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POLISHING COMPOSITION

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This invention relates to a polishing composition for use on relatively smooth surfaces, and more particularly to wax polishing compositions designed primarily for spray application, whose films are characterized by improved gloss, easy polishing, and relatively good durability on outdoor exposure.

Polishing compositions containing a great variety of ingredients including waxes are well-known in the art. Most of them are somewhat deficient in at least one desirable property such as initial gloss, ease of gloss development, outdoor resistance to the elements, and other properties discussed hereinafter. The present invention combines all these properties to an extent lacking in prior art compositions of which I am aware.

This invention has as an object the provision of a polishing composition for use on relatively smooth surfaces, capable of application by spray to reduce the time and labor requirement that characterizes the application of the conventional rubbing waxes, both paste and liquid. A further object is to deposit a film of controlled thickness and lubricity so that the operation of developing maximum gloss by mechanical effort is reduced from tedious, laborious rubbing to rapid and easy wiping. A still further object is to attain a degree of gloss higher than heretofore achieved in the art of polishing relatively smooth surfaces. A still further object is to attain an unusually high degree of stability and integrity during a relatively prolonged period of storage for this type of composition. Other objects will appear hereinafter.

These objects are accomplished according to the present invention by preparing a polishing composition comprising a soluble, liquid film-former of oily character, selected from the class of compounds technically known as polysiloxanes or silicenes, with a dispersion of waxes and wax-like coating substances, of animal, vegetable, mineral or synthetic origin, in a non-aqueous vehicle such as naphtha derived from petroleum, together with a finely divided, insoluble solid substance capable of enhancing the visibility of the wax film on drying, the dispersion being maintained in stable form largely through the presence of a metallic soap dispersible in the vehicle.

The invention is best described by illustrations of preferred compositions of the improved wax polishing composition, as follows:

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Example I

	Parts by weight
Zinc stearate	1.0
Polysiloxane	1.5
5 Beeswax	0.5
Amorphous silica	4.0
Lacquer diluent naphtha	30.0
V. M. & P. naphtha	63.0
10	100.0

Example II

	Parts by weight
Ethylene/methyl propionate telomer	0.5
15 Magnesium oxide	1.0
Microcrystalline hydrocarbon wax	0.5
Polysiloxane	2.0
Lacquer diluent naphtha	32.0
V. M. & P. naphtha	64.0
20	100.0

Example III

	Parts by weight
Ethylene/methyl propionate telomer	0.50
25 Magnesium oxide	1.00
Polysiloxane	2.25
Microcrystalline hydrocarbon wax	0.60
Lacquer diluent naphtha	31.88
V. M. & P. naphtha	63.77
30	100.00

Example IV

	Parts by weight
Ethylene/methyl propionate telomer	0.50
35 Magnesium oxide	1.00
Polysiloxane	1.00
Microcrystalline hydrocarbon wax	0.60
Beeswax	0.50
Lacquer diluent naphtha	32.13
40 V. M. & P. naphtha	64.27
	100.00

Example V

	Parts by weight
Polysiloxane	1.00
45 Magnesium oxide	1.00
Aluminum stearate	1.00
Lacquer diluent naphtha	32.33
50 V. M. & P. naphtha	64.67
	100.00

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Example VI

	Parts by weight
Ethylene/methyl propionate telomer	0.50
Magnesium oxide	0.50
Polysiloxane	1.00
Beeswax	0.30
Aluminum stearate	0.30
Lacquer diluent naphtha	32.47
V. M. & P. naphtha	64.93
	100.00

Example VII

	Parts by weight
Beeswax	0.3
Microcrystalline hydrocarbon wax	0.5
Magnesium oxide	0.5
Polysiloxane	1.0
Aluminum stearate	0.4
V. M. & P. naphtha	97.3
	100.0

Example VIII

	Parts by weight
Beeswax	1.2
Microcrystalline hydrocarbon wax	1.5
Magnesium oxide	1.5
Polysiloxane	3.0
Aluminum stearate	1.2
Petroleum naphtha B. R. 140-200° C.	91.6
	100.0

Example IX

	Parts by weight
Beeswax	0.9
Microcrystalline hydrocarbon wax	1.5
Magnesium oxide	1.5
Polysiloxane	2.4
Aluminum stearate	1.2
Petroleum naphtha B. R. 140-200° C.	92.5
	100.0

Example X

	Parts by weight
Beeswax	0.9
Microcrystalline hydrocarbon wax	1.5
Magnesium oxide	1.5
Polysiloxane	3.0
Aluminum stearate	1.2
Petroleum naphtha B. R. 140-200° C.	91.9
	100.0

