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CLEANING AND BLEACHING COMPOSITION

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This invention relates to cleaning, bleaching and penetrating agents or compositions and to their use in the treatment of fibrous materials, of metals, glass, paint and other surfaces. Primarily the invention is based on the discovery of the unexpected cleaning qualities of the soluble salts of sub-phosphoric acid. As will be made clear in the following description, the invention extends to various mixtures of the sub-phosphate with other ingredients, which mixtures or compositions have proven valuable in many commercial processes.

An object of the invention is to provide compositions suitable for the treatment of textiles and other organic materials sensitive to heavy metal salts which prevent deposition of such salts on the organic material and the appearance of stains.

Another object is to provide an improved cleaning, scouring and penetrating agent for industrial and household use.

A further object is to provide an improved bleaching agent which also may have excellent cleansing properties depending upon the nature of the auxiliary substances included in the composition.

The hypophosphates employed in accordance with the present invention may be either inorganic or organic salts. The preferred inorganic salt is tetrasodium hypophosphate, but other alkali metal salts may be used with substantially equal advantage. Of the organic salts which are suitable there may be mentioned triethanolamine, cyclohexylamine, aminopropandiol and other similar compounds. These compounds may be used alone in accordance with the broader aspects of the invention, but are preferably employed together with other compounds referred to as cleaning agents in the trades. One class of compounds which impart valuable properties are those which render solutions of the hypophosphates alkaline or more alkaline, such for example, the following salts: soda, water glass, borax or borates, alkali metal ortho- meta- and pyrophosphates, soap and other like compounds hereinafter referred to collectively as alkaline salt cleaning agents".

Instead of soap other saponaceous compounds may be employed, for example, the alkali metal salts of various sulfonated oils as Turkey red oil and sulfonated fatty alcohols such as described in the Bertsch United States Patent No. 1,968,797, granted July 31, 1934, which are hereinafter referred to collectively as "water soluble salts of higher molecular alkyl sulfonates" or other capil-

lary active compounds containing on the one hand higher molecular radicals and on the other hand a radical adapted to impart solubility in water. For the preparation of compositions suitable for particular purposes there may be added to the hypophosphates or the above mixtures other known foaming and superfatting agents, organic solvents and enzymes.

Bleaching agents having very valuable properties may be obtained by mixing with the above mentioned compositions one or more oxygen yielding substances of the nature of hydrogen peroxide, perborate salts, persulfate salts, and the like. The beneficial action of these compositions may be enhanced by the incorporation of one or more stabilization agents of the nature of the silicates of magnesium, zinc and barium. The presence of soap or other saponaceous compound in the bleaching composition imparts excellent cleansing powers thereto.

The present invention comprehends the very wide proportions of hypophosphates in the cleansing and bleaching agents. The exact proportions depend upon the use to which the composition is to be put and can be easily determined by those experienced in the art. The hypophosphate salts may be mixed with the other cleansing agent in any desired manner and at any desired point in the manufacture of the cleansing agent or during use. Thus these salts may be added to the cleaning agent in the form of a powder or as an aqueous solution. They may be mixed immediately before using or even during their use. After incorporation of the hypophosphate, the resulting compound may be prepared and sold in solid, liquid or plastic state in any one of the following forms, such as powder, flakes, threads, lumps, solutions, pastes, or as an emulsion in a suitable vehicle. When the cleaning compositions herein-described are employed as scouring powders there may be incorporated a finely divided abrasive material such as ground sand. The cleansing powers of such scouring compounds are increased to a remarkable and astonishing degree.

Aqueous solutions of the hypophosphates are especially suitable for the treatment of textiles and other organic materials sensitive to salts of heavy metals because the hypophosphates form water soluble complex salts with these metals which, for example, may be iron, copper or zinc salts. The hypophosphate prevents the precipitation of these metal compounds on the fibers and thus prevents stains from appearing thereon.

When the hypophosphates are employed as

an ingredient of the bleaching compositions here-
indescribed very valuable properties result due to
the fact that the hypophosphates are not oxidized
by the hydrogen peroxide or other oxygen deliver-
ing substances. The hypophosphates have an
outstanding stabilizing quality as compared with
pyro- and metaphosphates. In order to illus-
trate this superiority a series of tests are pre-
sented below.

A series of compositions were prepared con-
taining 50% soap, 8% soda, 8% sodium perborate,
20% water, and 14% of the several phosphate
compounds mentioned in the table. To deter-
mine the stability of the compositions 1% solu-
tions of the same were heated to the boiling point
and the oxygen loss determined by titration with
the usual permanganate solution.

The composition containing--	Percentage of oxygen liberated
Tetrasodium pyrophosphate.....	53.7
Sodium metaphosphate.....	52.3
Tetrasodium hypophosphate.....	37.9

An observation of the results recorded in the
above table shows that the hypophosphates have
a much greater stabilization effect than the pyro-
and metaphosphates.

