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AQUEOUS SHAMPOO COMPOSITION

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This application is a continuation-in-part of our application Serial No. 823,008, filed June 26, 1959 and now abandoned.

The present invention relates to compositions of matter, and more particularly to shampooing compositions of the type adaptable for use in the shampooing and cleaning of textile fabrics, and more particularly in the shampooing of pile fabrics of the type normally found in rugs and carpets.

Many shampoo formulations have been heretofore developed and employed in the cleaning of various textile fabrics, including pile fabrics of the type normally found in rugs and carpeting, each of which has met with varying degrees of success. In principle, most of such formulations, and in particular the more successful ones, have involved the use of detergent materials in aqueous or solvent mediums, in which dirt and soil were removed by normal detergent action. Others have involved formulations which are applied dry or damp to the touch to the surface to be cleaned, in which the soil and dirt particles are, in effect, loosened and removed by a mild detergent action and the loosened particles absorbed on relatively large particles of filler material. Thereafter, the surface to be cleaned is vacuumed.

With respect to the latter type of formulations, which heretofore have effected the most efficient cleaning action, they have required the expenditure of a great deal of effort to achieve cleaning, and in addition, fabrics and surfaces so cleaned are easily and readily resoiled.

Since most of the commercial formulations of the type described above and compositions of the type contemplated by the present invention have found widespread usage in the cleaning of pile fabrics, such as normally found in rugs and carpeting, the present invention will be described with respect to such materials, though not limited thereto.

In general, the better-known commercial shampoo formulations for pile fabric are difficult to apply and are only moderately efficient cleaners.

Therefore, it is an object of the present invention to provide a shampoo formulation which is simply and readily applied and which is characterized by a highly efficient shampooing and cleaning action.

More particularly, it is an object of the present invention to provide such a formulation in which the essential components cooperate to produce a superior shampooing and cleaning action, and further cooperate to aid in substantially complete removal of the formulation from the surface cleaned, after use.

It is a further object of the present invention to provide such a shampoo formulation which is readily formulated and easily employed.

It is a further object of the present invention to provide such a shampoo formulation adapted for use on all sorts of textile materials, but more especially pile textile fabrics such as rugs and carpets.

It is a further and particular object of the present invention to provide a process employing the shampoo formulation of the present invention whereby improved efficient cleaning of soiled textile fabrics is obtained and whereby such fabric, when cleaned, are characterized by a soil resistant finish thereon.

These and other objects and advantages of the present

invention will become apparent from the detailed description thereof set forth hereinbelow.

In accordance with the present invention, a stable aqueous composition of matter is provided, comprising a "high-foaming" organic non-saponaceous detergent and a finely divided inorganic siliceous material, characterized by a brightness as measured on a G.E. Reflectometer at 458 mu of a minimum of about 90.

The organic non-saponaceous detergent employable in the present invention are "high-foaming" detergent materials. In order for an organic detergent to be effectively employed in the composition of the present invention, it must be characterized by a foam measured immediately in milliliters of a minimum of about 200, as determined by the Ross-Miles Foam Test Method described in Oil and Soap, vol. 18, No. 1, 1941, at pages 99–102. In accordance with the present invention, the detergent must be high-foaming to result in easy and efficient cleaning. Thus, in general terms, low foaming detergent materials do not effectively release and suspend on the surface of the material being cleaned, particles of soil and dirt. High-foaming detergents function effectively for this purpose, and in the application of the shampoo formulation, loosen the soil and dirt and suspend particles thereof on the surface being cleaned, so that in subsequent vacuuming or other cleaning operations, they may be readily removed.

In addition, the "high-foaming" detergent should be one which in its dry state is not viscous or oily. Preferably, the detergent should be one capable of drying to an easily removal powdery form.

Among the numerous non-soap detergents which qualify under the above test and may be employed in the present invention, are certain alkyl esters of alkali metal salts of sulfosuccinic acid. These esters employable in the detergent composition of this invention may be an alkali metal salt such as sodium, potassium, ammonium, or an organic base such as ethanol amine salt of a dialkyl sulfosuccinate of the type described in U.S. Patent No. 2,028,091. The following are illustrative of such esters: sodium bis-n-octyl sulfosuccinate; sodium bis-n-nonyl sulfosuccinate; sodium bis-1-methyl-4-ethylhexyl sulfosuccinate; sodium bis-n-heptyl sulfosuccinate; sodium bis(2-ethylhexyl) sulfosuccinate; sodium bis-1-isopropyl-2-methylpropyl sulfosuccinate; sodium bis isobutyl-3-methylbutyl sulfosuccinate; sodium bis(3,5,5-trimethylhexyl) sulfosuccinate; guanidine bis(2-ethylhexy) sulfosuccinate; sodium bis tridecyl sulfosuccinate; sodium bis(tridecylglycol ether) sulfosuccinate; sodium bis(1-methylheptyl) sulfosuccinate; sodium bis(isobutylhexyl) sulfosuccinate.