Example XI

	Parts by weight
Beeswax	0.9
Microcrystalline hydrocarbon wax	1.5
Magnesium oxide	1.5
Polysiloxane	3.6
Aluminum stearate	1.2
Petroleum naphtha B. R. 140-200° C.	91.3
	100.0

The polishing compositions are preferably prepared as follows: The metallic soap is dispersed in a major portion of the naphtha by heating with agitation until a temperature of 160° F.-175° F. is reached, followed by continued agitation at this temperature until a clear dispersion is obtained. The magnesium oxide is then added with continued agitation and the mixture is cooled to 70° F.-80° F. Meanwhile, the waxes are melted together, not exceeding 200° F., the balance of the naphtha is added, and mixing is continued until the temperature drops to 175° F.

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The wax dispersion is then added to the metallic soap dispersion, followed by the polysiloxane. Final agitation should be of at least ten minutes' duration.

In the foregoing compositions, the waxes or waxy substances, the metallic soaps, and the polysiloxane are regarded as film formers, in that they remain on the polished surface after the process of application is completed to form a more or less continuous film of glossy character. The primary function of the metallic soaps, however, is that of a suspending agent for the other dispersed components, and its film-forming properties are secondary. Both the ethylene/methyl propionate telomer and the microcrystalline hydrocarbon wax serve as suspending agents, in addition to their primary function of gloss-producing film formers. The finely divided solid, as exemplified by the magnesium oxide, serves to enhance the visibility of the film on spraying and drying, so that the operator may exercise close control over film thickness. The naphthas serve as the vehicle in which the solids are suspended, and through which they are transferred to the surface to be polished.

The ethylene/methyl propionate telomer is a waxy material which may be used in place of beeswax in the invention. The preferred type is one which produces an absolute viscosity in the range from 1.5 to 3800 centipoises at 125° C. The lower viscosity range, however, is preferred. The microcrystalline hydrocarbon wax may be any of the hard varieties commonly sold on the open market, preferably one melting at 190° F. to 195° F. The lacquer diluent naphtha is an aliphatic petroleum distillate boiling between 88° C. and 131° C., having an aniline point between 54° C. and 60° C. The aluminum stearate may be any available on the market, but those nearest the theoretical aluminum tristearate $(C_{17}H_{35}COO)_3Al$ are preferred.

The polysiloxane used in the examples is an organosilicon oxide polymer in liquid form having a kinematic viscosity of 1000 centistokes. These polymers are multiples of the structure:



in which R is a hydrocarbon. They are discussed fully in Ruchow: "Chemistry of the Silicones," 1946.

The compositions as prepared according to the foregoing examples and directions are cloudy liquids of low viscosity. They are ready to spray without reduction, using compressed air delivered preferably at the rate of 2½ cubic feet per minute at 25 to 30 pounds' pressure. They dry very rapidly to yield a white, dusty film, which can be wiped to an unusually high gloss with very little effort, if not applied excessively. The durability of this film is good when exposed out-of-doors, and it retains a high degree of water resistance for a long period. The stability of the compositions is also good in prolonged storage, as evidenced by lack of corrosiveness to metallic containers, rapid and easy reconstitution of settled components by gentle agitation, and no damage from storage under alternately warm and cold conditions.

Although Example X above is the preferred form and concentration of the invention, it represents primarily a compromise for commercial purposes between economy and efficiency. The concentration of solids has been varied over a

wide range without becoming inoperable, as shown below:

	Preferred Composition	Operable Range
Beeswax.....	0.9	0.3- 2.7
Microcrystalline Wax.....	1.5	0.5- 4.5
Magnesium Oxide.....	1.5	0.5- 4.5
Polysiloxane.....	3.0	1.0- 9.0
Aluminum Stearate.....	1.2	0.4- 3.6
Naphtha B. R. 140° C.-200° C.....	91.9	97.3-75.7
	100.0	

A wide variety of finely divided solids may replace the magnesium oxide or amorphous silica to perform the function of enhancing the visibility of the film satisfactorily as a spray guide. Included are most of the commercially available white or light-colored pigments and extenders, although high specific gravity is to be avoided to preserve good settling. Among such pigments and extenders are titanium dioxide pigments, talc, blanc fixe, lithopone, and clays.

In the examples any aliphatic petroleum distillate, normally obtained in liquid form, may be used. These naphthas may have a wide range of boiling point represented by petroleum ether as the most volatile up to and including kerosene as the least volatile. Any of these may be substituted for the naphthas called for in the examples.

