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washing information { *iso-octyl, isohexyl, and dodecyl phenyl polyglycol ethers, alkali metal salts of phosphoric acid, potassium persulphate and water* } Examiner
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WASHING BATH FOR TEXTILE MATERIALS

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7 Claims. (Cl. 252—99)

This invention relates to the treatment of white and colored linen or textile material to be washed.

It is known that additions of phosphates to soap, fatty alcohol sulfonates or condensation products of fatty acids aid in the washing process. Their efficiency is mainly due to the fact that the lather producing power and yield of these washing mediums is increased and that a higher dispersing and emulsifying effect is obtained. Also, in case of polymerized phosphates, the lime salts are maintained in solution and, in case of other phosphates, the pH-value is buffered. However, it was not hitherto possible to clean white linen in a satisfactory manner by these combinations without the cooperation of alkali, or else the conditions had to be selected in a very special manner.

It has now been found that an excellent washing effect with respect to white and colored linen can be obtained with washing materials the solubility of which in water is not due to ionogenic groups but, for example, to OH-groups, additions of alkali metal salts of phosphoric acids containing less water than orthophosphoric acid, such as the hexametaphosphates or polyphosphates, pyrophosphates, subphosphates or the corresponding thiophosphates at a predetermined pH-value which is preferably adjusted to a value within the range of 6.1 to 8.0, while in case of the same pH-value, but without the said additions of phosphate the washing materials are practically inefficient. This fact is very striking since an addition of mono-, di- or trisodium phosphate in the same pH-range does not produce a similar increase of the washing power. Similarly, it is not possible by the use of washing mediums which are free from ionogen groups, plus soda, with or without the phosphate admixture according to the invention, to obtain the same good washing power as in the presence of these phosphates and without soda. Therefore a novel effect is clearly produced by the mixture of the said washing materials, comprising amongst others the aryl- or alkyl polyglycol ethers, with the phosphates according to the invention.

The method according to the invention offers the advantage that cotton and cellulose wool as well as artificial silk can be washed with minimum swelling and without detrimental effects to dye-stuffs which are sensitive and tend to run, even in the presence of wool, silk and artificial fibres of albumen raw material, which are sensitive to alkali. This preserving or mild treat-

ment is also of very great importance for the repeated washing of cellulose wool, since the resistance of linen of cellulose wool to washing is thereby increased very much.

Example 1

50 kgs. of linen are washed in 200 liters water with admixtures of 2 grams/liter of a polyglycol ether (of the type available under the trade name Igepal i. e. isohexylphenylpolyglycol ether) and 1 gram/liter of sodium hexametaphosphate. The temperature is gradually increased from 20° C. to 80° C. during the washing operation and the linen is then rinsed. The pH-value is 6.3.

Soft or hard water may be used for the washing process. By way of alternative, potassium, sodium and amino salts of the pyrophosphoric acid, of the polyphosphoric acid and of the subphosphoric acid, alone or mixed together, may be used instead of the above mentioned sodium hexametaphosphate. Also, it may be advantageous under certain circumstances to mix polyglycol ether and phosphate beforehand, by purely mechanical or atomizing methods.

Example 2

A bleached cotton frotté containing cellulose wool, which is soiled by gelatine, pearl ink, tea and olein is washed with a liquor containing 2 grams/liter of an alkyl, polyglycol ether, such as, for instance, Leonil O, i. e. isohexylphenylpolyglycol ether, and 1 gram/liter of sodium hexametaphosphate, at a temperature of 20 to 80° C. The pH-value of the liquor amounts to 6.1.

Substituting 1 gram/liter soda instead of sodium hexametaphosphate, a poor cleaning effect is obtained; also an unsatisfactory cleaning is obtained with a liquor comprising 2 grams/liter Leonil O, 1 gram/liter soda plus 1 gram/liter sodium hexametaphosphate.

According to a further modification of this washing method oxygen-producing per-salts are admixed with the washing liquor, whereby there is obtained not only a very good washing effect, but also an excellent degree of whiteness. In this case instead of the above mentioned phosphate proper, the additive compounds of the phosphates are advantageously used, such as, the salts of the perpyrophosphoric acid, of the permetaphosphoric acid or the perpolyphosphoric acid, or mixtures of the above mentioned phosphates with oxygen-producing per-salts, such as, for example, perborates, percarbonates, per-

sulfates, persulfates and the like are admixed with the non-ionogen washing material.

Hitherto, oxygen-producing per-salts have been admixed only with washing liquors having a pH-value of 9 or more, for washing and cleaning purposes. Moreover, it was necessary to add stabilizers to the washing mediums, for attaining a high degree of whiteness. The process according to the present invention, however, renders it possible to use oxygenous mediums also in washing liquors having a pH-value of less than 8, and renders the admixture of stabilizers unnecessary.

