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COATING COMPOSITION AND PROCESS OF
PRODUCING THE SAME

Francis J. Licata, New York, N. Y., assignor to National Oil Products Company, Harrison, N. J., a corporation of New Jersey

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11 Claims. (Cl. 106—178)

The invention relates, in general, to coating compositions and in particular to a process of producing the so-called "flat" type lacquers, varnishes and like compositions and to correlated improvements in the products thus produced.

The flat type lacquers, varnishes and like coating compositions differ from the ordinary lacquers and varnishes in that the resultant film derived therefrom is characterized by having a matte appearance or subdued gloss. Such effects are usually accomplished by incorporating into a lacquer or varnish a flattening agent of any suitable type, such, for example, as the normally solid water-insoluble soaps of the higher fatty or similar acids.

The mode of incorporating flattening agents, such as aluminum stearate, zinc stearate, zinc palmitate, calcium stearate, aluminum palmitate, etc. into varnishes and lacquers according to prior practices has been to suspend fine particles of these soaps in a suitable solvent vehicle by grinding and adding the resulting suspension to the varnish or lacquer. In view of the low solubility of the soaps in the solvents, actual suspension of the particles in the solvent is obtained rather than a solution of colloidal mixture. In some instances the soaps have been suspended in the lacquer or varnish by grinding directly therewith. During the grinding operation, which is usually carried out in a pebble, stone, iron or like mill, considerable heat is developed which tends to convert the solid soap into a gel, thus rendering the product useless as far as flattening is concerned. Such gelation is particularly troublesome during the summer months when low temperature control is difficult.

The grinding operation, which usually extends over a period of several hours, offers another serious difficulty in obtaining a uniform and proper soap particle size. A particle size within certain limits is essential to ensure satisfactory flattening in the final coating composition. If the grinding is arrested too early, coarse particles are obtained which yield gritty films and loss of diffusing power per unit weight of soap used. On the other hand, particles ground too finely gel readily and reflect too much light, thus destroying the flattening effects. It is, therefore, apparent that the grinding method is entirely empirical, difficult to control and very costly due to the equipment necessary and power consumed in operating such equipment.

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

A specific object of the invention is to provide a coating composition of the varnish or lacquer type containing a solid flattening agent of uniform and optimum particle size.

Another specific object of the invention is to provide a process of dispersing a solid flattening

agent in a varnish or lacquer type composition without the aid of grinding.

A further object of the invention is to provide a process of dispersing in a varnish or lacquer type composition optimum and uniform sized particles of a flattening agent.

Other objects of the invention will in part be obvious and will in part appear hereinafter.

According to the invention the process comprises precipitating a water-insoluble soap of a saturated higher fatty acid in a varnish, lacquer or like coating composition. More specifically, the process comprises adding a relatively concentrated solution of a water-insoluble soap of a saturated higher fatty acid in a non-polar solvent to a varnish or lacquer type composition containing polar compounds and/or polar solvent or vehicle, whereby the soap is precipitated in situ within the composition. The invention further includes the composition thus obtained which is characterized by having optimum and uniform sized soap particles dispersed therein which provide an ideal flattening effect on deposition of the varnish or lacquer.

The invention accordingly comprises the several steps and the relation of one or more of such steps with respect to each of the others, and the composition possessing the features, properties and the relation of constituents, which are exemplified in the following detailed disclosure, and the scope of the invention will be indicated in the claims.

It has now been discovered that uniform and optimum sized soap particles may be precipitated within a varnish or lacquer type composition by incorporating a relatively concentrated solution of a water-insoluble soap of a saturated higher fatty acid in a non-polar solvent into a lacquer or varnish containing a polar compound and/or a polar solvent or vehicle. Ordinarily, the non-polar solvents are capable of only dissolving small amounts of the water-insoluble soaps of the saturated higher fatty acids (i. e. usually not more than 1% to 3%) and still remain fluid without forming a gel at room temperature. While a fluid soap solution is practically necessary in carrying out the process of the invention, the ordinary soap-solvent solutions are far too dilute to use inasmuch as the proportion of the non-polar solvent introduced into the lacquer or varnish would be prohibitive in order to precipitate the desired quantity of soap therein. Use should, therefore, be made of a relatively concentrated solution which can be prepared by the use of a fluidifying agent of the type disclosed and claimed in co-pending application, Serial No. 117,018 filed December 21, 1936. According to this application, relatively concentrated water-insoluble soap solutions in non-polar solvents may be produced by including in the composition mahogany soaps.

