US 20120031804A1

(19) **United States**

(12) **Patent Application Publication**

Weller-Brophy

(10) **Pub. No.: US 2012/0031804 A1**

(43) **Pub. Date: Feb. 9, 2012**

(54) **LAUNDRY CLEANING PRODUCT**

(76) Inventor: **Laura Weller-Brophy**, Pittsford, NY (US)

(21) Appl. No.: **13/136,377**

(22) Filed: **Jul. 29, 2011**

Related U.S. Application Data

(60) Provisional application No. 61/370,213, filed on Aug. 3, 2010.

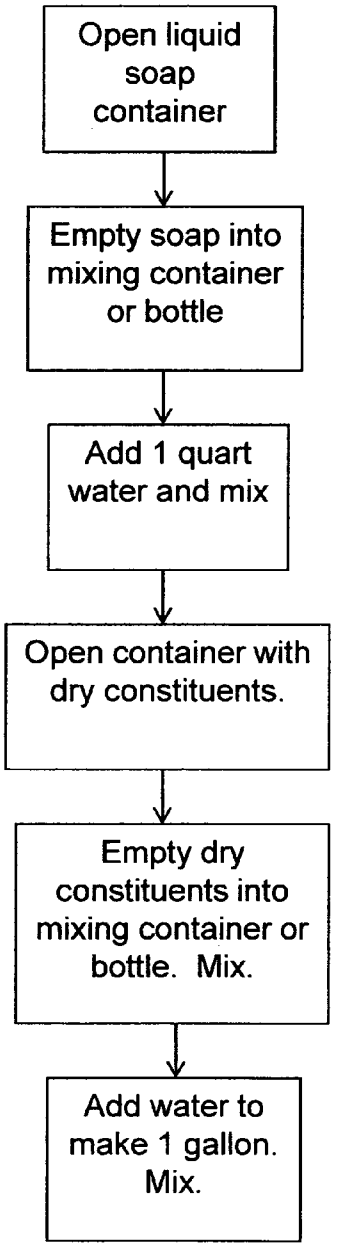
Publication Classification

(51) **Int. Cl.**
B65D 85/00 (2006.01)

(52) **U.S. Cl.** **206/525**

(57) **ABSTRACT**

The present invention relates to a laundry cleaning product, and more specifically to a concentrated laundry cleaning product comprising constituents to be mixed by the consumer, including a method for mixing the constituents into a dilute, liquid laundry cleaner for home use, and a kit including a laundry cleaner container.



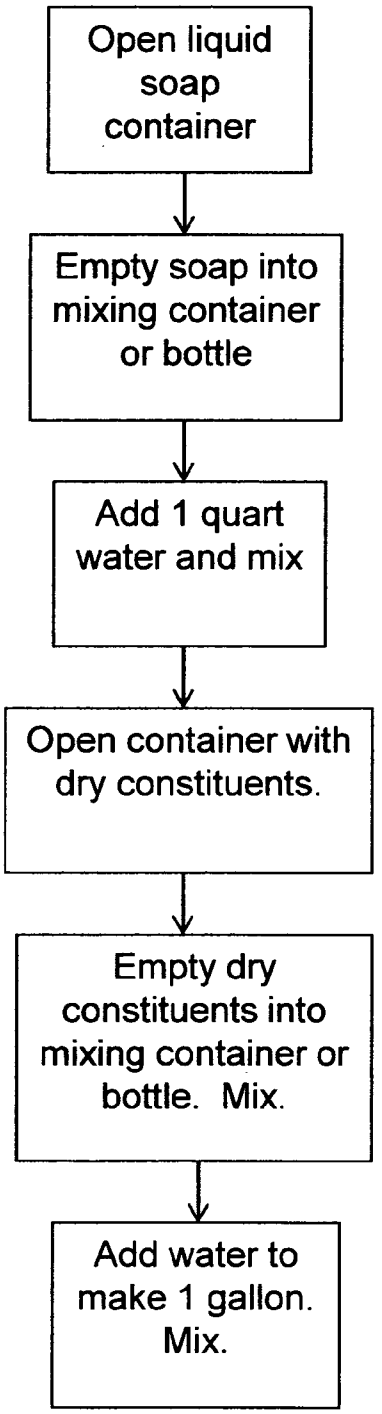

Open liquid soap container
Empty soap into mixing container or bottle
Add 1 quart water and mix
Open container with dry constituents.
Empty dry constituents into mixing container or bottle. Mix.
Add water to make 1 gallon. Mix.

