

[54] WASHING COMPOSITION FOR THE HAIR  
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 [22] Filed: **Jul. 26, 1988**

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 55-116800 9/1980 Japan ..... 252/106  
 2107586 5/1983 United Kingdom ..... 424/245

**Related U.S. Application Data**

[63] Continuation of Ser. No. 07/038,435, Apr. 13, 1987, abandoned, which is a continuation of Ser. No. 06/488,513, Apr. 25, 1983, abandoned.

**Foreign Application Priority Data**

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 [51] Int. Cl.<sup>5</sup> ..... **A61K 7/06; A61K 9/08; A61K 31/33; A61K 31/395**  
 [52] U.S. Cl. .... **514/183; 252/106; 252/107; 252/542; 424/70; 424/78; 424/80; 514/881**  
 [58] Field of Search ..... 424/245, 70; 514/183

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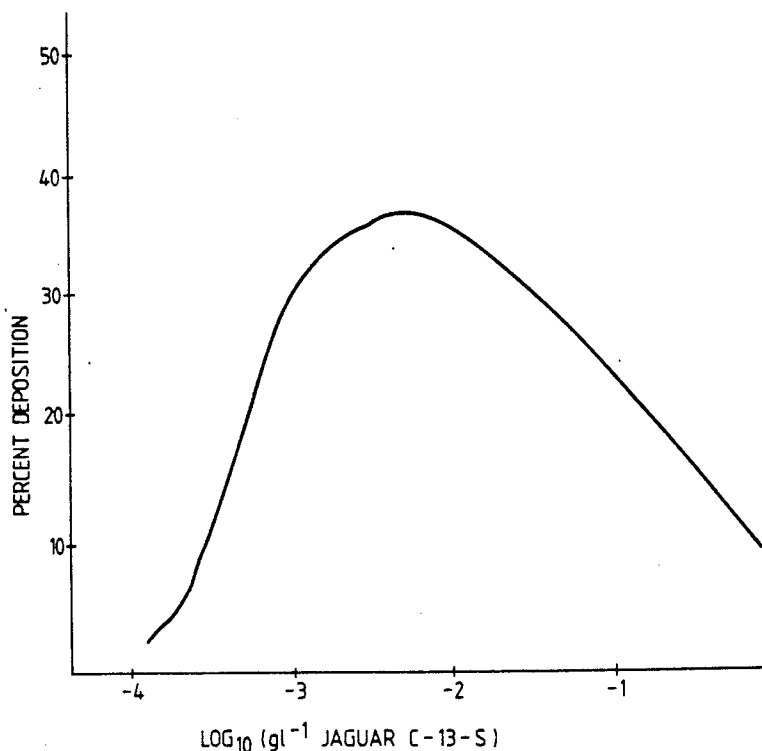
**OTHER PUBLICATIONS**

Norda Briefs, No. 464, Feb. 1975.  
*Primary Examiner*—Dale R. Ore  
*Attorney, Agent, or Firm*—Milton L. Honig

[57] **ABSTRACT**

The invention concerns a washing composition for washing a surface to deposit thereon substantially water-insoluble particles. The aqueous washing composition of the invention comprises an anionic surfactant, the particulate substance to be deposited and a water-soluble cationic non-cellulosic polymer which enhances the deposition of the particulate substance onto the surface but which cationic polymer does not form in the composition a water-insoluble complex with the anionic surfactant, the cationic charge density of the polymer being from 0.0001 to 0.0017; the concentration of the cationic polymer in the washing composition being from 0.0001% to 0.01% by weight; and the concentration of the surfactant in the washing composition being from 0.01% to 5% by weight.