In Example X ethylene/methyl propionate telomer may replace the microcrystalline hydrocarbon wax without detracting from the advantages of the invention. Moreover, both the beeswax and microcrystalline hydrocarbon wax may be replaced by a variety of other waxes or wax-like substances, or combinations thereof, in whole or in part, such as carnauba, paraffin, candelilla, various ozokerites and ceresines, myristic acid, oxidized hydrocarbon waxes, montan, ouricury, palm wax, spermaceti, sugar cane wax, bayberry wax and Chinese insect wax. In the claims the term "wax" is intended to be generic to these materials. Other metallic soaps that may be employed successfully as replacements for aluminum stearate include zinc stearate, calcium stearate, zirconyl stearate, zirconyl laurate and aluminum palmitate.

The unusually high gloss, ease of cleanup, uniformity and general superiority over known prior art with respect to initial appearance, and the good stability are attributed largely to the presence of the polysiloxane. This substance appears to act as (1) a lubricant, which influences the ease of cleanup; (2) a film-former; (3) a gloss-producing agent; (4) a water-repellent; and finally (5) an introfier or plasticizer, by virtue of which it appears to stabilize or homogenize the dispersed solids to a high degree in solid form as is evidenced in the easy cleanup of the laid down film.

The uses of this invention lie in the field of polishing and waxing relatively smooth surfaces, which embraces automobiles; busses; trucks; railway equipment; aircraft and marine equipment; enameled, painted, varnished or lacquered stationary equipment including display signs; containers and cabinets; furniture; metallic objects and art objects.

The compositions illustrated by the examples shown above and, in particular, by the preferred embodiment shown in Example X, have been found superior to the prior art cited above with respect to latitude of operable film thickness, 75

ease of development of high gloss, initial gloss and water resistance.

The ratio of polysiloxane to total film-formers in Example X including the aluminum stearate, is 0.455 or 1:2.2. I have found that ratios lying within the range from 0.4 (1:2.5) to 0.5 (1:2) will yield compositions comparable to Example X in properties, still possessing the advantages already claimed over the prior art. At ratios below 0.4, however, the lubricating action due to the presence of the polysiloxane is lowered, resulting in a higher energy requirement for the development of gloss by wiping; at the same time, the initial gloss is degraded more rapidly on outdoor exposure. In addition, a low enough ratio can be reached that there is not enough polysiloxane present to form a continuous film, with the result that the treated surface has a spotty, non-uniform appearance. On the other hand, ratios greater than 0.5 (or 1:2) have been shown to lead to excessively lubricated films, which are thus greasy and difficult to wipe to a satisfactory gloss, resulting in an unnecessarily costly composition as well. The range of greatest operability, therefore, is represented by the ratios of 0.4 to 0.5 of polysiloxane to total film-formers.

The degree of initial gloss obtainable with compositions of the present invention is unusually high. It has been outstanding over the prior art cited above and over other spray-waxing compositions in which polysiloxanes were not employed.

It is apparent that many widely different embodiments of this invention may be made without departing from the spirit and scope thereof, and therefore, it is not intended to be limited except as indicated in the appended claims.

I claim:

1. A polishing composition having the following percentage range:

Wax	0.8- 7.2
Finely divided inert solid	0.5- 4.5
Polysiloxane	1.0- 9.0
Water-insoluble metallic soap	0.4- 3.6
Naphtha	97.3-75.7

the said polysiloxane having a kinematic viscosity of about 1000 centistokes and being present in amount between 0.4 and 0.5 part for each part of total film-forming solids.

2. A polishing composition having the following formula in parts by weight:

Beeswax	0.9
Microcrystalline wax	1.5
Magnesium oxide	1.5
Polysiloxane	3.0
Aluminum stearate	1.2
Naphtha B. R. 140° C.-200° C.....	91.9
	100.0

3. The process of preparing polishing compositions which comprises dispersing 1.2 parts of aluminum tristearate in petroleum naphtha by heating with stirring until a temperature of 160° F. to 175° F. is reached, continuing the stirring until a clear dispersion is obtained, adding thereto 1.5 parts of magnesium oxide with continued stirring, allowing the mixture to cool to 70° C. to 80° C., separately melting 0.9 part of beeswax and 1.5 parts of hydrocarbon wax together, adding naphtha thereto, while mixing, allowing to cool to 175° F. adding this wax dispersion to the aluminum tristearate dispersion

together with 3.0 parts of polysiloxane and there-
after continuing the stirring for at least 10
minutes.

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file of this patent:

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