

Patented July 7, 1953

2,644,771

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UNITED STATES PATENT OFFICE

2,644,771

PROCESS OF COATING STRUCTURAL SURFACES

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No Drawing. Application May 10, 1949,
Serial No. 92,507

4 Claims. (Cl. 117-70)

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The present invention relates to coating compositions and it particularly relates to coating compositions which may be applied externally and internally for coating walls, rooms, structural members and similar surfaces.

It is among the objects of the present invention to provide coating compositions and a coating procedure which will largely eliminate dust and floating spray and which will enable rapid and fast application of the composition to ceilings and walls of rooms or other surfaces without the necessity of using masks and without the liability of the coating spray being carried to other surfaces than those which are to be covered.

Another object is to provide coating procedures and compositions which will give a uniform spread or coating and which will assure secure application and attachment of the coating material.

Another object is to provide novel coating compositions and procedures which are particularly adapted for application to buildings and structures to render them fire-proof, weather-proof and water-proof.

Still another object is to provide novel coating compositions and procedures for application to structures and particularly building surfaces or steel framework, which will enable the most effective coating even though such structures or surfaces be negatively charged and which will further assure a controlled rust-proofing, water-proofing and fire-proofing coating of high effectiveness.

Still further objects and advantages will appear in the more detailed description set forth below, it being understood, however, that this more detailed description is given by way of illustration and explanation only and not by way of limitation, since various changes therein may be made by those skilled in the art without departing from the scope and spirit of the present invention.

According to the present invention, the surface structure or building to be covered or coated is first treated with a coating solution consisting of a dispersion or emulsion in which said dispersion or emulsion is stabilized by a cationic surface active agent.

Then a second dispersion or emulsion is applied, stabilized by an anionic surface active agent.

Although usually two coatings should suffice, these alternating cationic and anionic stabilized emulsions or dispersions may be alternately applied until a coating of desired thickness is obtained.

Although the coating or surfacing materials

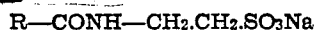
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may be dispersed in both the cationic and the anionic stabilized material, it has been found most satisfactory, according to one embodiment of the present invention, to disperse such materials as cement, lime, aluminum or other insoluble soaps or stearates, wood flour, rock wool, asbestos, pigments, graphite, metal powders, glass beads and so forth in the anionic stabilized dispersion or emulsion.

The anionic stabilizer may be a sodium potassium or amine soap or salt of a high molecular weight fatty acid. For example, it may consist of sulphonated naphthenic ether or a sulphonated keryl benzene or various soaps or sodium salts of sulphonated fatty acids, fatty alcohols, fatty esters or even naphthalene or other aromatic compounds.

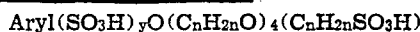
As specific examples of anionic stabilizers which may be utilized are the following compounds known commercially as Triton NE or 720 or 770, Igepon T or other collamids, Igepon AP, Keminol, Santomerse, Cardinol, Avirol and Duponol, Arctic Syntex M or T, Nyon 218, Nacconal LAL or NR, MP 198, Ultrawet, Nekal NS, Aerosol OT, NAL or NAO Tergitols.

Collamids are generally of the



where R is an alkyl group having 12 to 22 carbon atoms. Igepon T is a typical commercial example and has as its alkyl group $\text{C}_{17}\text{H}_{33}$ and is the sulphonated stearic acid amide of taurine. Arctic Syntex T is also a sulphonated collamid.

Triton 770 is a polysulphonate of an aromatic polyalkylene ether sulphate having the formula



Triton 720 is the corresponding sulphate.

Arctic Syntex M is a sulphated ester such as lauryl sulphoacetate and has the general formula



Nyon 218 is a condensation product of alkylthiophenol with 10 to 15 ethylene oxide units.

Nacconol NR, MP 198 and Ultrawet are aryl alkyl sulphonates or phenyl keryl sulphonates or sulphates.

Nacconol NR is a sodium salt of an alkylated benzene sulphonic acid obtained by condensing a chlorinated kerosene with benzene and sulphuric acid followed by neutralization with caustic soda.

Keminol is of the same general class in which phenol is substituted for benzene. Ultrawet is a monosodium benzene sulphonate containing an alkyl radical of 10 to 12 carbon atoms.

