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LAUNDRY PACKAGE

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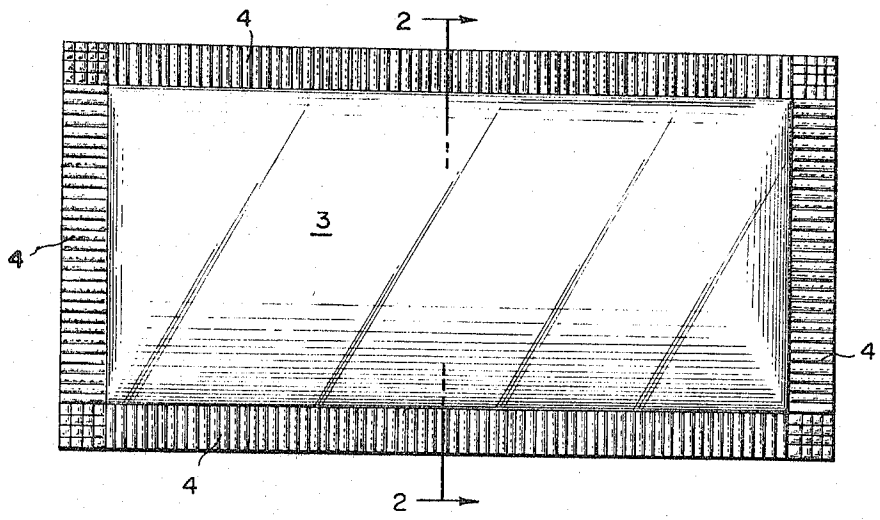

FIG. 1

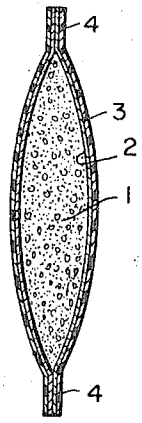

FIG. 2

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LAUNDRY PACKAGE

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The present invention is a continuation-in-part of U.S. application Ser. No. 169,316, filed Jan. 29, 1962, now U.S. Patent No. 3,186,869, which is in turn a continuation-in-part of application Ser. No. 90,959, filed Feb. 23, 1961, entitled Laundry Package, now abandoned, and relates to a water soluble package adapted to contain corrosive or volatile compounds. More particularly, the present invention is useful as a water soluble package containing a bleach and, if desired, a detergent or soap for laundry use.

Packages have been used for laundry purposes which comprise a water soluble bag containing detergents. Such bags have particular appeal for home use where a measured amount of detergent may be thrown into a laundry machine without waste or mess. Such packages are intended to provide the required amount of detergent required for a single filling of the machine.

It had been thought that bleach could not be added to such packages although a single package containing both bleach and detergent is desirable. However, strong bleaches, and in particular chlorine bleaches, react with the material which has heretofore been used to form the walls of the package. Chlorine bleaches will react with every known water soluble film useful for such packaging including for example, polyvinyl alcohol, methyl cellulose, carboxymethyl cellulose and polyethylene glycol. When a chlorine bleach reacts with this film forming material, it becomes insoluble and loses its disintegrating or dissolving properties. Consequently, if the package is allowed to stand long enough, it will not satisfactorily dissolve when thrown into the laundry water.

The present invention overcomes such difficulties, and provides a package containing a strong bleaching compound, preferably a chlorine containing bleach, which has an indefinite shelf-life, and in which the package does not react with the bleach. The present invention also provides a water soluble laundry package adapted to contain detergents and/or a chlorine bleach, in which the package will readily dissolve in water and in which the package material will not react with the bleach and thereby become insoluble.

A further object of the present invention is to provide a composition of material which is particularly useful for containing highly reactive oxidizing agents, such as chlorine containing bleaches without the likelihood of the composition of material reacting with the bleach.

A still further object of the present invention is to provide a novel combination of a detergent and chlorine containing bleach adapted for use in packages, and in particular in water soluble packages.

A further object of the present invention is to provide an improved package for chlorine containing bleaches and the like.

