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METHOD OF CLEANING CARPETS AND FABRICS

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ABSTRACT OF THE DISCLOSURE

Disclosed is a method of cleaning carpets and fabrics comprising combining at room temperature a fluorocarbon such as, for example, a fluoromethane, with an aqueous medium, then adding to and mixing with said combination a fatty acid such as, for example, lauric or stearic acid, and an amine such as triethanolamine or triethylamine, which forms an amine soap, and immediately thereafter contacting the fabric material with the cleaning composition so prepared.

BACKGROUND

This application is a continuation-in-part of our copending U.S. patent application Ser. No. 761,804, filed Sept. 23, 1968, now abandoned.

Field of invention

The present invention relates to cleaning compositions and more particularly to a novel, safe cleaning liquid for carpets and fabrics usable at room temperature and atmospheric pressure without pressurized vessels which both dissolves foreign organic substances and lifts dirt particles to the surface for easy removal, stored and applied in liquid form.

Prior Art

Conventional rug and like cleaning compositions utilizing amine soaps are well known in the art. Amine soaps are generally dissolved in water and used as detergents. However, when such cleaners are used to clean carpets, rugs or other fabric articles, the cleaning process causes large amounts of water to be absorbed and, therefore, the carpets, rugs and other articles must be subjected to prolonged drying times after cleansing.

Cleaning compositions comprising highly volatile components are also known in the art. Generally the highly volatile components comprise naphtha or other inflammable or toxic chemicals. Such components volatilize noxious or dangerously flammable fumes into the air and are particularly dangerous when used on carpets, rugs or fabric confined within rooms, or other enclosed areas. Fluorocarbons have been used as propellants (see U.S. Pats. 2,908,650 and 2,524,590) to force creams and soaps out of an atomizer.

BRIEF SUMMARY AND OBJECTS OF THE INVENTION

Until this present invention no completely nonflammable, nontoxic, high foaming liquid cleaning composition capable of use at atmospheric temperatures and pressures without pressurized containers has been disclosed in the art.

With the foregoing in mind, it is, therefore, a primary object of the present invention to overcome or substantially alleviate problems of the type mentioned above.

The present invention comprises a unique combination of cleaning agents for application in liquid form at room temperatures and atmospheric pressures primarily with carpets, rugs and fabrics and includes an amine soap-water emulsion for dissolving organic or other stains and dirt and a nontoxic, nonflammable volatile lifting agent for principally lifting inorganic dirt and other particles to the surface of the carpet or fabric for easy removal by conventional techniques.

It is, therefore, another primary object of the present invention to provide a novel initially liquid cleaning composition which is nontoxic and nonflammable.

It is another important object of the present invention to provide a novel initially liquid cleaning composition which both dissolves organic stains and material and lifts inorganic dirt and other particles to the surface.

Another important object is to provide an improved high foaming initially liquid cleaning agent for carpets, rugs and fabrics.

One still further object is to provide a unique, rapidly drying, initially liquid cleaning agent which is harmless to natural or synthetic fibers.

An additional object is to provide a high foaming cleaning agent for carpets, rugs and fabrics, which is capable of application in liquid form at room temperatures and atomspheric pressures without requiring the use of pressurized containers.

These and other objects and features of the present invention will become more fully apparent from the following description and appended claims.

DETAILED DESCRIPTION

The cleaning composition comprising the present invention comprises a liquid solution or emulsion preferably for use at room temperatures and atmospheric pressures, in cleaning carpets, rugs and fabrics. It is presently preferred that the composition contain two principal cleaning agents, both of which are nontoxic and nonflammable. The first cleaning agent is an amine soap which is normally emulsified with water and preferably forms relatively large volumes of foam or suds.

The amine soap is commonly prepared by combination of a fatty acid with a nitrogen containing base, preferably an amine. Essentially, any of the fatty acids, i.e. lauric, myristic, palmitic, linoleic, oleic and stearic, may be combined with any one of a large number of amines, of which triethanolamine, triethylamine, tripropylamine, diethylamine, pyridine, aniline, toluidine and diphenylamine are representative examples.

It is preferred that the amine soap be dissolved in water or if, as is not uncommon with amine soaps, the soap is substantially insoluble in water, an emulsion is formed by conventional techniques. If desired, an emulsifying agent or surface active agent (surfactant) may be used to aid in formation of the emulsion. Any suitable surfactant could be used, although non-ionic surfactants are presently preferred. Surfactants manufactured by Monsanto, Inc. under the trade name "Sterox" have been found to be satisfactory. Also emulsifying agents or surfactants mar-

keted under the trade name "Sorbitan," manufactured by Atlas Powder Company, could be used.

