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GEL SPOT REMOVER

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This invention relates to a novel composition for cleaning fabrics, and more especially relates to a cleaner in gel form capable of removing grease and other oil-type stains from fabrics without leaving a ring or other noticeable spot in the cleaned area.

The composition of this invention comprises, as essential ingredients, silicic acid as hereinafter specified and a special solvent mixture as hereinafter specified, the ingredients being present in amounts hereinafter described. If desired, other ingredients, e.g., perfume, may be incorporated for special purposes.

The term "silicic acid" as used herein also is to be taken to include hydrated silicon dioxides or activated silica, e.g., $\text{SiO}_2 \cdot x\text{H}_2\text{O}$. The particle size of the silicic acid, while it may vary over a wide range, is important to the attainment of effective cleaning without spotting. Particle sizes between about 0.01 to 10.0 microns give satisfactory results. I prefer to employ silicic acid having a particle size between about 2 to 5 microns, however. If silicic acid of smaller particle size than herein specified is used, difficulty in brushing it off the fabric following use will be encountered. The use of coarser silicic acid is disadvantageous because it adversely affects the cleaning effectiveness of the composition, due perhaps to its inability to hold enough solvent.

The special solvent mixture of this invention comprises three essential ingredients: (a) aromatic hydrocarbon or mono-halogenated aromatic hydrocarbons, which may have a total of from 1 to 3 carbon atoms in one or two alkyl side chains; (b) aliphatic hydrocarbons having from 4 to 10 carbon atoms or halogenated alicyclic hydrocarbons having from 4 to 6 carbon atoms; and (c) halogenated aliphatic hydrocarbons having from 1 to 8 carbon atoms.

Examples of the aforementioned solvent ingredients which are operable in this invention follow:

(a) Benzene, toluene, xylenes, isopropyl benzene and chloro benzene;

(b) Hexane, octane, hexene-1, octene-1 and cyclohexyl chloride; and

(c) Carbon tetrachloride, chloroform, ethylene dichloride, ethylene trichloride and 1-chloropentane.

The proportions of the silicic acid and special solvent mixture which may be employed in accordance with this invention may vary over wide limits. The silicic acid may be used in amounts from about 1% to about 20% by weight and the solvent in amounts from about 99% to about 80% by weight, the percentages being based on the total weight of the silicic acid and solvent mixture. It is preferred to use from about 10% to about 20% by weight of silicic acid and about 90% to about 80% by weight of solvent mixture, on the same basis.

It is also a feature of this invention that the amounts of ingredients in the specified solvent mixture to be employed shall be within certain ranges. Based on the total amount of such solvent ingredients, it has been found that from about 1% to about 5% by weight of ingredients above designated as (a) about 5% to about 30% by weight of ingredients designated above as (b) and about 65% to about 95% of ingredients above designated as (c) may be used. For especially desirable results, the amounts of (a), (b) and (c) should be from about 1% to about 3%, from about 20% to about 30% and from

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about 65% to about 75%, respectively, on the same basis as aforesaid.

In general, the compositions of this invention are made by mixing all of the ingredients together in a suitable mixing apparatus under agitation. If desired, the solvent mixture may be separately prepared and then intimately mixed with the silicic acid, and other ingredients, if any. In either event, the final composition is toothpaste-like in consistency and can be stored in and dispensed from a collapsible tube, as in the case of toothpaste itself.

To use the composition, a quantity sufficient to cover the area to be cleaned is extruded over this area and the material is spread over the stained area, either with a soft cloth or finger until the solvent has evaporated. This takes only a few seconds, after which the solid material is brushed off the area, leaving a clean substantially ring-free spot where the cleaning action occurred.

All of the fabrics tested have been found to respond to the cleaning action of the composition of this invention. These include common articles of clothing, whether made from cotton, silk or wool, or whether made from the synthetics such as nylon, orlon, cellulose acetate and other synthetics and combinations of synthetics with natural or synthetic fabrics. Also included are carpeting, draperies, upholstery and other fabrics.

In order to illustrate this invention further, the following example is given.

Example

A gel spot remover was made from the following formulation:

16 grams of silicic acid, 2-5 microns
60 grams of ethylene trichloride
22 grams of hexane, B.P. 68° to 70° C.
1.5 grams of benzene, 1° nitration grade
0.5 perfume

All of the ingredients except the silicic acid were mixed together to form a solvent mixture which was then added slowly, with stirring, to the silicic acid. The resulting mixture was stirred until all of the solid acid had been wetted.

A gel of tooth paste-like consistency was obtained. The gel was introduced into a conventional collapsible tube, such as those used to dispense toothpaste.

In use, the gel was spread over the soiled area to be cleaned by smearing the gel evenly over the soiled area. Sufficient time was allowed for the solvent to penetrate and then evaporate (normally 1 minute). This point is evidenced by the dry chalky-like residue of silicic acid remaining. The powder was then washed away with a stiff brush.

Normally, the soiled area is cleaned and there is no spotting, solvent ring or other discoloration. At times, when the spot is old or intense, it has been found desirable to repeat the cleaning operation for satisfactory results.

It has been found that the gel of this example satisfactorily removed common grease spots caused by fats and oils in foods, gum, tar, wax and similar materials. Soiled areas on fabrics such as wool, nylon, Orlon fiber, cotton, acetates, etc., responded to cleaning with the gel of this example.

While I have described my invention in detail in its preferred embodiment, it will be obvious to those skilled in the art, after understanding my invention, that various changes and modifications may be made therein without departing from the spirit or scope thereof. I aim in the appended claims to cover all such modifications and changes.

I claim:

1. A cleaning composition in gel form for removing grease and oil stains from fabrics so as to leave said fabrics spotless, which comprises silicic acid of about 0.01 microns to about 10 microns particle size and a solvent mixture comprising (a) at least one member selected from the group consisting of benzene, toluene, xylenes, isopropyl benzene and chlorobenzene, (b) at least one member selected from the group consisting of hexane, octane, hexene-1, octene-1 and cyclohexyl chloride, and (c) at least one member selected from the group consisting of carbon tetrachloride, chloroform, ethylene dichloride, ethylene trichloride and 1-chloropentane, said silicic acid being present in an amount within the range from about 1% to about 20% by weight of the total amount of silicic acid and solvent mixture and the amounts of the aforementioned ingredients (a), (b) and (c) comprising said solvent mixture being within the range from about 1% to about 5% of (a), from about 5% to about 30% of (b) and from about 65% to about 95% of (c) by weight of the total solvent mixture.

2. A cleaning composition in accordance with claim 1, wherein the silicic acid has a particle size within the range from about 2 microns and about 5 microns, the solvent mixture comprises (a) benzene, (b) hexane and (c) ethylene trichloride, the silicic acid is present in an amount within the range from about 10 percent to about 20 percent by weight of silicic acid and solvent mixture, and the amounts of benzene, hexane and ethylene trichloride present in the solvent mixture are within the

ranges from about 1 percent to about 3 percent, from about 20 percent to about 30 percent, and from about 65 percent to about 75 percent, respectively, by weight.

3. A cleaning composition in gel form for removing grease and oil stains from fabrics so as to leave said fabrics spotless which comprises the following ingredients in about the stated amounts by weight:

16.0 parts of silicic acid of about 2-5 microns particle size
1.5 parts of benzene
22.0 parts of hexane
0.5 part of perfume
60.0 parts of ethylene trichloride.

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