In addition to dialkyl sulfosuccinates of the type exemplified above, certain monoalkyl sulfosuccinates are contemplated. Thus, for example, disodium n-decyl sulfosuccinate; disodium myristyl sulfosuccinate; disodium cetyl sulfosuccinate; disodium stearyl sulfosuccinate; and disodium dodecylamidoethyl sulfosuccinate.

Additionally, certain bis-alkyl aryl esters of sulfosuccinic acid may be employed. As examples of such compounds, the following are illustrative: sodium bis-2-p,t-butyl phenoxyethyl sulfosuccinate; sodium bis-2-p,t-amyl phenoxyethyl sulfosuccinate; sodium bis trimethylcyclohexyl sulfosuccinate; sodium bis(cyclohexylcyclohexyl) sulfosuccinate, sodium di-4-t-amylcyclohexyl sulfosuccinate; and the like. Compounds of this class are described, in general U.S. Patent No. 2,507,030.

Certain sulfosuccinamates are useful such as disodium octadecyl sulfosuccinamate; disodium lauryl sulfosuccinamate; and disodium N-octadecyl N-dicarboxyethyl disodium sulfosuccinamate.

In addition to the preferred succinic acid esters described hereinabove, other anionic detergents are contem-

plated for use in the present invention. As examples of such agents, the following are illustrative: sodium lauryl sulfate; sodium heptadecylsulfate; sodium hydrocarbon (C_{11-16}) sulfonate; sodium alkyl (C_8–C_{12}) benzene sulfonate; sodium alkyl (C_8–C_{12}) toluene sulfonate; sodium alkyl (C_6–C_{12}) phenoxyethyl sulfate; and sodium oleylmethyl taurine sulfonate.

It will be apparent that suitable anionic detergents may be employed either singly or in combination with one another where compatible.

The finely divided siliceous material characterized by a brightness as measured at 458 mu by a G.E. Reflectometer of a minimum of about 90 are in general clays or specially processed clay type derivatives made from acid or alkaline digested clays, from leached and spent clays, and from digestion residues obtained from washings or chemical treatments of naturally occurring mineral deposits. Further, these siliceous materials may be prepared by reacting clays or derivatives thereof, such as alkali metal silicates with salts of aluminum, such as aluminum sulfate under controlled conditions. Generally the siliceous materials will contain, relative to other components in their composition, a major portion of SiO_2 usually above 45% by weight of total composition and normally between 45 and 75% by weight. In addition to SiO_2 content, such compositions usually contain between about 10% and 40% by weight of Al_2O_3 and the balance, lesser amounts of oxides of various metals such as sodium, iron, etc.

The G.E. Reflectometer values referred to herein are determined by employing G.E. Reflectometer at 458 mu in accordance with the procedure set forth in Kaolin Clays and Their Industrial Uses, copyrighted 1949, by the J. M. Huber Corporation, New York, New York.

Suitable clays for use in the present invention may be processed, as for example in accordance with the "dry process" and "wet process" such as are described in the text on Kaolin Clays and Their Industrial Uses referred to hereinabove. In order to improve the brightness of certain clays, they may be bleached in accordance with procedures well known to those skilled in the art, as for example by employing procedures such as those described in U.S. Patent No. 2,339,595.

The particular preferred finely divided siliceous materials contemplated for use in this invention, which materials are sometimes referred to as silicate pigments, may be prepared in accordance with U.S. Patent No. 2,739,073, by which procedures siliceous materials characterized by the proper brightness and particle size may be readily prepared.

In this regard, it is a second important characteristic of the siliceous component of the present composition that it be characterized by a fine particle size. Thus, in general, the siliceous material should be characterized by an ultimate particle size of between about .01 to about 0.1 micron and preferably by a particle size of from between about .02 to about .05 micron. While siliceous materials having a particle size of above about 0.1 micron are characterized by some utility, they are in general less satisfactory, in that while they tend to improve foaming and detergency, they are not so effective as the more finely divided particles.