The cleansing compounds herein described may
be effectively used without harm and with rapid
results in the cleaning of textiles and surfaces of
organic plastic substances, painted, lacquered
and enameled surfaces, and also glass, ceramic
and metallic industrial materials of all kinds.
Furthermore, the hypophosphates may be used
in the form of a liquid for the treatment of raw
materials or intermediate products of an or-
ganic nature, especially textiles, leather and other
fibers during the dyeing.

Example 1

Twelve parts of sodium perborate, 15 parts of
tetrasodium hypophosphate, 10 parts of soda, 1
part of magnesium silicate and 50 parts of soap,
all by weight, are thoroughly mixed together in
any suitable type of agitating apparatus. The
resulting composition is an excellent washing
agent adapted for use in the household and in
the trades for washing textiles for laundering
and other purposes. If it is desired to produce
a bleaching agent, the soap may be omitted. This
bleaching agent may be advantageously used in
the textile industry and in the home for bleach-
ing after the usual procedure, or for the bleach-
ing of fabrics during rinsing operations.

Example 2

A cleaning composition is prepared by mixing
30 parts of sodium hypophosphate with 20 parts
of soda and 15 parts of sodium metasilicate, all
parts by weight. This composition is excellently
suited for the cleaning of surfaces of all kinds
including glass, enamel, porcelain, etc. If it is
desired to clean alkali-sensitive metals a quantity
of waterglass may be added with good effect.

Example 3

Into a mixing apparatus there are introduced
10 parts of sodium perborate, 14 parts of tetra-
sodium hypophosphate, 8 parts of soda and 1
part of magnesium silicate, all by weight. The
resulting composition constitutes a good bleach-
ing agent, the aqueous solutions of which are
well suited for use in the textile industry for
bleaching fibers. These solutions are especially

valuable because of the slow and uniform rate
at which the oxygen of the perborate compound
is liberated. If it is desired to impart cleansing
properties to the composition 47 parts by weight
of soap are added. The resulting composition is
suitable for use in the household and in trade
laundries for the washing of textiles of all kinds.

Example 4

Nine parts of sodium perborate, 15 parts of
tetrasodium hypophosphate, 8 parts of soda, 1
part of magnesium silicate or other silicate here-
in disclosed, and 46 parts of a commercial mix-
ture of sodium salts of sulfonated higher alco-
hols composed principally of sodium lauryl sul-
fate, all by weight, are thoroughly mixed together.
An excellent washing agent is obtained which is
adapted for use in laundries as well as in the
household for cleaning and washing textiles,
laundry and the like.

It should be understood that the present in-
vention is not limited to the specific details and
compounds herein described, but that it extends
to all equivalent materials within the tenor of
the specification and the scope of the appended
claims.

We claim:

1. A treating composition for removing im-
purities from textiles comprising an aqueous so-
lution of a water soluble salt of subphosphoric
acid.

2. A cleaning composition suitable for metal
glass, paint and other surfaces composed es-
sentially of an aqueous solution of an alkali metal
salt of hypophosphoric acid.

3. A cleaning composition comprising a water
soluble hypophosphate salt selected from the
group consisting of alkali metal, triethanolamine,
cyclohexyl amine, and amino-propandiol salts of
hypophosphoric acid, and at least one substance
adapted to increase the alkalinity of an aqueous
solution of the composition selected from the
group consisting of soda, waterglass, borax, the
borates, alkali metal phosphates and soaps.

4. A cleaning and bleaching composition com-
prising a water soluble hypophosphate salt se-
lected from the group consisting of alkali metal,
triethanolamine, cyclohexyl amine, and amino-
propandiol salts of hypophosphoric acid, an oxy-
gen delivering per compound selected from the
group consisting of hydrogen peroxide, alkali
metal perborate salts and persulfate salts, and
at least one substance adapted to increase the
alkalinity of an aqueous solution of the compo-
sition selected from the group consisting of soda,
waterglass, borax, the borates, alkali metal phos-
phates and soaps.

5. A cleaning and bleaching composition com-
prising a water soluble hypophosphate salt se-
lected from the group consisting of alkali metal,
triethanolamine, cyclohexyl amine, and amino-
propandiol salts of hypophosphoric acid, an oxy-
gen delivering per compound selected from the
group consisting of hydrogen peroxide, alkali
metal perborate salts and persulfate salts, and
a silicate salt stabilizing compound selected from
the group consisting of magnesium, zinc and
barium silicates.

6. A cleaning and bleaching composition com-
prising a water soluble salt of hypophosphoric
acid, an oxygen delivering per compound bleach-
ing agent and a silicate of the group consisting of
magnesium, zinc and barium silicates.

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