Fig. 1

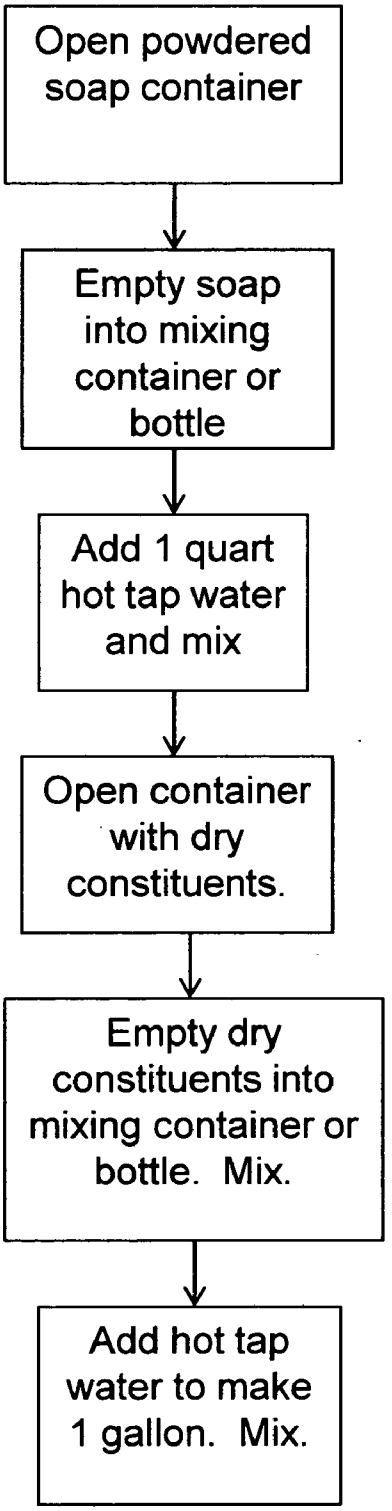

Open powdered soap container
Empty soap into mixing container or bottle
Add 1 quart hot tap water and mix
Open container with dry constituents.
Empty dry constituents into mixing container or bottle. Mix.
Add hot tap water to make 1 gallon. Mix.

Fig. 2

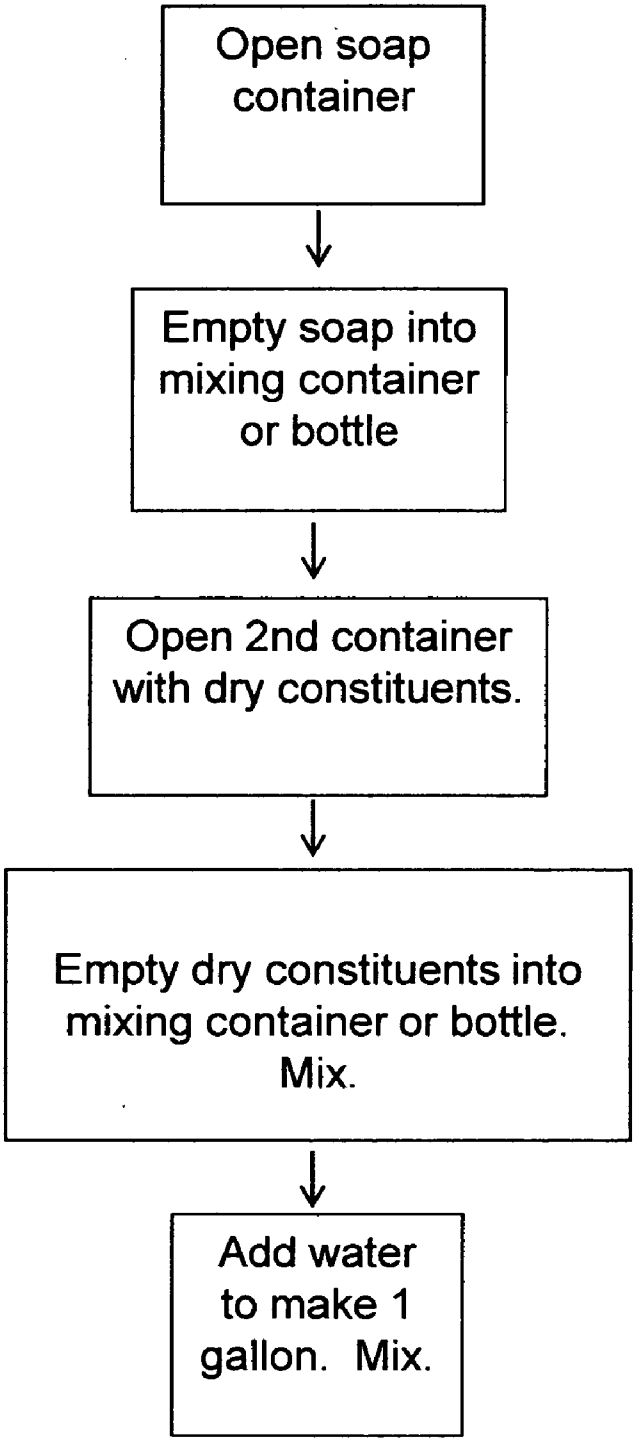

Open soap container
Empty soap into mixing container or bottle
Open 2nd container with dry constituents.
Empty dry constituents into mixing container or bottle. Mix.
Add water to make 1 gallon. Mix.