These and other objects and advantages of the present invention will be more clearly understood when considered in conjunction with the accompanying drawings, in which:

FIG. 1 is a plan view of a laundry package embodying the invention, and,

FIG. 2 is a cross sectional view taken along the line 2—2 of FIG. 1.

As illustrated in the drawing, the laundry package of the present invention may be formed of a thin walled

flexible bag having flexible walls 3 of water soluble film forming material, whose inner surfaces are provided with a water dispersible barrier coating 2, which is non-reactive with the bleach and/or detergent material 1 contained within the package. The flexible walls 3 may be heat sealed together about their peripheral margins 4. The wall 3 formed by the film forming material is of bag thickness, preferably from about .001 to approximately .003 of an inch thickness. A typical bag may have overall dimensions of 2¼" by about 4½", with a heat sealed margin 4 of approximately ⅜". These figures are exemplary and may be varied depending upon the particular use desired. The barrier coating 2 is contiguous with the wall 3 and forms a complete covering for its inner surface. The thickness of the barrier coating 2 is preferably in the range of about .001 to .003 of an inch, but this may be varied depending on the particular use and content of the bag.

The film forming material may comprise any of a number of water soluble film forming materials which are generally used to package laundry material in water soluble packages. Such film forming material includes, for example, polyvinyl alcohol, preferably plasticized, methyl cellulose; a carboxymethyl cellulose such as sodium carboxymethyl cellulose; sodium carboxymethylhydroxyethyl cellulose; or, a film derivative of polyethylene glycol. Other film forming materials such as set forth in Canadian Patent No. 510,555, issued Mar. 1, 1955, or comprising high molecular weight polymeric materials containing water solubilizing groups or hydrophilic groups, such as hydroxyl groups or carboxylic groups may be useful even though they are reactive with strong bleaches and in particular with chlorine, providing they are coated with a barrier as described herein.

The barrier coating 2 is preferably formed of a wax or oleaginous substance, for example, a wax selected from the group consisting of hydrocarbon, microcrystalline, animal and vegetable waxes, saponified fatty acids, saponified fatty acid, condensation products of ethyleneoxide, esters and mixtures of these and similar substances. The material forming the barrier coating should melt between room temperature of approximately 68° F. and the boiling point of water, 212° F. and preferably should melt in hot water in a melting temperature range preferably of about 130° F. to about 160° F. but this depends upon the specific nature of the coating material. This barrier coating material should be water dispersible. It functions to seal the inner surface of the walls 3 from contact with the bleach material. Since the barrier material which preferably comprises paraffin is itself not water soluble, it should preferably have incorporated or homogeneously dispersed throughout, a dispersing agent which will, upon wetting of the bag, cause the barrier material to disperse in colloidal form. Since the barrier material does not have structural strength, it will readily break up when the film forming material dissolves in water. The barrier material will thereupon disperse in the water in colloidal form, releasing the contents of the package into the water. This wax or oleaginous substance comprises the major portion of the barrier coating and preferably constitutes up to approximately 85% by weight of the coating.

Preferably mixed with the wax or oleaginous substance is an emulsifier, a film forming material, and/or softener. The function of the emulsifier is to assure a suitable colloidal dispersion of the barrier coating when the bag is immersed in water so that the barrier coating material will not interfere with the washing process. Preferably a film forming material is incorporated into the barrier coating. This film forming material is intended to assure a uniform and consistent barrier coating which is not likely to break or crack during application or storage. It is also useful to

incorporate a softener into the barrier coating, for purposes of assuring flexibility of the barrier coating so that it will not crack or otherwise become defective during bonding or storage of the laundry package. Certain materials may have a dual function as such an emulsifier, film forming material or softener.

Suitable emulsifiers comprise, for example, various nonionic surface active agents such as, glycerol monostearate. Other synthetic emulsifiers include salts of fatty acids, as for example, salts of oleic or stearic acids. Triethanolamine has also been found to be a suitable emulsifier. These compounds may also be used in various combinations with one another for specific desired effects. The emulsifier may preferably comprise up to approximately 20% by weight of the barrier coating.