By the use of mahogany soaps normally fluid solutions containing from 3% to 50% of the water-insoluble soaps may be obtained. While the use of mahogany soaps is preferred, other fluidifying agents may be used, such as the alkylamines (triethanolamine particularly) or other suitable agents which display fluidifying properties.

The non-polar solvents used herein for dissolving the soaps include those organic solvents which contain none of the so-called active groups, such as, hydroxyl, ester, carboxyl, ether and like oxygen containing groups. In other words, the non-polar solvents recommended include aliphatic, aromatic or cyclic hydrocarbons and their halogenated, alkylated and/or alkylated derivatives, such as, toluol, benzol, xylol, petroleum spirits, decalin, tetralin, hydrogenated coal tar naphtha, turpentine, terpene hydrocarbons, carbon tetrachloride, trichlorethane, ethylene dichloride, etc. The proportion of fluidifying agent used may vary within wide limits depending upon the soap concentration desired.

The flattening agent employed in the present invention may comprise any suitable water-insoluble soap of a saturated higher fatty acid, such for example, as aluminum stearate, aluminum palmitate, aluminum laurate, aluminum resinate, aluminum salts of acids from oxidized petroleum hydrocarbons or aluminum soaps of other suitable saturated organic acids as well as the corresponding calcium, zinc, magnesium, etc. soaps. While various soaps may be employed as the flattening agent, the use of aluminum stearate is highly preferred as dissolution of this soap in non-polar solvents with the aid of a fluidifying agent is more readily obtained. Moreover, the flattening effects of aluminum stearate is far superior to that of the other soaps.

The foregoing process is adapted for practice with any of the known coating compositions of the varnish or lacquer type containing polar compounds, and/or polar solvents or vehicles. Lacquers are principally solutions of cellulose derivatives which may or may not contain natural or synthetic resins or other polar film-forming ingredients. Such lacquers are usually dissolved or dispersed in polar solvents or vehicles, such as methyl, isopropyl or amyl alcohol, ethyl or amyl acetate, acetone, methyl ether or ethylene glycol or like oxygen containing substances. The film-forming ingredients also contain oxygen whereupon they are classified as polar compounds. The so-called varnish-type compositions usually contain natural and/or synthetic resins, oxidized oils, etc., all of which are classed as polar compounds. The solvents or vehicles normally employed in the production of varnishes include either polar or non-polar solvents depending upon the specific composition. In some cases both types of solvent are used. In any event, both the varnish and lacquer type compositions contain polar compounds which cause the precipitation of a saturated water-insoluble soap from a solution thereof when brought into intimate contact therewith. As aforementioned, this precipitation or throwing out of solution of the water-insoluble soap imparts desirable and improved flattening effects to the varnish or lacquer under treatment.

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.

Example I

To 11 gallons of a lacquer of the following composition:

Cellulose nitrate (1/2 sec.)	pounds	30
Amyl acetate	gallons	2
Ethyl acetate	do.	3
Butyl alcohol	do.	2

there is added with stirring 1 1/2 gallons of the following composition:

Parts by weight	
Aluminum stearate	30
Toluol	62
Mahogany soaps	2-12

Immediately upon admixture the aluminum stearate is precipitated out and dispersed throughout the lacquer.

Example II

To a gallon of varnish of the following composition:

Ester gum	pounds	135
China-wood oil	gallons	25
Solvent (Varol)	gallons	45

there is added 25 ounces of the 30% aluminum stearate solution set forth under Example I. The aluminum stearate is thrown out of solution as in Example I.

Example III

To a gallon of a composition of the following type:

Parts by weight	
Rezil #114 (an unsaturated phthalate resin produced by Amer Cyanamide Company)	167
Xylol	33
Turpentine	50
Mineral spirits	50

there is added 20 ounces of a 30% aluminum stearate solution in mineral spirits and a small amount of triethanolamine. The polar compound in the varnish causes precipitation of the stearate.

Example IV

To a gallon of the following composition:

Parts by weight	
Hand dark amber Congo resin	45
Concentrated phenolic resin #2	150
China-wood oil	594
Bodied linseed oil No. 9	108
Solvent (Varolene)	654
Toluol	648

there is added 30 ounces of a 20% solution of aluminum palmitate in a hydrocarbon solvent and a small proportion of triethanolamine.

Example V

To a gallon of the following composition:

Parts by weight	
Pontianak resin	400
China-wood oil	680
Linseed oil (4 hours)	120
Solvents (Varolene)	960
Hi-flash naphtha	240

there is added 15 ounces of a 40% solution of aluminum stearate in toluol containing mahogany soaps.