The second principal cleaning agent is a volatile, nontoxic and nonflammable fluorocarbon. It is preferred that members of the series marketed under the trade name "Freon" be used; and it is particularly preferred that only those "Freons" be used which have boiling points such that they will remain in a liquid state at atmospheric temperatures and pressures. "Freon–114," "Freon–11," and "Freon–113," having respective boiling points at 38.4, degrees F., 74.8 degrees F., and 117.6 degrees F. are considered satisfactory. "Freons" are fluoro- or chlorofluoromethanes and ethanes. In this specification, the term fluorocarbon means fluoro- or chlorofluoro-methanes and ethanes. Although a large number of fluorocarbons are known which could be used with the present invention, the fluorocarbons listed in Table I are presently preferred for their relatively nontoxic and nonflammable properties and for the fact that they are liquids at atmospheric temperatures and pressures.

TABLE I

Code	Compound	Boiling point (degrees Fahrenheit)
	Methane series	
F_{11}	CCl_3F	74.8
F_{21}	$CHCl_2F$	48.1
	Ethane series	
F_{112}	CCl_2FCCl_2F	199.0
F_{113}	CCl_2FCClF_2	117.6
F_{114}	$CClF_2CClF_2$	38.4

The code numbers listed opposite the fluorocarbons in Table I are part of a uniform code system adopted as standard 34 of the American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE) on June 3, 1957, for the identification of particular fluorocarbons. The letter F preceding the number is part of the uniform code number. The uniform code is used by essentially all of the major commercial distributors of fluorocarbons.

The fluorocarbon serves two primary functions. First, when placed on a carpet, rug or fabric, the rapid volatization of the fluorocarbon lifts dirt and other particles to the surface where they may be removed by, for example, a vacuum cleaner or the like. It should be noted that many fluorocarbons function as a solvent for some substances. Secondly, the volatization of the fluorocarbon provides for rapid drying of the carpet, rug or fabric treated by the cleaning composition.

The following examples taken at atmospheric pressure and room temperature indicate even more fully the nature of the invention although it is to be understood that the examples are illustrative only and do not limit the scope of the invention.

EXAMPLE 1

A carpet cleaning composition was prepared by combining the following components to form an emulsion:

Component:	Parts per-million
Water	460.000
Trichloromonofluoromethane (F_{11})	470,000
Oleic acid	30,000
Triethylamine	30,000
Sterox	10,000

EXAMPLE 2

Component:	Parts per-million
Water	470,000
Tetrachlorodifluoroethane (F_{112})	450,000
Oleic acid	40,000
Diphenylamine	30,000
Sterox	10,000

EXAMPLE 3

Component:	Parts per-million
Water	510,000
Trichlorotrifluoroethane (F_{113})	400,000
Linoleic acid	40,000
Tripropylamine	25,000
Sorbitan	25,000

It has been found that the above-mentioned compoment provide an effective cleaning composition when combined in amounts within the extreme ranges set forth in Table II below:

TABLE II

Component:	Parts per million
Water	400,000–950,000
Fluorocarbon	250,000–750,000
Fatty acid	35,000–500,000
Amine	7,500–30,000
Surfactant	7,500–30,000

If desired, the surfactant may be eliminated without substantially diminishing the cleaning action of the composition; however, the likelihood that the composition would separate is substantially increased.

The presently preferred cleaning composition comprising the present invention is, therefore, a superior cleaning agent which is completely safe, the composition having no components which are flammable or substantially toxic, and which is capable of use at room temperatures and atmospheric pressures.

The invention may be embodied in other specific forms without departing from the spirit or essential characteristics thereof. The present embodiments are, therefore, to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims rather than by the foregoing description, and all changes which come within the meaning and range of equivalency of the claims are therefore to be embraced therein.

We claim:

1. In the method of cleaning both organic and inorganic contaminates form synthetic and natural fiber, efficiently, with a minimum of time required for drying the material after cleaning, materials by contacting said material with a high sudsing, liquid cleaning composition, the steps of:

(a) immediately prior to contacting said material, preparing said cleaning composition by

(1) combining, at substantially room temperature and atmospheric pressure, fluorocarbon, selected from the group consisting of chlorofluoromethanes, chlorofluoroethanes, fluoromethanes and fluoroethanes, on the order of about 250,000 to 750,000 parts per million by volume with an aqueous medium of on the order of about 400,000 to 950,000 parts per million by volume, at atmospheric pressure and room temperatures;

(2) then adding to and mixing with the combination of fluorocarbon and aqueous medium a fatty acid, selected from the group consisting of lauric, myristic, linoleic, oleic and stearic acids, on the order of about 35,000 to 500,000 parts per million by volume at atmospheric pressure and room temperature and an amine, selected from the group consisting of triethanolamine, triethylamine, tripropylamine, diethylamine, pyridine, aniline, toluidine and diphenylamine, on the order of about 7,500 to 30,000 parts per

million by volume at atmospheric pressure and room temperature, the fatty acid and the amine forming an amine soap; and

(b) immediately thereafter, contacting said material with the cleaning composition prepared according to step (a).

2. In the method of claim 1, the additional step of:

adding to said composition, prior to contacting said material therewith, on the order of about 7,500 to 30,000 parts per million by volume of a substantially non-ionic surface active agent.

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