Fig. 3

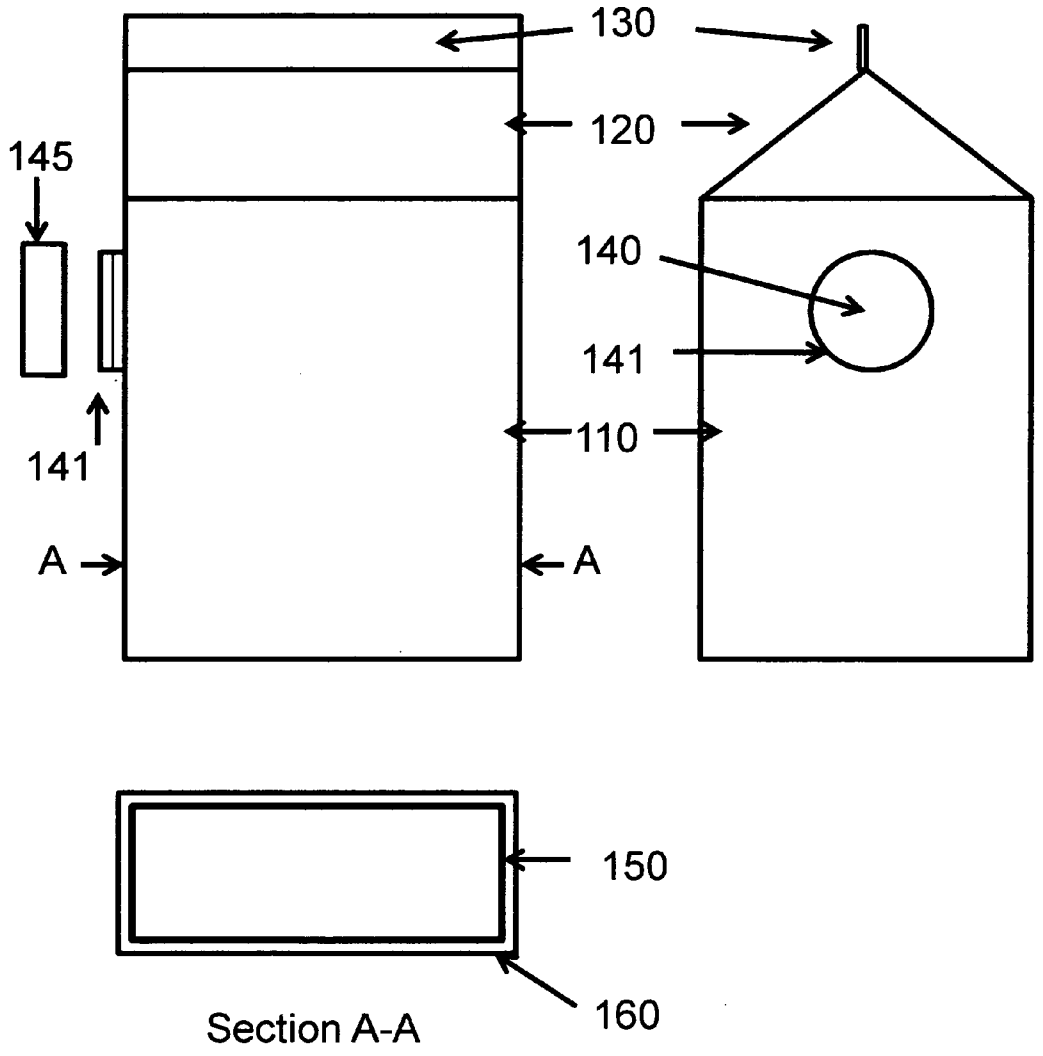


Fig. 4

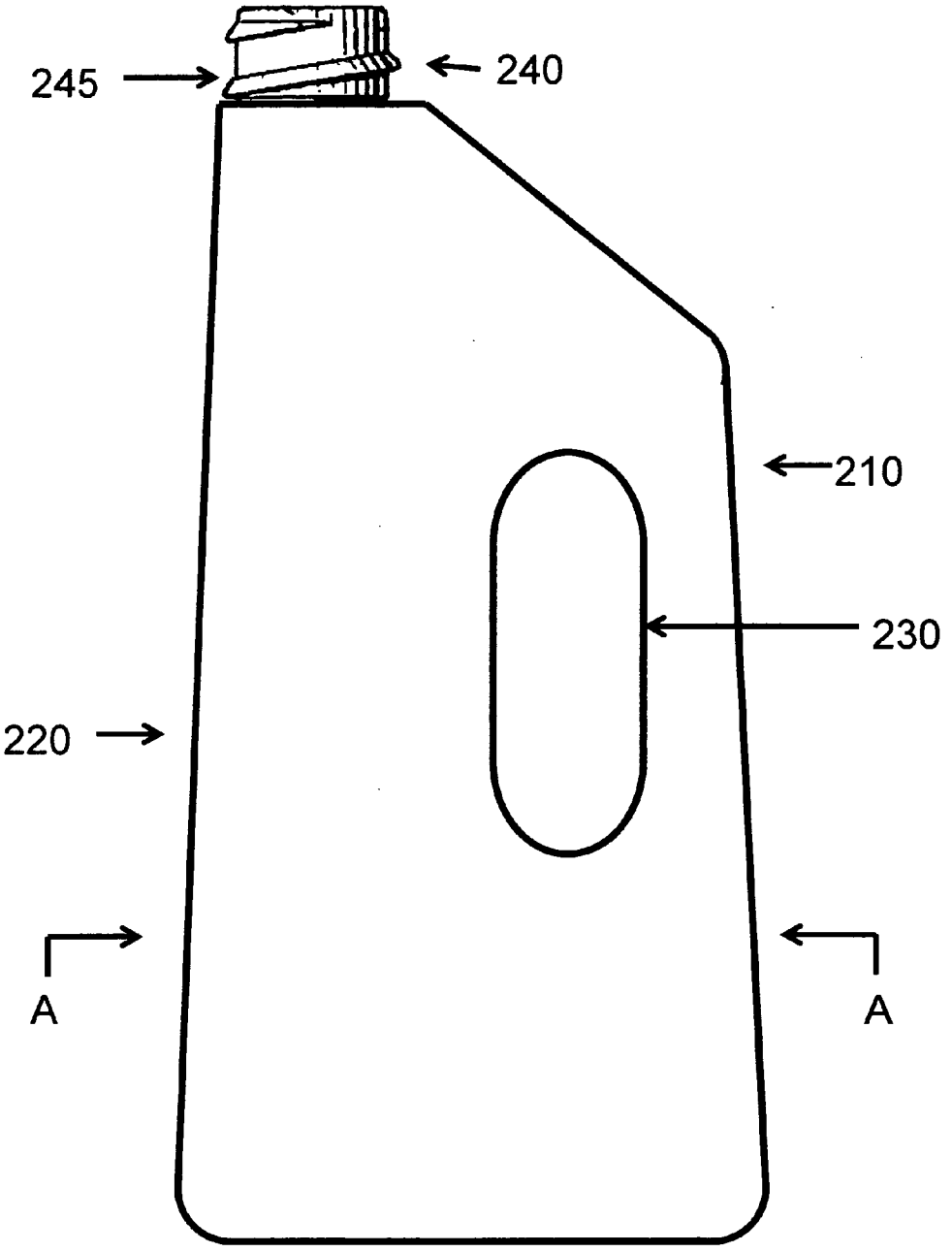


Fig. 5

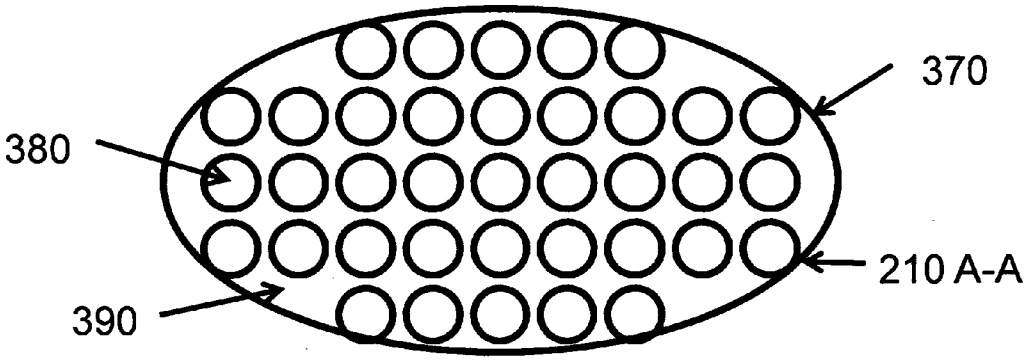


Fig. 6a

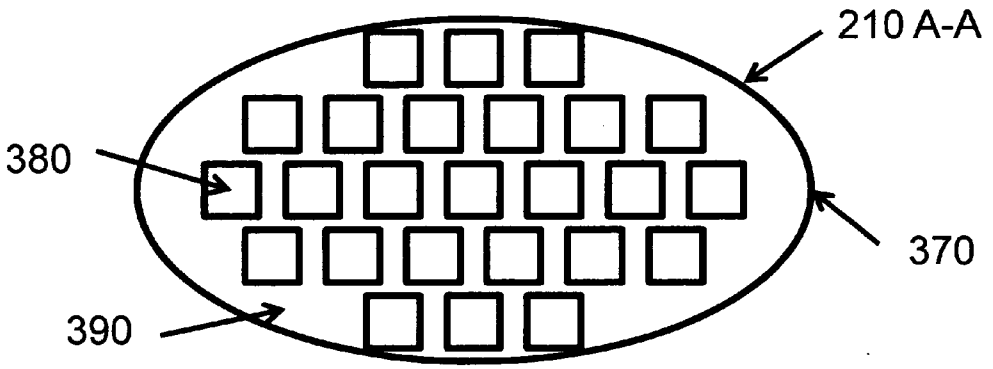


Fig. 6b

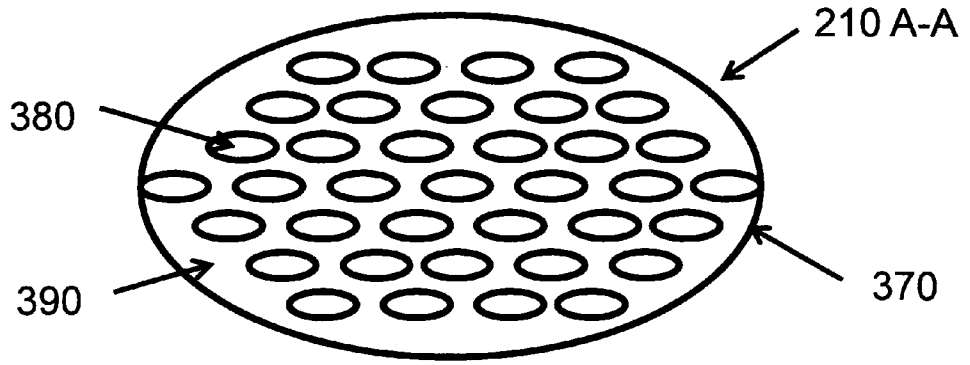


Fig. 6c

LAUNDRY CLEANING PRODUCT

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] Priority is claimed to: U.S. Provisional Patent Application Ser. No. 61/370,213 by Laura Weller-Brophy, entitled "LAUNDRY CLEANING PRODUCT", filed on Aug. 3, 2010, the disclosure of which is incorporated herein by reference.

FIELD OF THE INVENTION

[0002] The present invention relates to a laundry cleaning product, and more specifically to a concentrated laundry cleaner product comprising constituents to be mixed by the consumer, including a method for mixing the constituents into a dilute, liquid laundry cleaner for home use, and a kit including a laundry cleaner container.

BACKGROUND OF THE INVENTION

[0003] Over the past 50 years, laundry cleaner packaging and formulations have changed significantly, with predominately powdered cleaners in cardboard boxes replaced by liquid formulations in plastic containers. While the liquid formulations work well in cold water, and solve prior issues with powder clumping and inadequate dissolution in cold water, liquids pose their own problems. With the liquid formulations comprising significant amounts of water, the packages are large and heavy, necessitating high transportation costs. Further, the liquid detergent packages require relatively large volumes of display space at stores, and commensurate storage after purchase by consumers. Additionally, the move from paper to predominantly plastic containers has resulted in recycling issues; whereas paper recycling, including cardboard, is widely available, plastic recycling remains limited, with plastic often ending up in landfills.