It is one of the surprising aspects of the present invention that a typical finely divided siliceous component suited for use in the formulation is characterized by a high brightness or light reflectance in spite of its very fine particle size. This is contrary to general findings. See Paper Coating Pigments, TAPPI Monograph Series, No. 20, 1958.

Brightness in general terms relates to the amount of light reflected and, in general, materials characterized by a high brightness which remain on the surface cleaned have the visual effect of brightening the surface as for example, the pile portion of a rug or carpet. To this end, the finely divided siliceous materials contemplated by the present invention result in improved brightness of the fabric having been cleaned therewith.

The presence of the siliceous material in the formulation of the present invention achieves a multiplicity of very desirable features and appears to function in a synergistic way with the detergent portion of the formulation. Thus, it has consistently been observed visually that the presence of the siliceous materials in the formulation of the present invention result in increased foaming action of the detergent, resulting in a more effective suspension of released soil particles resulting from detergent action. The net effect of this cooperative activity with the detergent is to improve cleaning action.

In addition, the finely divided siliceous material cooperates with the detergent component of the present composition, in that it acts as a hardener for the detergents, i.e., the detergent dries on the fine siliceous particles more readily when shampooing is completed. This permits ready removal of detergent. This is a very desirable and important feature, in that it aids in the substantially complete removal of the detergent material from the surface being treated. Failure to completely remove said detergent results in the presence on the base material of detergent which normally is capable of attracting and retaining soil particles.

It should be noted that rugs or carpets shampooed with a formulation, not containing the siliceous material, resoil much more readily than those coating such material in that residual dry detergent is not as easily removed and attract soil easily.

In addition to these functions whereby the siliceous material cooperates with the detergent portion of the present composition, it has the property when employed in proper amounts, of a sufficient amount thereof remaining on the surface after vacuuming to impart a soil retardant finish. Apparently, when suitable finely divided siliceous material is employed in proper amounts, a sufficient portion of it fills the interstices and crevices in the textile fabric, thus preventing the deposition of soil and soil particles therein, and in addition renders such soil as may subsequently be deposited thereon more readily removed.

Thus, by employing the composition of the present invention, not only is soil removed more efficiently, but in addition the cleaned material does not resoil as readily.

In general, the siliceous material employed in the formulation of this invention is in such amounts as from between about .03 and about .30 ounce per square yard of exposed surface, and preferably from between about .05 and about .20 ounce per square yard of surface. It is a particular advantage of the present formulation that because of the brightness of the siliceous material employed, residual amount remaining on the surface after vacuuming results in a brighter cleaner surface which may be readily achieved without color change.

As employed herein, the term "square yard of exposed surface" with respect to flat goods refers to the surface to be shampooed, as measured in square yards. With respect to pile fabric of the type normally found in rugs and carpets, the expression refers to the outer exposed tips of the pile portion of the fabric. Thus, in general, with respect to pile fabric, the number of square yards of the fabric are coincident with the number of square yards of exposed surface.

The composition of the present invention may contain a weight ratio of detergent to siliceous material of from about 1:2 to 3:1 and preferably from about 1:1–2:1. The composition is normally dispersed in aqueous medium, which may contain in addition to the essential components, such ingredients as small amounts of alcohol, brighteners, disinfectants, perfumes and other components to accomplish particular desired functions.

Normally, an aqueous dispersion as manufactured will contain up to about 40% by weight of solids, principally identifiable as the detergent and the siliceous material.

In this connection, it is another important aspect of the present composition that formulations of this invention result in stable aqueous dispersions which are freeze-thaw stable and stable against separation for substantial periods of time. In addition any separation as may occur may be easily corrected simply by agitating as by shaking the container in which it is stored to return it to its original uniform state. It will be appreciated that maximum solids formulations as for example those containing up to 40% are greatly preferred, in that they are inherently more economical to manufacture and transport. For use, however, formulations of the type described above are normally diluted with water to maximum solids concentration of about 5%, normally to about 2% solids, said solids being constituted principally by the detergent and siliceous components of the formulation. Employing the formulation in such solids concentrations results in excellent cleaning action.

The principal end use of the composition of the present invention is in the shampooing of formed textile fabrics. In general, it has more application to heavy durable fabrics having a nap or pile of the type not normally dry cleaned or laundered. Still more particularly the present invention is directed to the shampooing of rugs and carpets. The formed textile fabrics may be vegetable, synthetic or of animal origin, including mixtures of these.