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Nekal NS is tri (2 ethyl butyl) sodium sulphotricarballylate.

Trisodium monostearyl sulphotricarballylate may also be employed.

Aerosol OT is a sodium dioctyl sulphosuccinate.

Aerosol NAO is disodium mono-oleyl sulphosuccinate.

Nacconol LAL is sodium lauryl sulphoacetate.

Igepon AP is sodium stearyl sulphopropionate.

Compounds such as N-octadecyl disodium sulphosuccinate and N-octadecyl (N-1,2-dicarboxy-ethyl) tetra-sodium sulphosuccinate may also be used.

Tergitol is a higher secondary fatty alcohol sulphate.

Santomerse is an alkylated diphenyl disulphonic acid.

Triton NE is an alkyl-aryl or keryl phenyl ether sulphate in which the alkyl group contains about 12 carbon atoms and the sulpho group is attached to the aryl group.

Gardinol, Duponol and Avirol are sulphated or sulphonated higher primary fatty alcohols containing 14 to 22 carbon atoms.

These anionic stabilizers may be used in amounts ranging from 0.1% to 10%.

Among the cationic materials which may be employed in aqueous solution or emulsion in amounts ranging from 1 to 10% are combinations including the following amines, namely: monoethanol amine, diethanol amine, triethanol amine, diethylamino-ethanol, tri-iso-propanol amine, phenyl-ethanol-amine, ethyl-phenyl-ethanolamine, phenyl-diethanol-amine, diamino-propanol, amyl-diethanol-amine, and hydroxy-ethylene-diamine.

Non-hydroxylated amines may be employed, such as ethylene-diamine, tetra-ethylene-pentamine, propylene-diamine, alpha-naphthylamine, aniline, dimethyl-aniline, diphenylamine, urea, o-toluidine and phenyl methylamine, but generally these organic amines can only be readily used in mixtures with ethanol or other alkanol amines.

It was also found that tetra-benzylammonium-hydroxide and similar quaternary ammonium compounds may be used in combination with the polyalkylene polyamines or hydroxy alkyl amines previously discussed.

Combined with these amines may be any one or more of the following fatty acids to amidize part or all of the amine groups. These fatty acids are stearic, palmitic, oleic, ceric, abietic, myristic, ricinoleic, eleostearic, linoleic and linolenic or fatty acids derived from the below mentioned glycerides.

The fatty acids may be derived from partial or total hydrolysis of sperm oil, cod liver oil, menhaden oil, halibut oil, castor oil, coconut oil, peanut oil, palm oil, olive oil, mustard seed oil, tea seed oil, cottonseed oil, rape seed oil, neat's-foot oil, lard oil, tallow, spermaceti, japan wax, wool grease or lanolin and hydrogenated fish and vegetable oils.

The best results are obtained where the fatty acid containing from 12 to 18 carbon atoms, or their glycerides or other esters are combined with polyalkylene polyamines or hydroxy amines containing from 2 to 10 carbon atoms, 1 to 3 amino groups and with hydroxyamines from 1 to 3 hydroxy groups.

The anionic solution or emulsion may contain 1 to 10% of the sodium, potassium or ammonium soaps of any of the above fatty acids. The vari-

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ous amines listed above may also be combined with the fatty acids listed to give such anionic surface active agents.

It is also possible to use binders or adhesives and either the anionic or cationic stabilized coating solutions.

The binders or adhesives which may be used in amounts of 5 to 25% may be casein, starch, dextrin, gum tragacanth, gum arabic, British gum, pectin, synthetic or natural latex or emulsified phenol formaldehyde, urea-formaldehyde, vinyl, styrene, methacrylate or hydrocarbon resins.

In making up the above dispersions or emulsions, desirably the surface active agent is added in amounts of 1 to 10% while the finely divided insoluble oil, wax, fat or solid material is being vigorously agitated in the aqueous external phase. If desired, a slurry of the insoluble material, such as asbestos, rock wool, cement, lime, aluminum stearate, or metal powder is sprayed onto the surface, dispersed in water at the same time as the cationic or anionic stabilized solution is sprayed upon the surface. Generally as a finished surface, it is desirable to apply a sodium silicate emulsion or dispersion or a pigmented emulsion or dispersion containing a dispersed resinous or plastic material. Instead of part or all of the aqueous base, it is possible to use organic solvents.