[0004] A recent move to more concentrated liquid laundry cleaners addresses plastic container volume, weight, and shelf space. The more concentrated liquids require relatively small amounts of laundry cleaner per wash load, allowing consumers to make smaller volume and weight purchases. Smaller packages allow transportation of a larger number of units of laundry cleaner, with less store display and storage space required per container. However, the move to concentrates has not solved the issue around plastic container recycling; concentrated cleaners remain in plastic containers, with only limited recycling available in the US. In addition, the move to concentrates has led to a new problem—overuse of laundry cleaner, with fabrics that retain residual soap even after rinsing. This is a logical outcome from the use of concentrates; their measurement becomes more critical as the water content is reduced. Laundry cleaner measurement caps may not be designed to permit accurate cleaner measurement; if one simply fills the cap with cleaner, one may be using two or more times the required amount of soap/cleaner product in the laundry. This results in overuse of laundry cleaner, more cost per load of laundry, and residual soap/cleaner product remaining in the laundered items. Removal of the residual soap/cleaner product through the addition of a secondary rinse cycle adds cost to the load of laundry. Retention of the cleaning soap/product in the washed articles can impact human comfort and health through increased cases of skin rashes, allergies due to the cleaning product, and general discomfort from contact with the chemicals retained in the fabrics.

[0005] Laundry cleaner recipes and methods of mixing are available that allow the consumer to make laundry cleaner at home (for example, "LoveToKnow Cleaning" web site with recipe for "Homemade Laundry Detergent"). These recipes consist of grated soap (Fels Naptha, most commonly), Borax, Washing Soda, and baking soda. The recipes require the soap to be melted in water, over heat, with the remaining dry ingredients added and simmered in the liquid to assure dissolution and mixing. Large bags and containers of the dry ingredients may be purchased, with the consumer mixing them at home, in typically 3 or more gallon batches. Limitations of such recipes and methods include 1) the dry ingredients must be added to water and heated on the stove to enable adequate dissolution and mixing; 2) the dissolved and mixed solutions require an overnight resting period to "gel"/form the cleaning solution; 3) the large volumes of premixed ingredients make multiple gallons of cleaner at a time, an amount that requires a very large container and difficulty in mixing prior to use; 4) large volumes of premixed dry ingredients tend to settle and to separate, with no easy way to ensure that smaller amounts of dry ingredients may be used to mix a smaller amount of liquid cleaner; 5) recipes and methods are not available that include the addition of enzymes; and 6) recipes and methods are limited to ingredients that are considered natural. There are no suggestions to use ingredients that are not considered natural, including anionics, nonionics, phosphate, zeolite, Na-carbonate, copolymers, citrate, PBS-4, PCS, TEAD, Na-Sulfate, silicates, perfumes, dyes, surfactants, water softeners, emulsifiers, and other agents to aid dissolution of components, also referred to herein as constituents, and mixing.