Glycerol monostearate has also been found suitable as a film forming material and may preferably constitute up to approximately 20% of the total weight of the barrier coating.

In place of glycerol monostearate, other nonionic emulsifiers or surface active agents may be used and substituted as emulsifiers. Such materials include materials referred to on page 970 of "Merck Index, 7th edition, Copyright 1960" under the definition of "Span" and "Tween." Ionic surface active agents, as for example, salt of fatty acids, such as the reaction product of oleic and/or stearic acid with triethanolamine and/or morpholine may be used. Such substitutes may be used in the same range as glycerol monostearate.

Suitable softening agents include for example, lanolin and petroleum jelly. Other softening agents may be used in place of petroleum jelly or lanolin, provided they are chemically inert with respect to the chlorine or other bleaches and detergents contained within the package, and provided they are chemically compatible with the paraffin. Such a softener may comprise up to approximately 25% by weight of the barrier coating.

The materials referred to above may perform multiple functions. For example, as indicated, glycerol monostearate many function both as an emulsifier and a film forming material, while lanolin may function both as an emulsifier and as a softener. This multiple utility permits a wide range of compositions in the barrier coating. However, any of the materials used in the barrier coating must be chemically inert with respect to the material contained within the package, and other materials normally encountered in washing. The materials of the barrier coating must be emulsifiable on dissolution of the supporting film and must be flexible or capable of being made flexible in the film form.

The composition comprising the barrier coating may comprise merely the wax or oleaginous material. However, this composition is not as satisfactory as a composition containing the emulsifier, film forming material and/or the softener for reasons set forth above.

The barrier coating material should comprise a homogeneous mixture of the materials referred to and may be applied to the flexible walls 3 at a temperature just above melting point of the barrier coating material. The coating operation may be performed in any suitable manner, as for example, by roller coating, or spraying. The thickness of the barrier coating will depend upon the method and temperature used. A preferred coating temperature is within the range of 130° F. to approximately 160° F. This again will depend upon the specific composition of the barrier coating material.

The contents of the package, preferably comprise in combination, a synthetic detergent and a chlorine containing bleaching agent. In addition, it has been found useful to include an alkaline source, a washing aid, a stabilizing water softener sequestering agent, a soil suspending agent and an optical bleach. The synthetic detergent and chlorine containing bleaching agent are combined in such a manner as not to decompose when mixed together, or disintegrate the package. Since chlorine is a strong oxidizing agent, detergents that are oxidizable or strong reducing agents should not be used. Various suitable detergents include for example, alkali metal salts, ammonium salts and ethanolamine salts of sulfonated higher alkyl mononuclear aryl hydrocarbons, having from 9 to 18 carbon atoms, for example, sodium dodecylbenzene sulfonate, alkali metal salts of fatty acids such as sodium oleate and sodium palmitate. Other synthetic detergents commercially available may also be used.

The bleach should be a strong oxidizing agent and preferably comprises a chlorine containing bleaching material. This bleach must be solid at room temperature and must decompose in water to release the bleaching agent, preferably chlorine. Suitable chlorine donor material may comprise, for example, dichloroisocyanuric acid and trichloroisocyanuric acid and their salts such as potassium trichloroisocyanuric acid. Other chlorine releasing agents, such as lithium hypochlorite, potassium hypochlorite and calcium hypochlorite, as referred to in British Patent No. 606,431, issued to William H. Langdwell, Aug. 13, 1948, are also useful.

A source of alkalinity may be provided from a compound selected from a group consisting of anhydrous sodium metasilicate, anhydrous potassium metasilicate, various metal phosphates or polyphosphates, such as sodium or potassium phosphates, or trisodium phosphate anhydrous may be useful. In addition to various other polyphosphates of sodium or potassium, sodium carbonate may also be used as an alkaline source. The alkaline source is optional and is useful primarily as an aid in the washing process. It has been found that soaps or detergents ionize better in alkaline media. This alkaline source also functions to aid in stabilizing a chlorine containing material in the combination.