"Synthetic fibers," as the term and similar ones are employed herein, refer to viscose rayon, acetate rayon, nylon, the polyester and the acrylic type fibers. As examples of the polyester fibers that are available commercially, those sold as Zephran and Dacron are illustrative. While examples of acrylic type fibers, those sold commercially as Creslan, Acrilan, Orlon and the like are contemplated.

Among the "vegetable fibers" contemplated are cotton, jute, ramie, and the like. Wool is illustrative of animal fibers.

As noted, the formulation of the present invention has particular application to the cleaning or shampooing of pile fabric and rugs. The employment of the shampoo formulation of the present invention on such pile fabric not only successfully cleans such material, but prevents ready resoiling of such material.

In the application of the formulation of the present invention, a solution having a solids content of about 2% is applied as by means of a sponge, sponge mop, or other suitable device to the surface to be shampooed. The action of application, as for example rubbing, causes the detergent formulation to penetrate into the surface of the fiber to be cleaned, and a rich foam to be produced which raises dirt particles to the surface and suspends them there. The siliceous material promotes detergency and foaming during application and when shampooing is completed, functions as a hardener for detergent particles, aiding in the removal of detergent, when the dried fabric is vacuumed. Residual amounts function as a soil barrier. As a result of this multi action, fabric cleaned in accordance with this invention do not resoil as readily as those cleaned with detergent alone.

It is an important feature of the formulation of the present invention that its application does not result in significant modification of hand of the fabric treated, nor does it significantly change or modify the color thereof.

In order to illustrate the present invention, the following examples are given primarily by way of illustration. No specific enumerations or details found therein should be construed as limitations on the present invention, except insofar as they appear in the appended claims. All parts and percentages are by weight unless otherwise specified.

EXAMPLES 1–5

Six different formulations were prepared employing a high foaming detergent, specifically the sodium salt of 2-ethylhexyl sulfosuccinate, and employing various clays and clay-type materials, as well as a commercially available soil retardant material. These formulations, as well as how they were employed, pH, particle size of the siliceous material, and the like, are identified in each example.

As indicated in the examples, they were employed as 1% solutions based on the detergent solids in the formulation and were applied to all-wool and all-cotton rugs by means of an applicator having a reservoir tank mounted on a handle and a sponge type applicator at the end thereof. By means of this device, a controlled amount of the shampoo formulation is allowed to permeate the sponge uniformly resulting in uniform application thereof to the rug to be cleaned. The formulation was applied to the rug employing a back and forth stroke with a continuous regular feed of the shampoo formulation. After shampooing, the rug was allowed to dry and vacuumed thoroughly to remove the dirt loosened by the shampooing.

In order to evaluate the comparative effectiveness of the formulations, the rugs were measured initially for their brightness and periodically thereafter, after fixed periods of soiling followed by shampooing, to measure their return to cleanliness.

The return to cleanliness is computed by the following formula:

$$\frac{\text{Shampooed reflectance} - \text{soiled reflectance}}{\text{Original reflectance} - \text{soiled reflectance}} \times 100$$

The reflectance readings are the average of eight replicate readings per sample taken at 600 mu on a G.E. Resoiling Spectrophotometer.

The results of these experiments are reported in Table I hereinbelow as well as is the observation with respect to foam formation resulting from the applications of the various formulations.

In all of the test recordings in this application, soiling is effected by exposing the rugs to heavy foot traffic for the periods of time indicated in Table I. The volume of traffic is sufficient to constitute normal use in an average household of approximately one year. The positioning, rotation of the rugs was according to a statistical pattern designed to insure the most uniform soiling possible.

Example 1

	Percent
Sodium 2-ethylhexylsulfosuccinate	24
Commercial soil retardant containing aluminum phosphate	14
Water	62

This formulation is employed as a 1.6% solids solution. The dispersion was characterized by a substantially neutral pH and by the aluminum phosphate particles having about 90% by weight of its particles below .5 micron. It was observed that the dispersion separated on standing in a short period of time.

Example 2

	Percent
Sodium 2-ethylhexylsulfosuccinate	24
Hydrous alumina silicate (Georgia kaolin)	25
Ethanol	15
Optical brightener	0.06
Water	35.94

This formulation is employed as a 2% solution. The average particle size of the hydrous alumina silicate was from 1 to 2 microns. The clay had a brightness when measured at 458 mu on a G.E. Reflectometer of 78–80 maximum. It was observed that the dispersion separated on standing in a short period of time.