[0006] A laundry cleaner mix, route to market, mixing method, and kit are presented here that meet these criteria. The formulations presented here span all-natural compositions as well as those incorporating manmade cleaning agents, stabilizers, and other constituents. All the formulations are mixed without the need for heating or for allowing the liquid solutions to sit for hours prior to use. The examples shown here include laundry cleaner constituents that have a long history of accepted use, with some comprising all natural ingredients.

PROBLEM TO BE SOLVED

[0007] There remains an unmet need for a laundry cleaner formulation that is available to consumers, has good cleaning power in cold water, has compact packaging that can be reused and/or recycled, and has lightweight packaging. There remains a need for a liquid laundry cleaner formulation that is a sufficiently dilute solution, so that measurement accuracy is not critical (sufficiently dilute meaning that one uses about ½ cup or more of laundry cleaner per full laundry load), is easy to mix, requiring no heating or simmering. There remains a need for laundry cleaner formulation that is available to consumers that can include effective soil and stain removers, such as enzymes, and which can be mixed into a variety of volumes, without the need to make overly large amounts at any one time.

SUMMARY OF THE INVENTION

[0008] This invention relates to a laundry product comprising one or more containers of concentrated, premeasured,

ready-to-mix constituents that are mixed without the use of heat to yield a container of dilute liquid laundry cleaner. The invention provides good cleaning in cold water, compact packaging that can be reused and/or recycled, lightweight packaging, is a sufficiently dilute solution when in liquid formulation so that measurement accuracy is not critical, is easy to mix, requiring no heating or simmering using an externally applied heat source, can include effective soil and stain removers, such as enzymes, and can be mixed into a variety of volumes, without the need to make overly large amounts at any one time.

[0009] The invention further relates to a laundry cleaner product wherein the one or more containers of concentrated, premeasured, ready-to-mix constituents comprise at least one constituent selected from the group consisting of dry constituents, liquid constituents or combinations thereof.

[0010] The invention further relates to a laundry cleaner product wherein the constituents include powdered soap with soap particles that have no physical dimension larger than 2 mm, and preferably no larger than 1 mm.

[0011] Still further, the invention relates to a laundry product comprising one or more containers of concentrated, premeasured, ready-to-mix constituents that are mixed without the use of heat to yield a container of dilute liquid laundry cleaner, wherein the one or more constituents comprises at least one soap and at least one enzyme.

[0012] Yet further, the invention relates to a laundry product kit comprising a ready-to-mix laundry cleaner concentrate and a laundry cleaner container in which to mix the laundry cleaner concentrate.

[0013] The invention further relates to a laundry product kit comprising a ready-to-mix laundry cleaner concentrate and a laundry cleaner container in which to mix the laundry cleaner concentrate, wherein the interior of the laundry cleaner container has structured surfaces.

[0014] The invention further relates to a laundry product kit comprising a ready-to-mix laundry cleaner concentrate and a laundry cleaner container in which to mix the laundry cleaner concentrate, wherein the interior of the laundry cleaner container has a meshed surface.

ADVANTAGEOUS EFFECT OF THE INVENTION

[0015] The present invention includes several advantages, not all of which are incorporated in a single embodiment. The invention provides good cleaning in cold water, compact packaging that can be reused and/or recycled, lightweight packaging, is a sufficiently dilute solution when in liquid formulation so that measurement accuracy is not critical, is easy to mix, requiring no heating or simmering using an externally applied heat source, can include effective soil and stain removers, such as enzymes, and can be mixed into a variety of volumes, without the need to make overly large amounts at any one time.

BRIEF DESCRIPTION OF THE DRAWINGS

[0016] FIG. **1**. This figure illustrates a first method of mixing the constituents of a laundry cleaner mix.

[0017] FIG. **2**. This figure illustrates a second method of mixing the constituents of a laundry cleaner mix.

[0018] FIG. **3**. This figure illustrates a third method of mixing the constituents of a laundry cleaner mix.

[0019] FIG. **4**. This figure illustrates a laundry cleaner container.

[0020] FIG. **5**. This figure illustrates a second laundry cleaner container.

[0021] FIG. **6***a*. This figure shows a cross-section of a laundry cleaner container with a mesh that includes circular openings.

[0022] FIG. **6***b*. This figure shows a cross-section of a laundry cleaner container with a mesh that includes square openings.

[0023] FIG. **6***c*. This figure shows a cross-section of a laundry cleaner container with a mesh that includes elongated openings.

DETAILED DESCRIPTION OF THE INVENTION

[0024] The present invention relates to a laundry product, including a ready-to-mix laundry cleaning concentrate, comprising one or more containers of premeasured dry and/or liquid formulations that, when mixed by the consumer, will yield a container of dilute liquid laundry cleaner. A concentrated laundry cleaner mix is disclosed, comprising premeasured constituents packaged in one or more envelopes, containers, and/or pouches containing ⅛-2 cups of dry and/or liquid laundry cleaning constituents, with instructions for mixing. A laundry product is disclosed, comprising a kit that includes a ready-to-mix laundry cleaner concentrate, and a laundry cleaner container in which to mix the laundry cleaner concentrate.