**1 Claim, 3 Drawing Sheets**



*Fig.1.*

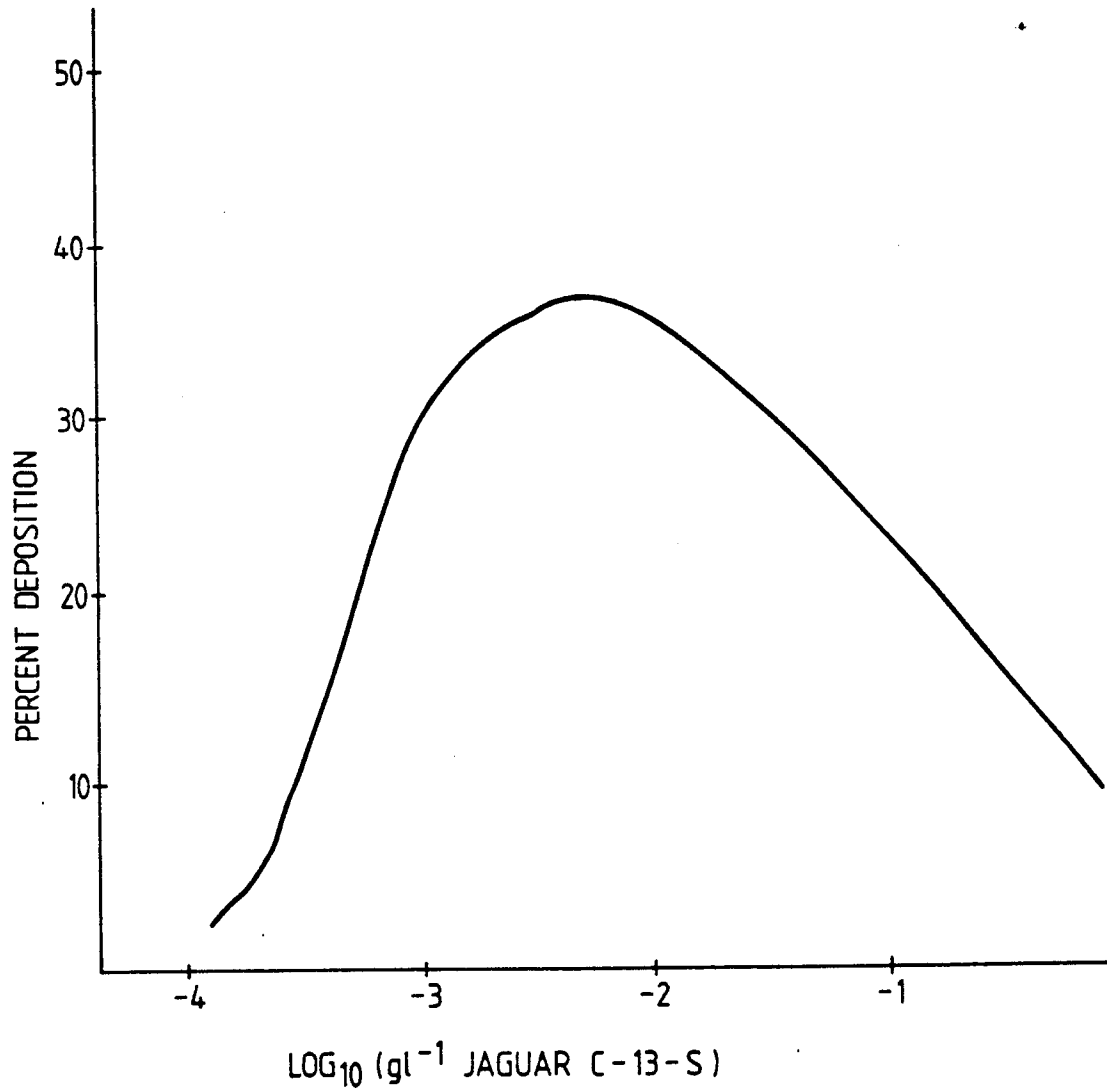


Fig. 2.

