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METALLIC SOAP SOLUTION

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The invention relates in general to solutions of polyvalent metal soaps and in particular to polyvalent metal soap solutions of high concentration and to correlated improvements in waterproofing and other compositions produced therefrom.

The waterproofing properties of the polyvalent metal soaps, also known in the art as metallic soaps, has been fully recognized and their use for this purpose is now well established. The most convenient method of applying polyvalent metal soaps to various surfaces is to produce a solution thereof in a solvent therefor. Various organic solvents have been used in the preparation of polyvalent metal soap solution, the more common ones including, among others, the hydrocarbons and their halogenated derivatives. While the foregoing practice has enjoyed some success, many difficulties have been encountered in view of the fact when more than about 2% or 3% of the soap is dissolved in solvent, the resulting mass forms a gel under atmospheric conditions, thus rendering it substantially useless as a coating or waterproofing composition. While the gel can be heated to render it somewhat fluid, the application thereof in a heated state is entirely unsatisfactory for most purposes. The application of solutions containing from 2% to 3% polyvalent metal soap is also highly impractical in view of the diluteness of the solution. Moreover, the cost is high due to the large amounts of solvent necessary.

Various proposals have been offered in an attempt to solve the foregoing problem by increasing the soap concentration without affecting the fluidity of the resulting solution. Peptizing agents such as acetic acid, phenol, tartaric acid, oxalic acid and the like have been used to increase the soap concentration in a solvent mixture without affecting the fluidity thereof. This proposal has proven to be highly undesirable commercially in view of the corrosive character imparted to the composition by such acidic agents. Another proposal includes the use of the ethanolamines or the ethanolamine salts of the higher fatty acids for the purpose of increasing the concentration of polyvalent metal soap solutions. A solution produced according to this teaching also has its drawbacks.

The general object of the invention is to obviate the foregoing and other disadvantages.

A specific object of the invention is to provide an improved free flowing concentrated polyvalent metal soap solution.

A further object of the invention is to provide

an improved coating and waterproofing composition.

Another object of the invention is to provide free flowing polyvalent metal soap solutions containing up to 50% polyvalent metal soap.

Other objects will in part appear obvious and will in part appear hereinafter.

It has now been found that the foregoing and other objects of the invention may be achieved by the use of suitable oil-soluble wetting agents. According to the invention a relatively small proportion of a suitable oil-soluble wetting agent containing an SO_3 group is used in the process of dissolving polyvalent metal soaps in a suitable organic solvent. The quantity of wetting agent used is usually determined by the concentration as well as the fluidity desired in the ultimate product. While any suitable oil-soluble wetting agent may be used, the sulfated or sulfonated types have been found to be superior, and they are, therefore, preferred. The free flowing composition of the invention is particularly adapted for use in coating and waterproofing paper, textiles, leather and other similar materials, and particularly in the waterproofing of building materials, such as, stone, concrete, bricks, wood and the like. It has been found that the wetting agents of the preferred type further provide a desirable plasticizing effect in the deposited coating. The expressions "solution" and "dissolving" are used in a broad sense and they are to include dispersions and dispersing respectively.

The invention accordingly comprises a composition of matter possessing the characteristics, properties and the relation of components which will be exemplified in the composition hereinafter described and the scope of the invention will be indicated in the claims.

In the preparation of the composition of the invention, any suitable polyvalent metal soap of a higher fatty or similar acids, such as the naphthenic acids, may be employed. Examples of such soaps include, inter alia, the polyvalent metal soaps of fatty acids containing 8 or more carbon atoms, such as the aluminum, calcium, magnesium, zinc, etc., soaps of stearic, oleic, linoleic, ricinoleic, palmitic, etc. acids. The expression "polyvalent metal soap" is employed to connote water-insoluble metal soaps of the higher fatty acids containing 8 or more carbon atoms and like soaps of the naphthenic acids, the latter of which may be obtained synthetically or from the refining of petroleum. While any suitable polyvalent metal soap may be used in accordance with the invention, the aluminum and calcium soaps are

preferred, and particularly aluminum or calcium stearate, palmitate or other saturated soaps of these metals.