The amount of flattening agent added to any coating composition may be varied within wide limits to produce the desired degree of subdued

lustre or flat effect. Generally the soap solution (based on 30% soap content) may be added in amounts ranging from 1% to 25% or more. It is obvious that the concentration of the soap solution may be varied, an operable range being about 5% to 50% or more. The concentration of the soap solution should be selected according to the particular composition to be treated. In those cases where the coating composition contains a solvent or vehicle of the same type as the soap solution, the concentration of the latter may be raised to prevent excess solvent in the final composition. Likewise, a lower concentration may be employed where the original composition is deficient in solvent. While the invention is particularly directed to transparent or substantially transparent lacquers or varnishes, certain coloring agents may be included to produce varied effects. In lieu of adding the soap solution to the varnish or lacquer directly, it may be added to any one or more of their usual ingredients. For example, the soap solution may be added to a polar solvent beforehand, whereby precipitation is effected and the resulting product added to the varnish or lacquer.

The mahogany soaps included in the soap solution as a fluidifying agent will also function as a plasticizer for the resulting composition. While the main purpose of the water-insoluble soap is to impart a flattening effect to the composition, it will also serve as a waterproofing agent therefor. It is also to be understood that any suitable mixture of water-insoluble soaps may be employed.

This application is a substitute for application Serial No. 195,120, filed March 10, 1938.

Since certain changes in carrying out the above process and certain modifications in the composition which embody the invention may 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 my 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 my invention, what I claim as new and desire to secure by Letters Patent is:

1. A process of incorporating a flattening agent into a coating composition, which comprises admixing a non-polar solvent solution containing a fluidifying agent and at least 3% of a water-insoluble soap of a saturated higher fatty acid with a composition selected from the group consisting of substantially water-free varnishes and lacquers containing an organic polar compound, whereby the soap is precipitated and dispersed within the composition.

2. A process of incorporating a flattening agent into a coating composition, which comprises admixing a non-polar solvent solution containing a

fluidifying agent and at least 3% aluminum stearate with a composition selected from the group consisting of substantially water-free varnishes and lacquers containing an organic polar compound, whereby the aluminum stearate is precipitated and dispersed within the composition.

3. A process of incorporating a flattening agent into a coating composition, which comprises admixing a non-polar solvent solution containing mahogany soaps and at least 3% aluminum stearate with a composition selected from the group consisting of substantially water-free varnishes and lacquers containing an organic polar compound, whereby the aluminum stearate is precipitated and dispersed within the composition.

4. A process of incorporating a flattening agent into a coating composition, which comprises admixing with a composition selected from the group consisting of substantially water-free varnishes and lacquers containing a polar solvent, a composition comprising 3% to 50% aluminum stearate, mahogany soaps and a non-polar solvent, whereby the aluminum stearate is precipitated and dispersed within the composition.

5. A process of incorporating a flattening agent into a lacquer, which comprises admixing a non-polar solvent solution containing a fluidifying agent and at least 3% of a water-insoluble soap of a saturated higher fatty acid with a substantially water-free cellulose ester lacquer, whereby the soap is precipitated and dispersed throughout the lacquer.

6. A process of incorporating a flattening agent into a lacquer, which comprises admixing a non-polar solvent solution containing mahogany soaps and at least 3% aluminum stearate with a substantially water-free cellulose ester lacquer, whereby the aluminum stearate is precipitated and dispersed throughout the lacquer.

7. A process of incorporating a flattening agent into a varnish, which comprises admixing a non-polar solvent solution containing a fluidifying agent and at least 3% of a water-insoluble soap of a saturated higher fatty acid with a substantially water-free resinous varnish containing a polar compound, whereby the soap is precipitated and dispersed throughout the varnish.

8. A process of incorporating a flattening agent into a varnish, which comprises admixing a non-polar solvent solution containing mahogany soaps and at least 3% aluminum stearate with a substantially water-free resinous varnish containing a polar compound, whereby the aluminum stearate is precipitated and dispersed throughout the varnish.

9. A coating composition selected from the group consisting of substantially water-free varnishes and lacquers containing aluminum stearate precipitated in situ therein from a non-polar solvent solution thereof, said soap imparting a flattening effect to the composition.

10. A flat type cellulose ester lacquer having aluminum stearate precipitated in situ therein from a non-polar solvent solution thereof, said lacquer being substantially water-free.

11. A flat type resinous varnish having aluminum stearate precipitated in situ therein from a non-polar solvent solution thereof, said varnish being substantially water-free.

FRANCIS J. LICATA.