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DETERGENT COMPOSITION

Wilmer C. Gangloff, Cincinnati, Ohio, assignor to
The Drackett Company, Cincinnati, Ohio, a
corporation of Ohio

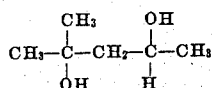
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This invention relates to detergents. More particularly, it has to do with the preparation and use of a novel and improved detergent composition which is especially adapted for cleaning the hard polished surfaces of glass, metal, stone, and similar materials.

The general object of the invention is to provide a more efficient cleaning fluid for the purpose described and one which will readily and quickly wet the surface to which it is applied, dissolve oily and other foreign substances, and evaporate at an optimum rate, not too quickly before the cleaning process is effected, nor too slowly so that long continued rubbing is necessary. The novel cleanser is thus very susceptible to use in removing dirt and oil and grease films from vitreous surfaces, especially transparent glass or plastic surfaces, whether in the form of windows, windshields of automobiles, mirrors, table or desk tops, or similar articles. It is particularly useful where water alone will not suffice and where it is undesirable to use ordinary soaps.

In its broader aspects, the invention marks the discovery that the dihydric alcohol, 2-methyl-2, 4-pentane diol,



when added to water in varying percentages, not only lowers the surface tension of the water markedly, but provides a detergent composition which answers the purposes set forth above in all respects. Although the lowering of the surface tension is only one factor in the efficacy of a detergent of this type, it may be stated at this point, as some indication of the properties of this compound, that the addition of 15% of the 2-methyl-2, 4-pentane diol to distilled water serves to lower the surface tension from approximately 70.6 dynes per square cm., to about 32.7 dynes per square cm., at about 21.1° C.

The 2-methyl-2, 4-pentane diol may be prepared in any known way, one of which involves the reduction of a compound of the nitroparaffin series, through the corresponding nitrohydroxy, amino, and amino-hydroxy compounds. One source of the nitroparaffin series of compounds is the waste gases of the petroleum industry.

Although the solution of 2-methyl-2, 4-pentane diol in water is highly effective when used alone, the invention in its more specific aspects contemplates the addition to such solutions of small quantities of a commercial wetting agent of a well-known type, such as, for example, the alkylated sulfonates and other sulfonated compounds marketed under the names "Aerosol," "Santomerse," and other trade names. These compounds include alkylated sodium sulfonate, isopropyl naphthalene sodium sulfonate, and di-

octyl sodium sulfo succinate. Such wetting agents aid in obtaining a good spread and even flow over the surface to be cleaned, and a very small amount is sufficient—say about one-tenth of one percent.

It has also been found that certain other solvents, some of which have comprised ingredients of prior cleansing fluids, may be added to the basic diol solution or employed to replace a portion of the diol which may then be used in somewhat reduced quantity. These solvents are selected on the basis of their dissolving properties, their miscibility with water, and their boiling points. Although certain of these solvents have been employed in similar detergents, it has been found that the combined action of the diol and the other solvent, and in fact the action of the diol and the wetting agent, when used together, afford an increased detergent action which is apparently greater than can be explained as the mere additive result of the combination. Actually, it has been found that it is impossible to predict, from the nature and composition of the ingredients, what these mixtures would do with respect to detergency. The facts must be determined experimentally.

Among the water-soluble oil solvents which may be used in this connection may be mentioned the low molecular weight, low boiling point mono hydroxy alcohols, such as methyl, ethyl, and isopropyl alcohol; esters like methyl and ethyl acetate; ketones like acetone or methyl ethyl ketone. Also mono ethyl ether of ethylene glycol, $\text{CH}_2\text{OHCH}_2\text{OC}_2\text{H}_5$; mono ethyl ether of diethylene glycol, $\text{CH}_2\text{OHCH}_2\text{OCH}_2\text{CH}_2\text{OC}_2\text{H}_5$, or their corresponding acetates may be employed. The first named of said ethers is known as "Cello-solve," the latter as "Carbitol," and among the acetates, probably the best known is "Cellosolve acetate," $\text{CH}_3\text{OC}_2\text{H}_5\text{CH}_2\text{C}_2\text{H}_5\text{O}_2$.

Selected formulas serving as specific examples of the practice of the invention are set forth below.