Any suitable oil-soluble wetting agent containing an SO_3 group may be used as the fluidifying or peptizing constituent. Examples of such agents include among others the oil-soluble salts of the following: mineral oil sulfonates (better known as mahogany soaps), sulfated fatty alcohols containing 8 or more carbon atoms, sulfonated naphthenic acids, naphthalene sulphonie acid, sulfated animal and vegetable oils (particularly the anhydrous and salt-free type produced in accordance with the disclosures in copending U. S. patent applications Serial No. 77,761, filed May 4, 1936; Serial No. 160,270, filed August 21, 1937; and Serial No. 197,858, filed March 24, 1938.

As for the vehicle, any suitable solvent may be used such as the hydrocarbons or their halogenated derivatives, examples of which include, petroleum spirits, gasoline, toluol, benzol, xylol, terpenes, carbon tetrachloride, trichloroethane, etc. Oxygen containing solvents, such as alcohols, aldehydes, ketones, etc., may also be used in combination with the foregoing type.

The percentage of polyvalent metal soap present in the final composition may be varied up to 50% depending upon the particular use of the composition. Moreover, the quantity of oil-soluble wetting agent may likewise be varied to obtain the desired properties in the composition. Best results have been obtained by using an amount of the wetting agent within the range of about 1% to 20% by weight of the composition, the quantity used depending, in part, on the quantity of soap included.

For a fuller understanding of the nature and objects of the invention, reference should be had to the following examples which are given merely to further illustrate the invention and are not to be construed in a limiting sense, all parts given being by weight:

Example I

A composition particularly adapted for waterproofing various materials and surfaces may have the following formula:

	Parts
Aluminum stearate.....	30
Mahogany soaps	8
Toluol	62

The foregoing composition is free flowing at atmospheric conditions and is adapted to be readily spread evenly on surfaces to be coated and/or waterproofed. The film resulting from the application of this composition is substantially transparent and possesses good plasticity and flexibility.

Example II

Another composition of the invention may have the following formula:

	Parts
Aluminum palmitate.....	25
Mahogany soaps.....	6
Petroleum spirits.....	69

Example III

Still another composition of the invention may be produced from the following constituents:

	Parts
Aluminum stearate.....	20
Mahogany soaps.....	3
Carbon tetrachloride.....	77

It is obvious that any other suitable oil-soluble wetting agent containing an SO_3 group or mixture of such agents may be used in lieu of the mahogany soaps specifically illustrated in the foregoing examples. Likewise, other suitable solvents or polyvalent metal soaps or appropriate mixtures of solvents and soaps may also be employed. The solvent or solvents to be used should be selected according to their boiling point in order to obtain the desired rate of evaporation. In applications where drying is to be effected at atmospheric conditions, solvents having a boiling point of 150°C . or less is recommended, while higher boiling solvents may be employed when drying is to be carried out under heat and/or under reduced pressure.

A coating deposited from the composition of the invention on paper adds decided transparency thereto and thus yields an ideal and relatively inexpensive method for simultaneously waterproofing paper and rendering the same transparent. This is highly advantageous in the preparation of certain grades of wrapping paper. Moreover, the plasticized coating facilitates the sealing of the paper in the wrapping of various articles therein. In the application of the free flowing solution to any surface, any suitable means known to the art may be resorted to.

While any suitable oil-soluble wetting agent containing an SO_3 group is recommended, the use of mahogany soaps is highly preferred. The proportions of polyvalent metal soap, oil-soluble wetting agent and solvent may be varied relative to one another to suit the conditions at hand. In preparing the free flowing solution, the wetting agent may be added to the solvent or to a gel of polyvalent metal soap in solvent, or the agent may be distributed throughout the polyvalent metal soap before dissolving or dispersing the same in the solvent.

This application is a continuation-in-part of our U. S. application Serial No. 117,018, filed December 21, 1936.