[0025] The invention described herein comprises a laundry cleaning product, and more specifically a concentrated laundry cleaner product comprising constituents to be mixed by the consumer, including a method for mixing said constituents into a dilute laundry cleaner for home use. There are no known prior art references to concentrated laundry cleaning product mixes for use by consumers that do not require heating of relatively large quantities of mix, and overnight resting of the solution to allow formation of the cleaner.

[0026] Commercially available laundry cleaning products, consisting of concentrated liquid detergents can provide good cleaning in cold water, and have compact packaging that may be reused. The smallest containers of liquid detergent are relatively light in weight, and special formulations are available that are dye and fragrance free. However, current liquid formulations are highly concentrated, often requiring less than ¼ cup to clean a full load of laundry. Laundry bottle caps provided to measure the liquid detergents are typically inadequately marked to allow a consumer to measure the correct amount of detergent, with the result that the highly concentrated liquid may be over-used. Laundry bottle caps commonly hold at least twice the amount of concentrated liquid required for a full load of laundry; filling the cap, instead of careful measurement can lead to a load of laundry that wastes the detergent, increases the cost of the laundry load, and causes the fabrics to retain detergent.

[0027] Current liquid laundry detergents, while offering smaller plastic packages due to the more concentrated detergent formulations, are relatively bulky and heavy to transport, and take significant store shelf space. The smaller and lighter weight laundry detergent containers are often more expensive per unit volume, with the laundry detergent typically costing at least $0.30/load. Consumers who carry their purchases or who use public transportation are limited by the total weight and bulk of purchases that they can carry; existing laundry detergent products are not sufficiently compact and light weight to facilitate ease of transportation. Further, commer-

cially available laundry detergent formulations do not list ingredients, with consumers unable to confirm the contents of the cleaner prior to use.

[0028] The novel laundry cleaner is marketed and sold as a kit for mixing and use by the consumer. Much like powdered and concentrated liquid beverages, a premeasured amount of concentrate/concentrates is/are provided for mixing with water by the consumer.

[0029] The components/constituents may be in liquid or powder forms. Representative components include anionics, nonionics, soap, phosphate, zeolite, Na-carbonate, copolymers, citrate, PBS-4, PCS, TEAD, Na-Sulfate, silicates, perfumes, and dyes. Preferably, the constituents include an all-natural soap ingredient. All-natural soaps comprise water, lye, and fats such as olive oil, palm oil, coconut oil, shortening, and other fats known to those skilled in soap making. All-natural soaps may be made that can be grated into powders that comprise finely dispersed solid particles having particle sizes less than 2 mm in the longest dimension, and preferably less than 1 mm in the longest dimension. Commercially available bar soaps such as Ivory and Fels Naptha, contain ingredients that include sodium tallowate and/or sodium palmate, water, sodium cocoate or sodium palm kernelate, glycerin, sodium chloride, fragrance, coconut acid, palm kernel acid, tallow acid or palm acid, methyl ether, sorbitol, sodium chloride, pentasodium pentetate and/or tetrasodium etidronate, titatium dioxidand, tetrasodium EDTA, dyes and fragrance. Such bar soaps do not produce powders when grated, but instead form long pieces of soap when grated, with a longest dimension of more than 2 mm, and more commonly with a longest dimension of about 10 mm. These grated soaps do not dissolve readily into water without heating. When used in our example formulations, both Fels Naptha and Ivory caused clumps to form in the liquid cleaner, with very little dissolution and mixing of the soap in the water. In addition, the grated Ivory soap was found to clump with the other dry ingredients of our example formulations when blended as a dry mix; these clumped dry ingredients did not readily dissolve and mix into solution when shaken according to our method.

[0030] Other additions to the formulations may include, but are not limited to, surfactants, water softeners, emulsifiers, and other agents to aid dissolution of components and mixing. Other ingredients can be included, such as those disclosed in the washing or cleaning formulations of U.S. Pat. Publ. 2008/0004202 to Wolfgang et al., filed Jan. 3, 2008, incorporated herein by reference. Additionally, mixing beads or other mechanical aids to mixing may be added. Preferably, the laundry product includes a natural liquid soap constituent, a washing soda constituent, a Borax constituent, and water. In another embodiment, the laundry product includes a natural powdered soap constituent, a washing soda constituent, a Borax constituent, and water. The preferred dry constituents include natural soap, washing soda, and Borax. Preferably, the powdered soap has soap particles that have no physical dimension larger than 2 mm; most preferably, the powdered soap has soap particles that have no physical dimension larger than 1 mm; the small size of the soap particles is advantageous for mixing and dissolution. This particle size may be achieved by grating, grinding, and other means known to generate powders.