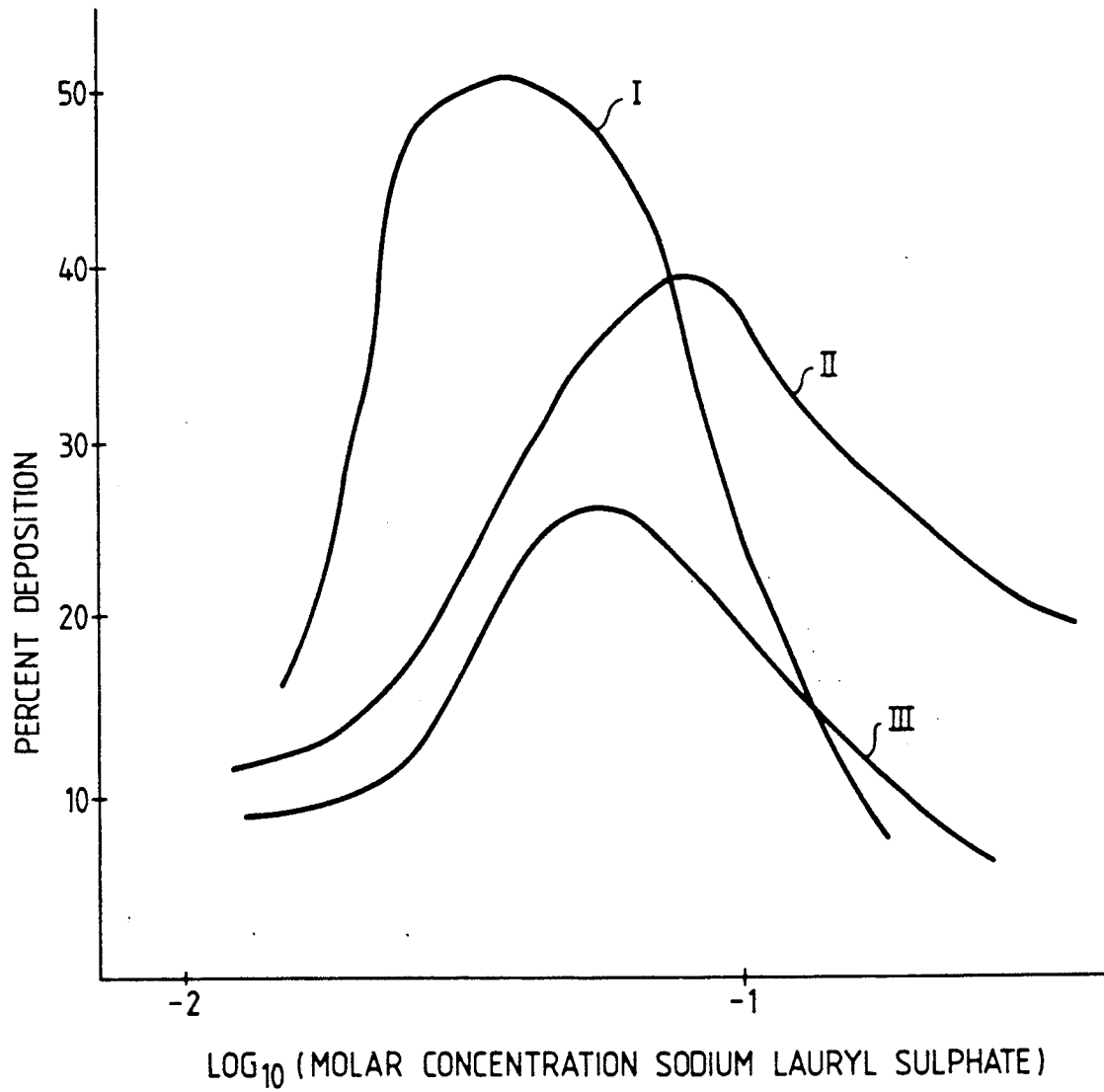
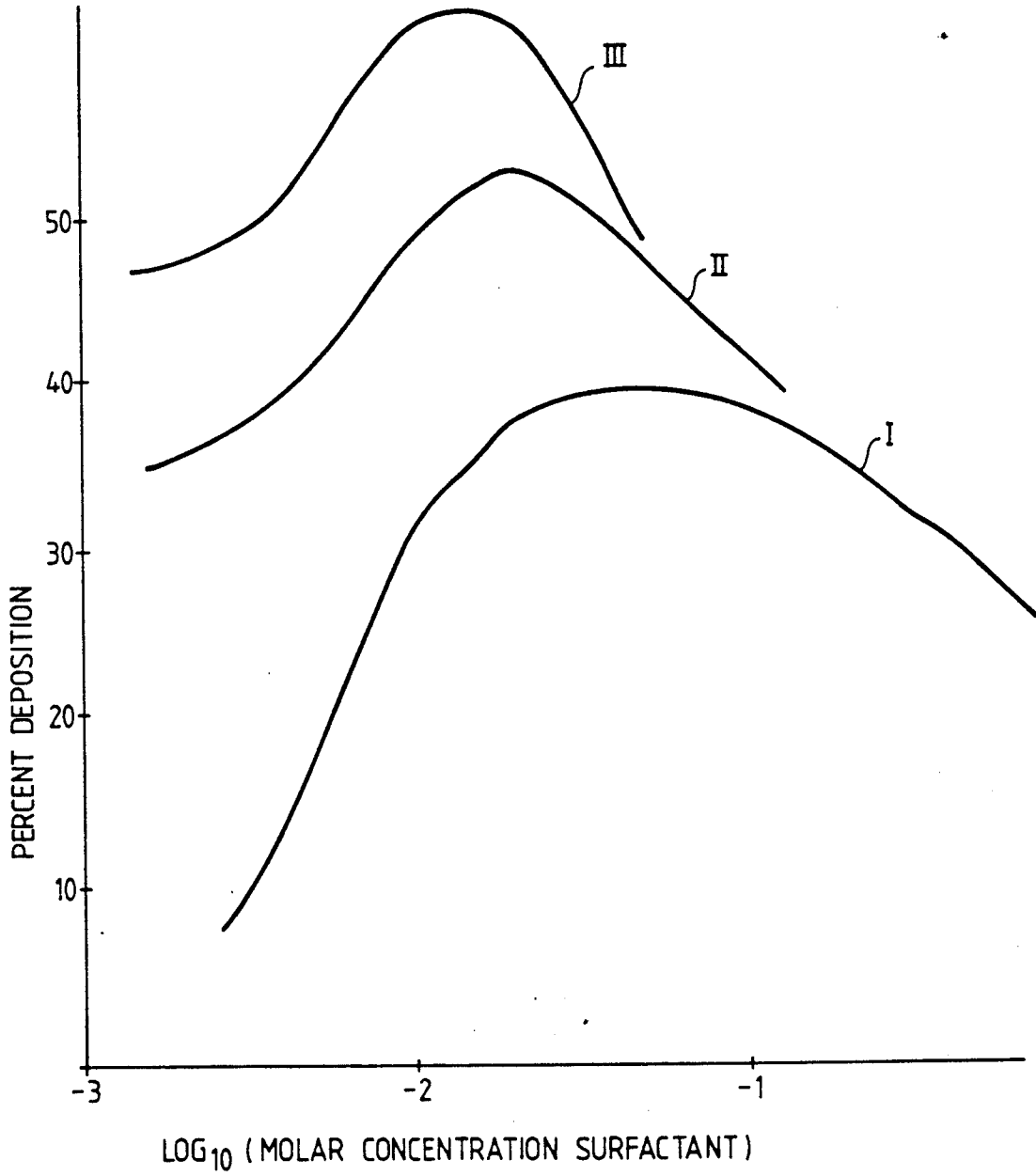


