

UNITED STATES PATENT OFFICE

2,254,434

STABILIZING AGENT FOR OXYGEN-
CONTAINING PER-COMPOUNDS

Otto Lind, Dusseldorf, and Herbert Colonius,
Unterbach, near Erkrath, Germany, assignors,
by mesne assignments, to The Procter &
Gamble Company, Cincinnati, Ohio, a corpo-
ration of Ohio

No Drawing. Application August 27, 1938, Se-
rial No. 227,112. In Germany September 7,
1937

4 Claims. (Cl. 252—95)

This invention relates to the stabilization and regulation of per-salts and other per-compounds constituting one component of treating agents of a diverse nature such as used in bleaching, washing, rinsing, cleaning, scouring, and the like arts. More particularly the invention relates to a new class of stabilizing and regulating agents for bleaching compositions or washing, cleaning, soaking, rinsing, penetrating, scouring and the like compositions containing bleaching constituents and their resulting compositions of matter.

A great number of detergent, cleaning, rinsing, and the like agents which contain per-compounds are known in the prior art. The special action of these agents is based upon the fact that the per-compounds contained therein, when placed in solution, develop oxygen especially at elevated temperatures, such as in boiling operations. The oxygen delivered in this manner has particular functions apart from those of the remaining constituents. The oxygen given off in minute bubbles penetrates to the innermost recesses of the treated materials such, for example, as textiles, clothing, and the like, and exercises a bleaching and disinfecting function at one and the same time. Furthermore this exceedingly fine dispersion of gaseous oxygen loosens soil particles adhering to the surfaces of the goods, thereby making their emulsification and removal by the other cleaning constituents much easier.

In the use of per-compound bleaching agents alone or in combination with detergents and cleaning agents, it is essential that these compositions be absolutely stable during storage or transportation even if the period of storage or transportation be an extended one. The demands of the trades are not satisfied simply by the provision of a stable composition, but it is necessary that the per-compounds, when put in solution for use, deliver the oxygen uniformly throughout the whole period of the washing and bleaching operation. If regulating agents controlling the speed and uniformity of the delivery of oxygen from compositions using per-compounds are not present, all of the oxygen is delivered almost instantaneously or very quickly upon placing the compositions in solution. This instantaneous delivery of oxygen has great disadvantages, as more oxygen is given off per unit of time than can be effectively used either for bleaching or cleaning, since the cleaning fluid does not have sufficient time to perform its emulsifying function and more oxygen is present than can be used effectively to contact the material either to bleach it or loosen the dirt from

the fabric. Furthermore, this instantaneous delivery of an excess of oxygen may bleach the fabrics to a degree greater than desired, whereby the texture of the fabric is damaged. On the other hand, it is easily possible to use compounds which retard the evolution of oxygen from the per-compounds to such a degree that not enough oxygen is delivered per unit of time to attain maximum efficiency during the washing, cleaning, bleaching, or like operations, or the compounds may retard the evolution of oxygen to such an extent that oxygen remains in the per-compounds after the cleaning or bleaching operations have been completed. The great problem is to find a stabilizing and regulating agent for compositions containing per-compounds that may, by a variation in its proportion, effectively stabilize the per-compound during storage and transportation and at the same time regulate the speed and the uniformity of the delivery of the oxygen when placed in solution to that which will assure maximum utilization of the oxygen present and produce cleaning and bleaching effects desired.

It is an object of the present invention to provide a new group of agents for stabilizing and regulating compositions of the nature of those discussed above to assure a maximum utilization of the oxygen present in the per-compounds.

Another object of the instant invention is to provide compositions containing per-compounds which are stable in storage and during transportation.

Yet another object of the invention is to control the speed and uniformity of the liberation of oxygen from compositions containing per-compounds.

A further object of the invention is to produce a class of bleaching agents containing per-compounds which are stable in storage and during transportation and which uniformly deliver oxygen when placed in solution.

Still another object of the invention is to produce a new class of compositions for cleaning, washing, rinsing, bleaching, and like operations which are stable in storage and during transportation and which control the liberation of oxygen even in hard waters.

The present invention, considered in its broader aspects, relates to stabilization agents composed of combinations of magnesium silicate with any one or more of a number of water-soluble salts of organic amino acids having at least two carboxyl groups in the alpha positions for every basic nitrogen atom present, which agents render

compositions containing per-compounds stable during storage and transportation and also produce a uniform and complete oxygen liberation from such compositions during rinsing, bleaching, cleaning or other operations.

The presence of these stabilizing and regulating agents in compositions containing per-compounds makes it possible to procure complete utilization of the oxygen present and to obtain uniform delivery of the oxygen, thereby assuring a uniform bleaching, disinfecting, cleaning, or the like action.

The magnesium silicate used must be pre-formed or exist as such in the composition before use, for the desired effect is not obtainable with mixtures of the organic amino acids and compounds capable of producing magnesium silicate in the treating solution. It may be procured in known manner through the reaction of magnesium sulfates with water glass.

Many different water-soluble salts of various organic amino acids may be used, such, for instance, as the sodium and potassium salts of imino-diacetic acid, imino-disuccinic acid, nitrilotriacetic acid and the like. Numerous other amino acid salts of the type disclosed are procured by substituting alkyl, aryl, aralkyl, oxyalkyl and like radicals or their substitution products for the hydrogen atoms of the imino acids. Other suitable compounds can be procured by substituting the alkyl, aryl, aralkyl, oxyalkyl and the like radicals or their substitution products for the hydrogen atoms of the methylene radical of the amino acids resulting in compounds such as the salts of C-dimethyl-nitrilo-triacetic acid.

