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COMPOSITION FOR REMOVING FIBROUS LAYERS FROM SURFACES

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This application is made under the act of March 3, 1883, as amended by the act of April 30, 1928 and the invention herein described may be manufactured and used by or for the Government for governmental purposes without the payment to me of any royalty thereon.

My invention relates to the removal of fibrous layers from surfaces to which they are attached by an adhesive.

This invention is of utility in connection with the removal of gummed labels, envelope flaps, stamps, or of wall paper from walls.

The fibrous layer may be of paper pulp, cloth or other material. Where the invention is applied to the removal of stamps, labels or envelope flaps, these are usually attached to the surface to which they adhere with a dextrin paste. Wall paper is usually attached to the wall with a starch paste. The invention is particularly useful in the removal of wall paper since the removal of such paper involves considerable expense and time, and results often in injury to woodwork or injury to the wall surface, and an accumulation of much dirt in the room where the work is proceeding.

The process of which this is an improvement seeks to remove fibrous layers, especially wall paper, easily and quickly by spraying or brushing thereon a gel consisting essentially of an aqueous gel of an hydrophilic colloid containing also a penetrant, that is some water soluble organic liquid penetrant, said gel imparting its moisture or liquid ingredients to the fibrous layer and thereby softening it sufficiently to permit its easy removal. I have found that this invention can be greatly improved by certain modifications and additions of which this application is a specification.

As is well known most fibrous layers are sized with water-resistant materials to lessen the water absorbing tendencies of said layers. This sizing may be of casein, starch, varnish or siliceous material but in the case of wall paper, rosin mixed with aluminum resinate is predominantly used. This sizing largely prevents the speedy soaking up of the fibrous layers by water as it is ordinarily used to remove wall paper or other layers. The sizing also largely defeats the intended action of the gel in soaking up the paper at a rapid rate. The penetrant does not sufficiently assist the soaking action of the water.

The process, of which this is an improvement, consists in a plastic material or gel having added to it a penetrant, said penetrant being used for the purpose of assisting the penetrating action of the softening agent (water). By this procedure it is very difficult to produce a smooth gel, since the process results in a lumpy product which thereafter, can only be brought to a proper consistency by further treatment or the lapse of time.

I have discovered that if the hydrophilic colloid, such as bentonite and similar colloidal clays, starch, silicic acid, in the dry state is mixed with the particular penetrant utilized, a smooth paste is obtained. This paste is then added slowly to water in the proper amount as hereinafter explained. It is advisable to agitate the water while the paste is being added. The penetrant added to the colloid in this manner forms an extremely satisfactory paste suspension of the gel material, which when poured into the water causes the gel material to be speedily and satisfactorily dispersed through the dispersing medium and thereby greatly assists in the preparation of a smooth gel of uniform consistency. Also the gel material, or colloid, can be mixed with the penetrant and thereafter be added to the water as and when the gel is needed.

I have also found that either methyl or isopropyl alcohol is much better to use as a penetrant than ethyl alcohol because it has as great or greater penetrating properties and because its purchase is not hampered by any beverage and medicinal uses. However, my invention further lies in the inclusion of certain wetting agents in the paste mixture referred to above, this paste mixture being then composed of the colloid, a penetrant and a wetting agent. These so-called wetting agents produce a very great lessening in the surface tension of water and thereby produce speedy penetration of water into fibrous layers regardless of any sizing contained therein. Consequently these wetting agents cause the water or softening agent to quickly travel from the gel into the fibrous layer. These wetting agents are alkali salts of sulfonated organic materials and also alkali salts of sulfate esters of aliphatic alcohols although the terms sulfonated and sulfated are used interchangeably. They are not precipitated or affected by salts occurring in hard water or by those salts which commonly occur as impurities in bentonite. They are not acid or alkaline in their reaction to any appreciable extent and are not injurious to wood or other finishes. Among the wetting agents which I find of great value are sulfonates of the type of isopropyl naphthalene sulphonic acids or salts of these acids of the type as illustrated by the general formula $R—C_{10}H_6—SO_3Na$ in which R rep-

resents an aliphatic side chain attached to the naphthalene nucleus; sulfonated pine oil where the active ingredients are probably sulfonates of alpha and beta terpineols, of fenchyl alcohol and of borneol; and more especially salts of sulfonates of higher fatty alcohols, particularly lauric alcohol, of which the following is a type formula:

$$R-\overset{H}{\underset{H}{C}}-O-SO_2-ONa$$

in which R may represent any aliphatic hydrocarbon chain containing eleven or more carbon atoms, but for the purposes of this invention I prefer to use a material in which R represents as great a predominance of eleven carbon atom chains as possible.