Fig. 3.



## WASHING COMPOSITION FOR THE HAIR

This is a continuation application of Ser. No. 038,435 filed Apr. 13, 1987, which is a continuation of Ser. No. 488,513, filed Apr. 25, 1983 both now abandoned.

This invention relates to a washing composition for washing a surface to deposit thereon water-insoluble particles, such as particles of a solid antimicrobial substance or the liquid particles of an emulsified oil. In particular the invention relates to an aqueous washing composition comprising an anionic surfactant, the water-insoluble particles and a cationic polymer which serves to enhance the deposition and retention of the particles on the said surface.

Detergent compositions, for example shampoos, comprising an anionic surfactant, water-insoluble particles and a cationic polymer have been described in U.S. Pat. No. 3,580,853 (Parran). In the detergent compositions described in that patent the cationic polymers are water-soluble cationic nitrogen-containing polymers having a molecular weight within the range from 2,000 to 3,000,000 and have a cationic charge density greater than 0.001 in aqueous solution. The "cationic charge density" of a polymer as that term is used in said U.S. Patent, and as used herein, refers to the ratio of the number of positive charges on a monomeric unit of which the polymer is comprised to the molecular weight of said monomeric unit. The cationic charge density multiplied by the polymer molecular weight determines the number of positively charged active sites on a given polymer chain. The Parran patent states that the cationic polymer can be employed in the detergent composition at a concentration within the range from about 0.1% to about 10% by weight, preferably from about 0.25% to about 4.0% by weight.

