a uniformly coated surface, and dries to produce a thin coating. On the other hand, a dispersion of, say, 6% by weight of pectate produces a coating of a thickness desired under some circumstances. With such a dispersion, I may preferably employ ¼% or more of common soap, based on the final batch, or other surface tension depressant in suitable proportions. The soap or other surface tension depressant is added after the pectate has been dispersed. These are not essential when coating paper.

After drying, the coated material may be formed into containers with the coated side on the interior, to receive the molten asphalt, or the like. It will be found that such containers can be removed or stripped from the solidified contents satisfactorily.

Obviously the term "paper" for the purposes of my invention is equivalent to any substance presenting a similar surface which it is desired to have readily removable from the asphalt or the like.

Numerous attempts and suggestions have been

made heretofore for the solution of this problem of using paper containers for handling sticky substances, but none of these have been brought into a successful commercial operation substantially free from hampering disadvantages. Among the substances prominently suggested for this purpose are preparations containing clays, as, for example, bentonite and preparations containing soluble alginates.

A number of distinguishable pectates are known. These vary somewhat in their properties. However, so far as I am at present aware, they all present some degree of utility in connection with the present invention. Two distinctly different types of pectates are: the type made by the process disclosed in Huber Patent No. 1,410,920; and the type disclosed in my Patent No. 2,132,065.

The process described in Patent 1,410,920 is substantially as follows:

Lemon pulp is ground fine, soaked in water, and dewatered. The dewatered pulp is added to caustic soda solution of 0.2 to 0.4% concentration and gently stirred for fifteen to thirty minutes at about 40° C. After filtration the pulp is re-extracted and the filtrates are combined.

The extract may be clarified as by sedimentation, after which it is precipitated by adding with gentle stirring a fine stream of mineral acid, such as sulfuric. The coagulum is strained off and washed until the wash water shows no trace of the acid, after which it is dried at not over 70° C. and ground to produce the finished product.

The crude pectated pulp described in my Patent 2,132,065 is produced substantially as follows:

Citrus pulp is finely ground and thoroughly washed with water. It is then suspended in sufficient water to give a fluid mass. Soda ash is added with stirring to make the liquid just alkaline to phenolphathalein (about pH 8.5). The pulp is left in contact with the soda ash for about twelve hours, preferably at about 25° C. Any free liquor is drained off and the pectated pulp is thoroughly washed with water, dewatered, ground, and dried.

The dried or undried pectated pulp may be dispersed in water by adding 100 parts of it (dry basis), 12 parts of trisodium phosphate, and 1.2 parts of sodium hydroxide to 2000 parts of boiling water. The suspension is well agitated and kept just alkaline to phenolphthalein for, say, fifteen minutes. It is then ready for use as such, or may be diluted.

Purified "fibrous" pectates may be prepared from the above dispersion by filtration to remove pulp particles, and precipitating with an approximately equal volume of alcohol.

The alkali pectates obtained by the above process are fibrous in appearance, in contrast to the non-fibrous character of pectates made by other processes, and I refer to them as "fibrous" pectates.

It will be obvious to those skilled in the art that other specific phosphates and other specific alkalies may be used in place of the particular ones mentioned hereinabove for dispersion purposes.

For the purpose of the present invention I prefer for commercial and economic reasons to utilize the "fibrous" type of pectate, made as disclosed in my Patent No. 2,132,065, and in particular the crude fibrous pectated pulp therein described. This material possesses ease and cheapness of manufacture, and reliability of action in connection with the present invention, which I regard as outstanding advantages.

As indicated above, this invention is useful under circumstances where it may be desired to prevent asphalt, bitumen, tacky rubber, and the like surfaces from sticking or to reduce the tendency to do so; and the aqueous dispersion may be applied to the desired surfaces in a variety of ways, as by spraying it upon articles already coated with asphalt, or by dipping them in the aqueous dispersion.

When bodies composed of tacky rubber or having tacky rubber surfaces are subjected to serious deformation, the surface coating herein described may undergo sufficient cracking to permit the bodies to stick together to a considerable extent.