The amount of magnesium silicate needed for the purpose of this invention is very small, frequently ranging from 0.5-1.5% by weight of the total composition. The organic amino acid salts, however, must be present in excess of the magnesium silicate. The preferred ratio requires five or more times as much amino acid salt as magnesium silicate but the ratio may vary from 2-20 or 3.5-20 or more times as much of the amino-acid salt as of the silicate.

The aforementioned stabilizing and regulating agents may be used with a wide variety of per-compounds and compositions containing per-compounds. Excellent disinfecting, rinsing, bleaching, and the like agents are procured when the stabilizing agents are used with oxygen producing per-compounds alone, such as with sodium perborate and other perborates, percarbonates, perphosphates, perpyrophosphates, hydrogen peroxide, and like peroxides and similar compounds. Furthermore, washing and cleaning compositions are obtained in accordance with the present invention by adding detergents such as soaps, sodium and other water-soluble salts of sulfuric acid esters of higher molecular fatty alcohols or salts of sulfonated fatty alkyl compounds or mixtures thereof, salts of methyl taurines acylates by means of higher fatty acid radicals, or other saponaceous compounds.

Solutions of compositions of the instant invention have the unexpected quality of delivering oxygen uniformly and completely even in hard water. Nevertheless, alkaline agents such as water glass, sodium metasilicate, borax, soda, phosphates, such as alkali ortho- or pyrophosphates, and like alkalinity-imparting compounds may be used wherever they serve to aid in the washing, cleaning, bleaching or rinsing operations without in any way affecting the utility of the stabilizing and regulating agents, and the

resulting compositions are considered a specific embodiment of the instant invention.

These new agents and as well compositions of matter containing the same may be worked up by means of various types of known equipment and can be provided in a wide variety of forms. For example, they can be marketed in the form of powders, lumps, flakes, strips, chips, granules, solutions or pastes. One particular advantage of the detergent compositions of the instant invention is that the per-compounds do not decompose when in the solid or powder form.

The new products of the instant invention find use in many branches of industry as well as in the household. They are especially valuable as detergent, bleaching, cleaning, and washing agents in the treatment of textiles, clothing, and the like, although they find use wherever bleaching, washing, cleaning, soaking, rinsing, penetrating, scouring, and the like operations are desired.

The examples which follow, in which all parts are expressed by weight, will serve to illustrate the various compounds and compositions of matter of the instant invention and some of their uses.

Example 1

Ten parts of sodium perborate are thoroughly mixed in a suitable mixing apparatus with 32 parts of soap, 12 parts of soda, 14 parts of the sodium salt of nitrilotriacetic acid and 1 part of magnesium silicate. An excellent detergent is obtained which is useful in many branches of industry and in the household for washing textiles, clothes and the like.

Example 2

Twelve parts of sodium perborate, 8 parts of soda, 20 parts of sodium salt of imino-diacetic acid and 1 part of magnesium silicate are mixed with each other in an edging mill. A bleaching agent is obtained which is excellently suitable for bleaching a wide variety of textiles in the textile industry.

Example 3

Ten parts of sodium perborate, 30 parts of the commercial mixture of the sodium salt of sulfonated higher fatty alcohols, 10 parts of soda, 7 parts of sodium pyrophosphate, 7 parts of the sodium salt of nitrilo-triacetic acid and 2 parts of magnesium silicate are well mixed with each other. The product is an especially valuable detergent, solutions of which deliver oxygen slowly and uniformly.

Example 4

Twelve parts of sodium percarbonate, 32 parts of soap, 15 parts of soda, 12 parts of the sodium salt of nitrilo-triacetic acid and 1.5 parts of magnesium silicate are thoroughly mixed. An excellent detergent is obtained which can be used with advantage in the household and commercial laundries for washing textiles and clothes. The dry mixture is especially stable. The detergent is an excellent cleaning agent which in no way causes disintegration of the fibers in the fabrics being washed.

It should be understood that the present invention is not limited to the specific compounds or other details described in the specification and that it includes all equivalent substances and steps and conditions within the general tenor of the specification and the scope of the appended claims.

We claim:

1. As an agent for stabilizing and controlling the flow of oxygen from oxygen-containing per-compounds, the combination comprising water-soluble salts of amino acetic acid having at least two carboxyl groups in the alpha positions for each basic nitrogen atom present and magnesium silicate said water-soluble salts being present in excess of the quantity of said magnesium silicate.

2. As an agent for stabilizing and controlling the flow of oxygen from oxygen-containing per-compounds, the combination comprising water-soluble salts of amino acetic acid having at least two carboxyl groups in the alpha positions for each basic nitrogen atom present and magnesium silicate, the amount by weight of the said salt of the amino acid being of the order of 3.5-20 times the magnesium silicate content.

3. As an agent for stabilizing and controlling the flow of oxygen from oxygen-containing per-compounds, the combination comprising the sodium salt of imino-diacetic acid and magnesium silicate said sodium salt being present in excess of the quantity of said magnesium silicate.

4. As an agent for stabilizing and controlling the flow of oxygen from oxygen-containing per-compounds, the combination comprising the water-soluble salt of nitrilo-triacetic acid and magnesium silicate said water-soluble salt being present in excess of the quantity of said magnesium silicate.

OTTO LIND.
HERBERT COLONIUS.