A

Per cent

2-methyl-2, 4-pentane diol.....	5
Wetting agent (Santomerse).....	0.1
Water.....	94.9

B

Per cent

2-methyl-2, 4-pentane diol.....	20
Wetting agent (Santomerse).....	0.1
Water.....	79.9

C

Per cent

2-methyl-2, 4-pentane diol.....	5
Isopropyl alcohol.....	5
Wetting agent (Santomerse).....	0.1
Water.....	89.9

D

	Per cent
2-methyl-2, 4-pentane diol.....	20
Mono ethyl ether of ethylene glycol.....	5
Wetting agent (Santomerse).....	0.1
Water.....	74.9

E

	Per cent
2-methyl-2, 4-pentane diol.....	20
Mono ethyl ether of diethylene glycol.....	5
Wetting agent (Santomerse).....	0.1
Water.....	74.9

F

	Per cent
2-methyl-2, 4-pentane diol.....	15
Water.....	85

At this point, comparative data with regard to the surface tension of the above solutions and of water may appropriately be inserted (percentages approximate; temperature at 70° F. or 21.1° C.):

	Dynes/cm. ²
Water.....	70.6
A.....	44.2
B.....	39.1
C.....	32.8
D.....	38.5
E.....	38.5
F.....	32.7

G

	Per cent
2-methyl-2, 4-pentane diol.....	5
Water.....	95

H

	Per cent
2-methyl-2, 4-pentane diol.....	30
Water.....	70

I

	Per cent
2-methyl-2, 4-pentane diol.....	15
Wetting agent.....	0.1
Water.....	84.9

J

	Per cent
2-methyl-2, 4-pentane diol.....	10
Mono ethyl ether of ethylene glycol.....	5
Wetting agent.....	0.1
Water.....	84.9

K

	Per cent
2-methyl-2, 4-pentane diol.....	10
Isopropyl alcohol.....	5
Wetting agent.....	0.1
Water.....	84.9

L

	Per cent
2-methyl-2, 4-pentane diol.....	10
Mono ethyl ether of diethylene glycol.....	5
Wetting agent.....	0.1
Water.....	84.9

"Santomerse" used in the examples set forth above is an alkyl aryl sulphonate, conveniently a sodium salt of this series.

Suitable innocuous coloring matter and perfume may be added to the solutions to improve their appearance and odor, and aid in their

identification. The amounts of such added substances are quite inconsiderable, however, and will not affect the approximate percentages of principal ingredients set forth in the exemplary formulas.

The preferred approximate ranges of proportions of the various necessary and optional ingredients are set out in the summary below:

	Per cent
2-methyl-2, 4-pentane diol.....	5 to 30
Wetting agent.....	none to 0.1
Isopropyl alcohol (or equivalent).....	none to 20
Mono ethyl ether of ethylene glycol (or equivalent).....	none to 20
Mono ethyl ether of diethylene glycol (or equivalent).....	none to 20
Water (with dye or perfume as desired).....	95 to 59.9

The novel detergent solutions are preferably applied by being sprayed on the surface, although they may be applied in any other suitable manner as by wetting a cloth with the solution and then rubbing the surface therewith. The solution is quickly distributed over the surface to be cleaned and then the surface is polished with a clean cloth or other fabric or tissue.

It is understood that various changes and modifications, such as would occur to one skilled in the art, may be made in the embodiments described above without departing from the scope of the invention as defined by the subjoined claims.

Having thus described the invention, what is new and desired to be secured by Letters Patent is:

1. A detergent composition for cleaning polished surfaces of glass, said composition comprising from about 5% to about 30% of 2-methyl-2, 4-pentane diol, approximately 0.1% of a commercial wetting agent of the alkylated sulphonate type, and the balance predominantly water.

2. A detergent composition for cleaning polished surfaces of glass, said composition comprising an aqueous solution of approximately 5% to 30% of 2-methyl-2, 4-pentane diol, and a wetting agent of the alkylated sulphonate type.

3. A detergent composition for cleaning polished surfaces of glass, said composition comprising an aqueous solution of 2-methyl-2, 4-pentane diol, a water-soluble organic oil solvent, and a wetting agent of the alkylated sulphonate type, the amount of pentane diol present being approximately 5% to 30%.

4. A detergent composition for cleaning polished surfaces of glass, said composition comprising 2-methyl-2, 4-pentane diol, a water-soluble organic solvent comprising a glycol ether, a wetting agent of the alkylated sulphonate type, and water, the amount of pentane diol present being approximately 5% to 30%.

5. A detergent composition for cleaning polished surfaces of glass, said composition comprising from about 5% to about 20% of 2-methyl-2, 4-pentane diol, and from about 5% to about 20% of mono ethyl ether of ethylene glycol, a wetting agent of the alkylated sulphonate type, and about 90% to about 60% of water.

WILMER C. GANGLOFF.