Example 3

	Percent
Sodium 2-ethylhexylsulfosuccinate	24
Water washed Georgia clay	25
Alcohol	15
Optical brightener	0.06
Water	35.94

This formulation is employed as a 2% solids solution. It was observed that the dispersion separated on standing in a short period of time. The pH of the formulation was 7 and the clay was characterized by a particle size of about 1.0 micron. The clay had a brightness when measured at 458 mu on a G.E. Reflectometer of 83–84 maximum.

Example 4

	Percent
Sodium 2-ethylhexylsulfosuccinate	9
Sodium silico aluminate (a pigment grade siliceous material which loses about 16% water on ignition and has the following analysis: SiO_2, 79.7%, Al_2O_3, 9.9%, Na, 5% and the balance being various metal and metal oxides). Siliceous material calculated to have the formula: $NaAl(SiO_2)_4 \cdot 3H_2O$	10
Ethanol (95%)	10
Optical brightener	0.06
Water	71.94

This formulation is employed as a 1.9% solids solution. This dispersion was markedly more stable than the previous formulation. The pH of the formulation was 7.2 and the average particle size of the sodium silico aluminate was 0.02–0.03 micron and had a brightness of 93–94 when measured at 458 mu on a G.E. Reflectometer. This high brightness is surprising in view of the extremely fine particle size.

Example 5

	Percent
Sodium 2-ethylhexylsulfosuccinate	13.60
Soil retardant containing aluminum sulfate	18.25
Optical brightener	0.06
Ethanol	9.0
Water	59

This formation is used as apparently a 2.5% solids solution. The formulation had a substantially neutral pH and the soil retardant was characterized by an average particle size of 1 micron. The dispersion separated on standing after a short period of time.

TABLE I.—PERCENT RETURN TO ORIGINAL CLEANLINESS OF WOOL AND COTTON RUG SOILED BY NORMAL TRAFFIC

Treatment		Percent Return to Cleanliness						Observed Foaming During Shampooing
		1 Wk.	2 Wks.	3 Wks.	4 Wks.	5 Wks.	6 Wks.	
Control Detergent.	Wool rug.	65.0	52.0	49.1	53.0	40.1	35.0	Standard.
Ex. 1	Wool	81.8	71.4	68.5	60.9	65.8	45.4	Do.
Ex. 2	do	59.1	61.1	66.9	70.3	65.2	41.0	Do.
Ex. 3	do	50.4	56.7	64.1	68.2	59.2	51.3	Do.
Ex. 4	do	85.2	72.8	84.9	83.5	78.3	75.0	More foam, more rapidly than std.
Ex. 5	do	42.3	44.6	38.8	34.9	30.0	29.8	

Table I above illustrates that the stable formulation of the present invention results in a 75% return to original cleanliness for wool carpeting after 6 weeks of soiling.

In order to further illustrate the improved value of the present formulation, the present formulation was compared with an identical formulation containing a known commercially available oil retardant consisting of colloidal silica. This material was characterized by a brightness as measured on a G.E. Reflectometer at 458 mu of 87. The formulations employed in this comparative test are set forth in the Examples 6, 7 and 8.

EXAMPLE 6

	Percent
Sodium bis-2-ethylhexylsulfosuccinate	9
Ethanol (95%)	10
Optical brightener	.06

EXAMPLE 6—Continued

	Percent
Sodium silicate aluminate (Ex. 4)	10
Water	70.94

The application of this formulation resulted in about .15 ounce of siliceous material per square yard of exposed surface area of the various fabric shampooed.

EXAMPLE 7

	Percent
Sodium bis-2-ethylhexylsulfosuccinate	9
Ethanol (95%)	10
Optical brightener	.06
Sodium silicate aluminate (Ex. 4)	5
Water	75.94

The application of this formulation resulted in about .07 ounce of siliceous material per square yard of exposed surface area of the various fabric shampooed.

EXAMPLE 8

	Percent
Sodium bis-2-ethylhexylsulfosuccinate	9
Ethanol (95%)	10
Optical brightener	.06
Colloidal silica solution	10
Water	70.94

The application of this formulation resulted in about .15 ounce of siliceous material per square yard of exposed surface area of the various fabric shampooed.

These formulations are adjusted to pH 7.5 by the addition of 10% HCl solution. The formulations of Examples 6–8 were applied to various rug sections made of wool, cotton, nylon, and cellulose acetate, and their return to cleanliness measured and computed in accordance with the formula set forth hereinabove. The soiling was accomplished in a manner similar to that in Examples 1–5. These values are set forth in Table II below.