The latter sulfonates are usually mixtures of sulfonates or sulfates of various fatty alcohols. It is understood that there are other wetting agents which will serve more or less well and I mention these only as examples. I may also use mixtures of these wetting agents in any desired proportions.

In general my invention consists of a plastic mass or gel prepared as above specified, of a consistency which may be applied either with a brush or with a sprayer and consequently the proportions of some or all of the constituents may vary widely and still be satisfactory under the varying conditions of use. However, as an illustration of one composition which I have found satisfactory I may use one gram of sulfonated pine oil and one gram of sulfonated or sulfated lauric alcohol, seven to nine grams of bentonite and ten to twelve cubic centimeters of isopropyl alcohol or methyl alcohol, the whole stirred together into a smooth flowing paste or slurry which when ready for application to wall paper or other fibrous layers is poured into one hundred cubic centimeters of water. It is obvious that I may vary these proportions widely within the spirit of my invention. I may substitute two grams of one of the sodium salts of sulphates of mixtures of fatty alcohols in which lauric alcohol predominates for the mixture of sulfonated pine oil and sodium lauric sulphate, or I may find it advantageous to use entirely different wetting agents and to completely change the proportions used. I may use acetone, or alcohols such as ethyl or propyl, or ethylene glycol, etc., in place of methyl or isopropyl alcohol, and I may vary the amounts I use of the organic liquids or penetrants. I may vary the amounts of bentonite or of water depending upon conditions. Finally, of course, the respective proportions can be multiplied any number of times to obtain any quantity desired.

Where only one layer of fibrous material is to be removed I may increase the proportion of water very greatly since only a small amount of moisture is required to soak up one layer and it is not necessary to hold a thick layer of gel on the surface. Again, where several layers of heavy fibrous material of high absorptive capacity must be soaked up I will want to get enough softening liquid on the outer surface at one application to soak entirely through the several layers. To this end I will make the gel thick enough to hold as thick a layer of gel on the surface as may be required to furnish the requisite quantity of softening liquid for soaking up all the layers present. Even a relatively non-flowing gel of the type I employ will contain more than eighty-five per cent of softening liquid.

By softening liquid I refer to any liquid which is capable of softening adhesives used for holding fibrous layers on surfaces. Ordinarily the softening liquid will be a mixture of water and an organic liquid such as isopropyl alcohol in which mixture is dissolved a suitable wetting agent. The gel material will usually be bentonite but it may be any material which is capable of binding the softening liquid into a gel of the desired state of plasticity.

Under some conditions I may find it advisable to use a pigment or dye in my gel to assist even application of the gel to the fibrous layers.

I do not wish to be limited to the exact ingredients or proportions thereof which I have specified and desire that I be limited only by the showing of the prior art and the scope of the appended claims, and that I be allowed the full range of equivalents in interpretation thereof.

Having fully disclosed my discovery, I claim:

1. A composition for use in detaching fibrous layers from surfaces comprising a gel formed of bentonite, methyl alcohol as a penetrant and an alkali metal salt of the sulfate esters of primary aliphatic higher fatty alcohols as wetting agent, and water in substantially the proportions of one part of bentonite by weight to twelve parts of water by weight.

2. A composition for use in detaching fibrous layers from surfaces comprising a gel formed of bentonite, methyl alcohol in substantially one tenth the volume of water employed, and a mixture of equal parts of sulfonated pine oil and an alkali metal salt of the sulfate esters of primary aliphatic higher fatty alcohols, said mixture being equal in weight to two per cent of the weight of water employed, and water in substantially the proportions of one part of bentonite to twelve parts of water by weight.

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