Pursuant to the instant invention, the coating compound may be applied rapidly and efficiently to buildings and other structures to provide a coating which is hard and cannot be washed off with a fire hose. Pursuant to the instant invention, a hard continuous moisture-proof barrier is applied to the warm side of a structure to prevent transmission of moisture-laden heat to the cold side.

A stable dispersion is obtained by virtue of the use of surface active agents. After application, the coating is tamped firm and dries.

The following is a summary of the method of application pursuant to my invention and more fully outlined above:

The first step of my process consists in spraying a synthetic emulsion binder, containing a cationic amide, onto the surface to be coated. This changes the charge of said surface to a cationic or plus charge.

The binder can be applied in sandwich form by building layer upon layer, if so desired.

Secondly, there is applied, by spraying, a slurry, consisting of a compound of cement, lime, aluminum stearate (waterproof), and an inert material plus an anionic wetting agent, such as sulphated naphthanate. This slurry is added simultaneously with the fibre which consists of rock wool and asbestos, and other fibrous materials, all of which constitutes the dry portion. Anionic or non-ionic dispersed pastes of color pigments, both organic or inorganic, such dispersed pastes being prepared with a non-ionic dispersing agent, may be added to the slurry in the form of water dispersion non-ionic pigments. Upon building up the base mat, more concentrated slurries, containing such color pigment dispersions, may be applied as a finishing coat.

The embodiment of the invention shown and described herein is to be considered merely as illustrative, as the invention is susceptible to variation, modification and change within the spirit and scope of the appended claims.

Having now particularly described and ascertained the nature of the invention, and in what

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manner the same is to be performed, what is claimed is:

1. The method of forming a hard, continuous moistureproof fibrous asbestos insulation coating on a structural surface to insulate said surface, consisting of alternately spraying cationic and anionic dispersions thereon until a coating of desired thickness is built up on said surface, said cationic dispersions comprising essentially a synthetic resinous binder containing 1-10% of a stabilizing cationic, surface active amide, and a carrier liquid therefor, to impose a cationic charge on said surface, and said anionic dispersion comprising essentially a mixture of cement, lime, aluminum stearate and an inert material dispersed in water plus a stabilizing anionic wetting agent, and introducing a comminuted fibrous insulation material into the anionic dispersion during spraying thereof onto the surface being coated.

2. A process of coating structural surfaces such as walls and ceilings for producing tightly adherent fibrous asbestos insulation coatings thereon, which comprises applying to the surface as a ground coating a cationic emulsion comprising essentially a cationically charged amide dispersed in a carrier liquid together with a binder for the said amide, overlying the said ground coating with an anionically charged coating composed essentially of an anionically charged wetting agent, incorporating in one of the emulsions, prior to its application to the surface being coated, a mixture composed essentially of cement, lime, and aluminum stearate, and introducing into the last mentioned emulsion, a comminuted fibrous insulating material simultaneously with the application thereof to the surface being coated.

3. A process of coating structural surface such as walls and ceilings for producing tightly adherent fibrous asbestos insulation coatings thereon, which comprises applying to the surface as

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a ground coating a cationic emulsion comprising essentially, an aqueous dispersion of a cationically charged amide together with a binder therefor, overlying the ground coating with an anionically charged aqueous emulsion compound essentially of an anionically charged wetting agent, incorporating in the anionically charged dispersion, prior to application thereof to the ground coating, a mixture composed essentially of cement, lime and aluminum stearate, and introducing into the anionically charged emulsion a comminuted fibrous insulating material simultaneously with the application thereof to the surface being coated.

4. The method of forming a hard, continuous moistureproof fibrous, asbestos insulation coating on a structural surface to insulate said surface, consisting of alternately spraying cationic and anionic dispersions thereon until a coating of desired thickness is built up on said surface, said cationic dispersions comprising essentially a synthetic resinous binder containing a stabilizing cationic, surface active amide, and a carrier liquid therefor, to impose a cationic charge on said surface, and said anionic dispersion comprising essentially a mixture of cement, lime, aluminum stearate, and introducing a comminuted fibrous insulation material into the anionic dispersion during spraying thereof onto the surface being coated.

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