TABLE II.—PERCENT RETURN TO ORIGINAL CLEANLINESS WOOL, COTTON, NYLON, AND ACETATE RUGS

	Example 6	Example 7	Example 8
Wool:			
1 Week	62.5	60.0	47.5
2 Weeks	56.7	49.8	45.6
3 Weeks	61.8	46.3	39.9
4 Weeks	58.6	56.6	42.6
Cotton:			
1 Week	20.6	25.5	16.8
2 Weeks	23.6	18.4	17.5
3 Weeks	18.9	17.4	11.5
4 Weeks	12.5	6.8	3.6
Nylon:			
1 Week	74.2	62.7	63.5
2 Weeks	75.9	60.0	70.5
3 Weeks	76.8	59.4	55.4
4 Weeks	76.7	56.6	53.8
Acetate:			
1 Week	72.5	73.2	4.5
2 Weeks	83.3	50.0	39.5
3 Weeks	88.1	46.7	33.3
4 Weeks	78.0	58.6	22.4

Table II above clearly demonstrates the superiority of formulations containing the sodium silicate aluminate of this invention over formulations containing equivalent amounts of a commercially available colloidal silica. The advantages of the formulations of the present invention (Examples 6 and 7) over the formulation of Example 8 are apparent. Thus, in these comparative tests on rugs of four different kinds of fibers, formulations of this invention are markedly superior.

It will be apparent in accordance with this invention that while the amount of siliceous material employed in the formulation may be sufficient to apply from between .03 to .30 ounce per square yard of exposed surface, that after drying on vacuuming the residual amount of siliceous material will be substantially less. The residual amount will depend of course on the amount employed, effectiveness of vacuuming and other variables. However, in general, it is from between about 10% and 70% of what is applied or contained in the shampoo formulation.

We claim:

1. An aqueous shampoo composition suitable for use in the shampooing of pile fabric, said composition containing up to 40% solids, comprising water, a high-foaming synthetic organic anionic sulfonated detergent which is capable of drying to an easily removable powdery form, and an inorganic siliceous clay characterized by from 45% to 75% by weight of silica and 10% to 40% by weight of alumina and by a brightness as measured by a G.E. Reflectometer at 458 mu of a minimum value of about 90 and an ultimate particle size of from about .01 to about .1 micron, said detergent and siliceous material being present in relative weight ratios of about 1:2 to about 3:1, respectively.

2. An aqueous shampoo composition according to claim 1 in which the high-foaming detergent is an alkali metal salt of 2-ethylhexylsulfosuccinate.

3. An aqueous shampoo composition according to claim 1 in which the inorganic siliceous clay is a sodium aluminate silicate characterized by a particle size of from about .02 to about .05 micron.

4. An aqueous shampoo composition suitable for use in the shampooing of pile fabric, said composition containing up to 40% solids consisting essentially of water, sodium 2-ethylhexylsulfosuccinate and a sodium aluminate silicate clay containing from about 45% to 75% of silica and from about 10% to 40% of alumina and characterized by a brightness as measured by a G.E. Reflectometer at 458 mu of a minimum of about 90 and an ultimate particle size of from between .01 and from about .1 micron, said detergent and said siliceous material being present in relative weight ratios of about 1:1 to about 2:1, respectively.

5. A process which comprises shampooing a soiled pile fabric with an aqueous shampoo composition containing up to 40% solids, said composition consisting essentially of water, sodium 2-ethylhexylsulfosuccinate and a sodium aluminate silicate clay containing from about 45% to 75% of silica and about 10% to 40% of alumina and characterized by a particle size of between .01 and about .1 micron and by a brightness measured by a G.E. Reflectometer at 458 mu of a minimum of about 90, said detergent and said silicate being present in relative weight ratios of from 1:1 to about 2:1, respectively, said sodium aluminate silicate being applied to the pile fabric in an amount of from between about .05 and about .20 ounce per square yard of surface and thereafter removing the released soil.

References Cited by the Examiner

UNITED STATES PATENTS

1,943,519	1/34	Denning et al.	252—160
2,028,091	1/36	Jaeger	252—161
2,339,595	1/44	Williams et al.	106—72 XR
2,428,317	9/47	Moran	252—131 XR
2,739,073	3/56	Bertorelli	106—288
2,770,600	11/56	Ricciardi	252—140 XR
2,913,418	11/59	Sohngen et al.	252—163

FOREIGN PATENTS

319,415	9/29	Great Britain.

OTHER REFERENCES

Bennett: "The Chemical Formularly," vol. 4, page 499 (1939).

Bennett: "The Chemical Formulary," vol. 9, page 533 (1951).

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