Since certain changes may be made in the above composition of matter and different embodiments of the invention could be made without departing from its scope, it is intended that all matter contained in the above description shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the following claims are intended to cover all the generic and specific features of the invention herein described and all statements of the scope of the invention, which as a matter of language might be said to fall therebetween; and that they are intended to be inclusive in scope and not exclusive, in that if desired, other materials may be added to our novel composition of matter herein claimed without departing from the spirit of the invention. Particularly, it is to be understood that in said claims, ingredients or components recited in the singular are intended to include compatible mixtures of said ingredients wherever the sense permits.

Having described our invention, what we claim as new and desire to secure by Letters Patent is:

1. A free flowing composition comprising a polyvalent metal soap, an oil-soluble wetting agent containing an SO_3 group and a liquid solvent for the polyvalent metal soap selected from the group consisting of aromatic hydrocarbons, aliphatic hydrocarbons and chlorinated hydrocarbons.

2. A free flowing composition comprising an aluminum soap of a higher fatty acid, an oil-soluble wetting agent containing an SO_3 group and a liquid solvent for the polyvalent metal soap selected from the group consisting of aromatic hydrocarbons, aliphatic hydrocarbons and chlorinated hydrocarbons.
3. A free flowing composition comprising an aluminum soap of a higher fatty acid, an oil-soluble wetting agent containing an SO_3 group and a liquid solvent for the aluminum soap selected from the group consisting of aromatic hydrocarbons, aliphatic hydrocarbons and chlorinated hydrocarbons.
4. A free flowing composition comprising aluminum stearate, an oil-soluble wetting agent containing an SO_3 group and a liquid solvent for aluminum stearate selected from the group consisting of aromatic hydrocarbons, aliphatic hydrocarbons and chlorinated hydrocarbons.
5. A free flowing composition comprising aluminum palmitate, an oil-soluble wetting agent containing an SO_3 group and a liquid solvent for aluminum palmitate selected from the group consisting of aromatic hydrocarbons, aliphatic hydrocarbons and chlorinated hydrocarbons.
6. A free flowing composition comprising calcium oleate, an oil-soluble wetting agent containing an SO_3 group and a liquid solvent for calcium oleate selected from the group consisting of aromatic hydrocarbons, aliphatic hydrocarbons and chlorinated hydrocarbons.
7. A free flowing waterproofing composition comprising a polyvalent metal soap, mahogany soaps and a liquid solvent for the polyvalent metal soap selected from the group consisting of aromatic hydrocarbons, aliphatic hydrocarbons and chlorinated hydrocarbons.
8. A free flowing waterproofing composition comprising an aluminum stearate, mahogany soaps and a liquid solvent for aluminum stearate selected from the group consisting of aromatic hydrocarbons, aliphatic hydrocarbons and chlorinated hydrocarbons.
9. A free flowing waterproofing composition comprising an aluminum palmitate, mahogany soaps and a liquid solvent for aluminum palmitate selected from the group consisting of aromatic hydrocarbons, aliphatic hydrocarbons and chlorinated hydrocarbons.
10. A free flowing waterproofing composition comprising a calcium oleate, mahogany soaps and a liquid solvent for calcium oleate selected from the group consisting of aromatic hydrocarbons, aliphatic hydrocarbons and chlorinated hydrocarbons.
11. A free flowing waterproofing composition comprising a polyvalent metal soap, mahogany soaps and toluol.
12. A free flowing waterproofing composition comprising an aluminum stearate, mahogany soaps and toluol.
13. A free flowing waterproofing composition comprising an aluminum stearate, mahogany soaps and petroleum spirits.
14. A free flowing waterproofing composition comprising an aluminum stearate, mahogany soaps and carbon tetrachloride.
15. A free flowing waterproofing composition comprising a polyvalent metal soap, mahogany soaps and a liquid solvent for the polyvalent metal soap selected from the group consisting of aromatic hydrocarbons, aliphatic hydrocarbons and chlorinated hydrocarbons, the polyvalent metal soap comprising 3% to 50% of the composition.
16. A free flowing waterproofing composition comprising an aluminum soap, mahogany soaps and a liquid solvent for the aluminum soap selected from the group consisting of aromatic hydrocarbons, aliphatic hydrocarbons and chlorinated hydrocarbons, the aluminum soap comprising 3% to 50% of the composition.

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