Asphalt and bitumen are very commonly employed for the purpose of coating a variety of objects where a heavy and resistant protective coating is required. An example is the coating of pipes which may be exposed to many different conditions. In applying the invention to the coating of such objects I may either spray the pectate dispersion on the coated object or dip the object after coating into the pectate dispersion, depending upon the size, weight, and shape of the article and convenience in handling. When the dispersion is to be applied directly to the surface of the asphalt, bitumen, or the like, I find it preferable to employ soap or other suitable surface tension depressant in the manner and amount hereinabove described in order to obtain satisfactory spreading of the fluid film over the asphalt or other substance.

Having thus described my invention in such clear, concise, and exact terms as to enable others skilled in the art to make and use the same, I claim as my invention and desire to secure by Letters Patent the following:

1. A method of producing relatively non-sticky surfaces of asphalt, bitumen, and the like, which comprises placing in immediate juxtaposition with the surface a coating containing effective quantities of pectate.

2. A method of rendering articles coated with asphalt, bitumen, and the like, non-sticky at the surface, comprising applying to the surface a coating containing effective quantities of pectate.

3. In the manufacture of transportation packages of asphalt, bitumen, and the like, the step comprising coating at least the interior surface of the material of the container with a coating containing quantities of pectate sufficient to permit ready separation of the container from the contents thereof.

4. As a new article of manufacture, a body having a surface composed of asphalt, bitumen, tacky rubber, or the like, the surface being coated with a coating containing effective quantities of pectate, whereby the surface is rendered relatively non-sticky.

5. A transportation package comprised of asphalt, bitumen, highly concentrated molasses, or the like, within a removable container, and a coating on the interior of the container comprised of pectate, which perfects the transportation package in rendering the container readily removable.

6. As a new article of manufacture a container formed from paper, or the like, and adapted for use in the handling of asphalt, bitumen, highly concentrated molasses, and like substances, said container having on its interior

surface a coating containing effective quantities of pectate, which perfects the container for the use designated.

7. As a new article of manufacture paper adapted for use as a container for asphalt, bitumen, highly concentrated molasses, and like substances, and having a coating containing pectate in amounts not less than about ½ pound of pectate per 1000 square feet of paper, which perfects the paper for use in a container for asphalt, bitumen, highly concentrated molasses, and like substances, and permits ready separation of a container made from said paper from the contents thereof.

8. A method of minimizing adherence between sticky substances such as asphalt, bitumen, and the like, and a material such as paper and the like, which said substance and material normally tend to stick together, comprising interposing a layer of a composition, an effective component of which consists of pectate.

9. A method of rendering non-sticky articles having an outer normally sticky surface consisting of asphalt, bitumen, or the like, which comprises applying to the surface of such article a coating containing a pectate in amounts not less than about one-half pound of pectate per thousand square feet of article surface.

10. A method of rendering non-sticky articles having an outer normally sticky surface consisting of asphalt, bitumen, or the like, which comprises applying to the surface of such article an aqueous dispersion of pectate, the dispersion including a surface tension reducing agent.

11. A method of rendering non-sticky articles having an outer normally sticky surface consisting of asphalt, bitumen, or the like, which comprises applying to the surface of such article an aqueous dispersion of pectate to form a coating containing not less than one-half pound of pectate per thousand square feet of article surface.

12. A method of rendering non-sticky articles having an outer normally sticky surface consisting of asphalt, bitumen, or the like, which comprises applying to the surface of such article an aqueous dispersion of pectate, the dispersion including a surface-tension reducing agent, to form a coating containing not less than one-half pound of pectate per thousand square feet of article surface.

13. A method of producing relatively non-sticky surfaces of asphalt, bitumen, and the like, which comprises placing in immediate juxtaposition with the surface a coating containing effective quantities of fibrous pectate.

14. As a new article of manufacture, a body having a surface composed of asphalt, bitumen, tacky rubber, or the like, the surface being coated with a coating containing effective quantities of fibrous pectate, whereby the surface is rendered relatively non-sticky.

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