A suitable washing aid such as anhydrous tripolyphosphate may also if desired, be included in the composition. This washing aid functions as a water softener and peptizing agent.

A similar function is performed by the stabilizing water softener sequestering agent. Such agents may include for example, sodium tetraethylenediamine tetraacetic acid. A soil suspending agent, as for example, carboxymethyl cellulose may also be incorporated into the composition, together with an optical bleach such as products marketed under the names "Calcofluor" and "Tinopal." The soil suspending agent and the optical bleach are conventional in washing compounds and their use is not critical. If desired various inert fillers such as sodium sulphate may also be used.

If present, the detergent preferably comprises from about 10% to about 35% by weight of the total mixture; the alkalinity imparting compound preferably comprises up to about 25% to 35% by weight of the total mixture; the chlorine donor material comprises by weight at least 5% of the total mixture; the washing aid is employed in amounts up to about 25% to about 35% by weight of the total mixture; the stabilizing sequestering agent is used in amounts up to about .10% to about 2.5% by weight of the total mixture; the soil suspending agent may be used in amounts up to about .5% to 1% and the optical bleach may be used in amounts of up to about .2% to .5%. Each of these amounts are weights of the total composition.

While the foregoing percentages suggest a preferred range for a combination composition of a detergent and chlorine containing chemical, the package may consist in one embodiment, of the packaging material and a chlorine containing bleaching material alone. This composition will of course, function only as a bleaching agent. The contents, which includes the detergent and chlorine containing chemical in the preferred embodiment, are mixed in dry form and packaged within the packaging material. In preparing the composition, which includes the detergent and chlorine containing chemical, the constituents are weighed out, dried, and put through a sieve

in a mixer, for example, a "Day-type." The ingredients are thus mixed together thoroughly, forming a uniform dry powder. There is no mixing problem. This procedure is carried out in a dry room having for example, less than 50% humidity at room temperature. The exact temperature and humidity is not critical. The mixed composition is then fed to a hopper in the packaging machine which makes the packages and then fills and seals them in a conventional manner. These packages, which are formed of the coated film material previously described, are water-soluble and consequently dissolve readily when the package is placed in water. When the package disintegrates there is no deposit left on the wash.

Various examples will more fully describe the scope of the present invention.

Example 1

The supporting film is formed of polyvinyl alcohol having a thickness of two mils. The coating film composition is a mixture of glycerol monostearate, oleic acid and triethanolamine. The preferred concentration of the glycerol monostearate is 85%, the oleic acid 5% and the triethanolamine 10%. However, the permissible range of glycerol monostearate may vary from about 20% to about 85%, the oelic acid, 3% to 10% and the triethanolamine from 1% to 10% by weight of the total composition.

The glycerol monostearate presumably functions in this example primarily as a film forming material. The oleic acid and the triethanolamine in combination form an emulsifier (oleic acid triethyl ammonium salt). Other surface active agents, nonionic or ionic may be substituted for the oleic acid and triethanolamine. If desired, the composition may include lanolin or petroleum jelly or other softeners to give greater flexibility to the film. If included, such softeners should not exceed about 25% of the total composition by weight. The composition is mixed preferably at a temperature of 130° F., but a range of 130° F. to 140° F. is satisfactory. The coating material was applied to the supporting film by passing the film over rollers running in a bath of melt at a temperature of about 140° F. with a range of 150° F. to 180° F. being permissible, so that a film having a thickness of approximately .002" is applied to the supporting film. The barrier coating solidifies almost immediately. Supporting film carrying the barrier coating may be fed to a package forming and filling machine, and packages are made continuously having dimensions of approximately 2¼" in width and about 4½" in length, with a heat sealed margin of about ⅜". The washing compound which fills the bags may contain a combination of a detergent in the range of 10% to 35%, an alkaline source in the range of 25% to 35%, a chlorine donating chemical of at least 5%, a washing aid in the range of 25% to 35% and a stabilizing water softener sequestering agent in the range of .1% to .25% all by weight. These materials forming the washing compound are selected from one of the aforementioned compounds.