The Applicant has investigated the mode of action of the enhancement of deposition from liquid detergent compositions of the Examples of the Parran patent containing an anionic surfactant and it appears that the enhancement is dependent upon the precipitation upon dilution of the detergent composition to form an aqueous washing composition of a complex formed between the anionic surfactant and the cationic polymer. The formation of complexes between cationic polymers and anionic surfactants is well-known and is described in Norda Briefs, No. 464, February 1975. This article mentions that such complexes may be solubilised at increased surfactant levels and also refers to the deposition of the water-insoluble complex onto the hair during the shampooing process. The Norda Briefs article refers in particular to those complexes formed using the quaternary nitrogen-substituted cellulose ether derivatives (available commercially under the trade name Polymer JR) which the Parran patent states are particularly efficacious for enhancing the deposition of particulate substances. Applicant's experiments have indicated that in the Parran formulations comprising an anionic surfactant, complexes between the cationic polymer and anionic surfactant precipitate, or separate upon dilution during use and that it is essential for this to occur if an enhancement in the deposition of the particulate substance is to be obtained from the Parran compositions containing an anionic surfactant. While precipitation of the complex and its deposition onto the hair may give a benefit in its own right, for such deposition leads to improved hair condition, more particularly improved ease of combing, such deposition of substantial amounts

of cationic polymer is not always desired by the user. It is known for example from European Patent Application No. 80300940 (Publication No. 0 018 717) that deposition of a cationic derivative of a polygalactomannan gum onto the hair during shampooing gives conditioning effects.

Applicant has now found that the presence of certain cationic polymers in aqueous washing compositions comprising an anionic surfactant can enhance the deposition of water-insoluble particles in the absence of the precipitation of a cationic polymer-anionic surfactant complex.

According to the invention there is provided an aqueous washing composition for washing a surface to deposit thereon substantially water-insoluble particles comprising an anionic surfactant, the particulate substance and a water-soluble cationic non-cellulosic polymer for enhancing the deposition, of the particulate substance onto the surface but does not form in the composition a water-insoluble complex with the anionic surfactant, wherein the cationic charge density of the polymer is from 0.0001 to 0.0017; the concentration of the cationic polymer in the washing composition is from 0.0001% to 0.01% by weight; and the concentration of the surfactant in the washing composition is from 0.0% to 5% by weight.

The cationic polymer employed in the washing composition of the invention is a non-cellulosic polymer having a cationic charge density of from 0.0001 to 0.0017 in aqueous solution. In the detergent compositions of the Parran patent the polymers employed have a cationic charge density greater than 0.001 and the lowest specific cationic charge density mentioned is 0.002 for the cellulosic polymer employed in Example XII of that patent. It is to be noted in particular that non-cellulosic polymers having a cationic charge density of 0.0001 to 0.001 are useful in washing composition of this invention but are excluded from the Parran invention. The cationic polymers employed in this invention have a molecular weight within the range from about 2,000 to about 3,000,000 as in the Parran invention.

The non-cellulosic cationic polymers employed in the washing composition of the present invention are present in a concentration of from 0.000% to 0.01% by weight. Below 0.0001% a less satisfactory degree of deposition is obtained and above about 0.01% it may not be possible to avoid the separation of a polymer-surfactant complex. We have found that the amount of particulate substance deposited onto the substrate is dependent upon the concentration of the polymer in the aqueous washing composition.

The preferred cationic polymer for use in the washing composition of the invention is a cationically-substituted galactomannan gum. The gum occurs naturally as guar gum, the principal component of the seed of the guar plant, *Cyamopsis tetragonalobus*. The guar molecule is essentially a straight chain mannan branched at quite regular intervals with single membered galactose units on alternative mannose units. The mannose units are linked to each other by means of beta (1-4) glycosidic linkages. The galactose branching is accomplished through an alpha (1-6) linkage. The cationic derivatives are obtained by reaction between the hydroxyl groups of the polygalactomannan and reactive quaternary ammonium compounds. The degree of substitution of the cationic groups is sufficient to provide a cationic charge density of 0.0001 to 0.0017. The quaternary ammonium

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