The washing mediums to be used in the novel washing process according to the invention may be produced in such manner that the components are intimately mixed together and put on the market in the form of a paste. According to a preferred form of the invention, however, the components are converted into a powder form, by atomizing or dry rolling and in this case the components may either be mixed first and then atomized, or fed to the roller drying mill as a mixture or the components may be combined in the required proportions at a point shortly in advance of the nozzle or the roller feeding device.

It is also possible to produce the novel ingredients by adding the oxygen to the initial products which are dissolved or mixed, i. e. the non-ionogen detergent and the phosphate anhydride, for instance, by adding hydrogen peroxide, sodium peroxide or similar per-compounds to said components. If a pH-value of about 7 or less is maintained in this process, oxygenous compositions are obtained which are very stable even in a liquid or pasty condition.

Example 3

25 kgs. of linen are washed in a washing bath of 100 liters containing 2 grams isooctyl phenyl polyglycol ether and 1.5 grams of sodium perpolyphosphate per liter. The washing bath which is at first at room temperature is gradually heated to 80° and the material to be washed is then rinsed as usual. The pH-value of the bath amounts to 6.8. By way of alternative, an alkali perpyrophosphate or an alkali permetaphosphate may be used instead of sodium perpolyphosphate.

Example 4

In order to wash 25 kgs. of cotton texture, a washing liquor is prepared in which 200 grams dodecyl phenyl polyglycol ether, 20 grams of sodium perborate and 100 grams of sodium pyrophosphate are added per 100 liters water. The washing and rinsing operations are carried out in the usual manner. The material to be washed will then show a very high degree of whiteness, even in case of a very intensive initial soiling.

By way of alternative, perpyro-, perpoly- or permetaphosphate may be used instead of pyrophosphate in the mixture with sodium perborate.

Example 5

In order to wash artificially soiled frotté strips, a washing bath is produced containing 2 grams dodecyl phenyl polyglycol ether, 1 gram sodium polyphosphate ($\text{Na}_5\text{P}_3\text{O}_{10}$) and 1 gram potassium persulfate per liter and having a pH-value of 6.9 to 7.1. By washing the material with this

liquor a higher degree of whiteness is obtained than with a liquor containing no potassium persulfate.

The method of the present invention has been described in detail with reference to specific embodiments. It is to be understood, however, that the invention is not limited by such specific reference but is broader in scope and capable of other embodiments than those specifically described.

I claim:

1. In the process of washing white and colored textile materials consisting of vegetable, natural or artificial fibers or mixtures thereof with animal, natural or artificial fibers in aqueous baths, ranging in temperature between room temperature and the boiling point, containing dissolved therein polyglycol ethers selected from a group consisting of isohexyl, isooctyl and dodecyl phenyl polyglycol ethers and water soluble salts of phosphoric acids which contain less water of constitution than orthophosphoric acid; the step which comprises adjusting the said aqueous washing baths to a pH value ranging from 6.1 to 8, whereby enhanced washing power is obtained.

2. A washing bath for linen and other textile materials comprising an aqueous solution of a polyglycol ether selected from a group consisting of isohexyl, isooctyl and dodecyl phenyl polyglycol ethers and a water soluble salt of a phosphoric acid which contains less water of constitution than orthophosphoric acid, said aqueous bath having a pH value ranging between 6.1 and 8.

3. A method according to claim 1, in which oxygen-supplying per-salts are added to the aqueous bath.

4. An aqueous bath for washing linen and other textile materials, comprising water, two grams per liter of a polyglycol ether selected from the group consisting of isohexyl, isooctyl and dodecyl phenyl polyglycol ethers and one gram per liter of an alkali metal salt of phosphoric acid which contains less water of constitution than ortho-phosphoric acid, said bath having a pH value of the order of 6.3.

5. An aqueous bath for washing linen and other textile materials, comprising one liter of water, two grams of isooctyl phenyl polyglycol ether and one and one-half grams of an alkali metal salt of a phosphoric acid which contains less water of constitution than ortho-phosphoric acid, said bath having a pH value of the order of 6.8.

6. An aqueous bath for washing linen and other textile materials, comprising one hundred liters of water, two hundred grams of dodecyl phenyl polyglycol ether, twenty grams of sodium perborate and one hundred grams of an alkali metal salt of a phosphoric acid which contains less water of constitution than orthophosphoric acid.

7. An aqueous bath for washing linen and other textile materials, comprising one liter of water, two grams of dodecyl phenyl polyglycol ether, one gram of sodium triphosphate and one gram of potassium persulphate and having a pH value of from 6.9 to 7.1.

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