Example 2

A package made in accordance with Example 1 was thrown into a washing machine containing water at a temperature of 130° F. The supporting and barrier film of the bag dissolved quickly and released the contents into the wash water.

Example 3

A preferred coating material is made up from the following constituents, the percentages being weight of the total composition.

	Percent
Glycerol monostearate	10
Lanolin	2
Paraffin	65
Petroleum jelly	23

The paraffin is the main coating constituent. The other materials give the film softness and continuity and thereby maintain the flexibility of the resulting bag. The glycerol monostearate also functions primarily as an emulsifier and secondly as a film former. While the lanolin functions primarily as a softener for the paraffin, it also functions as an emulsifier.

The coating material was made by mixing the constituents together at a temperature of 120° F. to form a homogeneous molten mass. A polyvinyl alcohol film was coated with this mass at 160° F. Bags were made from the coated film and filled with detergents and chlorine containing bleach. The bags were tested as described in the previous examples. It was found that the coating material effectively prevented reaction between the chlorine and the washing compound and the polyvinyl alcohol, and that the bags dissolved freely when thrown into the water of a washing machine.

In addition, it has been found that coating made in accordance with the present invention also effectively prevents deterioration of bags containing detergents or other washing compounds alone, which in the absence of the coating described, would deteriorate the bag over a period of time.

What is claimed is:

1. A laundry package comprising a washing compound containing a bleaching compound having releasable chlorine contained therein,

and means containing said compound comprising a bag having multilayer walls,

one of said layers formed of a water soluble film forming material normally reactive with chlorine and having a thickness of from about .001 inch to about .003 inch,

a second layer intermediate said first layer and said material comprising a water dispersible film nonreactive with chlorine,

said walls adapted to disperse and dissolve in water at a temperature between room temperature and 212° F. to release said washing compound whereby a predetermined amount of said washing compound is available for use.

2. A laundry package consisting essentially of a washing compound comprising vital ingredients for a complete wash and containing a bleaching agent which releases chlorine when contacted with water,

a bag surrounding said compound and having multilayer walls,

said washing compound comprising a detergent selected from the group consisting of alkali metal salts, ammonium salts and ethanolamine salts of sulfonated higher alkyl mononucelar aryl hydrocarbons having from 9 to 18 carbon atoms, sodium oleate and sodium palmitate, said detergent being substantially nonreactive with said bleaching agent in said laundry package,

said bleaching agent being selected from the group consisting of dichloroisocyanuric acid and trichloroisocyanuric acid and their salts wherein said bleaching agent is present in an amount of at least 5% by weight of said washing compound,

one of said layers being formed of an organic water soluble film forming material normally reactive with chlorine and having a thickness of from about 0.001 to about 0.003 inch,

and a second layer intermediate with said first layer and said washing compound comprising a water dispersible barrier coating not reactive with chlorine,

said barrier coating being selected from the group consisting of (a) a mixture of glycerol monostearate with oleic acid and triethanolamine, and (b) a mixture of glycerol monostearate with lanolin, paraffin and petroleum jelly,

said walls being dispersible and dissolvable in water at

a temperature between room temperature and 212° F. to release said washing compound whereby a predetermined amount of said washing compound is available for washing and simultaneous bleaching use.

3. A laundry package in accordance with claim 2 wherein said water soluble film forming material is selected from the group consisting of polyvinyl alcohol, methyl cellulose, carboxymethylcellulose, and sodium carboxymethyl hydroxyethyl cellulose.

4. A laundry package in accordance with claim 2 wherein said barrier coating is a mixture of glycerol monostearate with oleic acid and triethanolamine.

5. A laundry package in accordance with claim 2 wherein said barrier coating is a mixture of glycerol monostearate with lanolin, paraffin and petroleum jelly.

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