[0031] The laundry product is preferably modified through the addition of one or more enzymes in liquid and/or powder form to enhance the cleaning properties of the laundry cleaner solution. The enzymes may include proteases, amylases, cellulases, and custom blends of these or other enzymes used to enhance the cleaning performance. Surprisingly, we have found that there are enzymes that do not suffer from clumping, gels, and difficult dissolution when combined with the natural soap and other constituents described above. In specific, the powdered "Clean Power" sold by Genencorp readily dissolves into our cleaning formulations when water is added and the mixture shaken, without forming gels or clumps. The "Clean Power" product consists of a blend of protease and amylase. This blended enzyme, when used in the laundry cleaner mix, dissolves readily with the other components of the formulation.

[0032] Other enzymes used in the formulation may include the "SEBrite" products sold by the Specialty Enzymes and Biochemicals Co., California, USA. In specific, the SEBrite LP and BP powdered enzymes may be used at the loadings noted in the examples. The loadings area for a blend of the LP and BP products, with the blend designed to provide the optimal performance; preferably, the LP and BP enzymes are blended in a 2:1 ratio, LP:BP. It was found, however, that the SEBrite LP and BP powered enzymes caused gels to form in the liquid laundry cleaners after being mixed. The "Clean Power" product did not produce gels, resulting in a liquid laundry cleaning solution that poured readily, even after being mixed for several weeks.

[0033] Liquid enzymes may also be used, at loadings similar to those noted here for the powdered enzymes. The final amount of enzyme is determined by its activity and concentration as purchased.

[0034] The examples may be modified by storing the mixed laundry cleaners in more than one container. Other sizes of laundry cleaner containers may be used to hold the final mixture or more than one container can be used, with the constituents split between containers during mixing; constituents may be mixed in a container and poured into one or more laundry cleaner containers after mixing.

[0035] Volumes of materials in the mixes may be altered so that the mixes will produce lesser or greater amounts of dilute laundry cleaner. The volumes described in the examples are not meant to be limiting, and are exemplary; other volumes may be considered as convenient for consumers. Regardless of the volume of dilute laundry cleaner that results from the mix, the overarching novelty of the invention is the mix product that is sold to customers, allowing the laundry cleaner to be constituted by the consumer through addition of water, with no heating of the solution required to promote dissolution of the constituents.

[0036] To bring to market, the laundry product may be mixed or unmixed, and packaged in one or more envelopes, packets, plastic containers, or pouches that are labeled with contents and mixing instructions. The plastic materials should be recyclable. A "starter" kit may be made available having the first set of ingredients and a special laundry cleaner container or bottle, including a measuring cap that readily permits a ½ cup volume to be dispensed. Other dilutions may be mixed, allowing more or less volume of liquid laundry cleaner to be used. The ingredients in the mix used to make a gallon of laundry cleaner comprise liquids and/or powders having a total volume between ⅛ cup and 2 cups. The ingredient volume scales with the total amount of liquid laundry cleaner to be prepared; the gallon size noted here is exemplary.

[0037] The dry powdered soap may be packaged in an envelope, packet, plastic container, or pouch. Alternatively, all of the dry ingredients may be mixed or preblended and packaged in a single envelope, packet, plastic container, or pouch that has a label with contents and mixing instructions. The product may be brought to market by premixing the components in a plastic laundry bottle that is sold to the consumer. The kits preferably contain premeasured amounts of laundry cleaner mix, with the mix packaged so that a full container or envelop is emptied to make the desired amount of laundry cleaner. The product may be brought to market by premixing the ingredients (dry soap, washing soda, enzyme (s), and Borax, for example) in a laundry bottle or container that is sold to the consumer.

[0038] The product may be brought to market by premixing the constituents, for example, liquid soap, washing soda, and Borax, in a plastic laundry bottle that is sold to the consumer. The consumer adds water to dissolve the cleaner constituents, shakes to mix, and caps for further use as noted above.

[0039] While the water can be any temperature up to 130 deg F., the water is preferably 95-130 deg F. Multiple water additions and mixing steps may be used to ensure complete mixing of the constituent materials.

[0040] The product may also be brought to market by a hybrid packaging scheme, wherein at least one constituent, for example, a liquid constituent, is provided in a plastic laundry bottle that is sold to the consumer, with the dry constituents provided in one or more small envelopes or other containers. To mix the laundry cleaner, water is added to the constituent/component in the bottle, with the mixture shaken to mix. The powders are next added with the resulting mixture shaken until well mixed. More water is added until the bottle is filled to within 1-2" of the top, to facilitate shaking. Other orders of water and dry constituent addition may be done.

[0041] Once the consumer purchases the initial kit of plastic laundry bottle, and laundry cleaner constituents, further purchases may be made of the laundry cleaner components/constituents only. Laundry cleaner component kits may comprise a container or envelop of the dry constituents (appropriately labeled), and a pouch or rigid container of the other constituents (also appropriately labeled). The kit would include instructions on how to mix the constituents using the laundry cleaner container or other container.

[0042] In one embodiment, the present invention provides a method for mixing the laundry product with liquid soap as illustrated in FIG. **1**. This figure illustrates one procedure that may be used by a consumer, with flexibility in the order of addition of the liquid soap and dry components.

[0043] The consumer first opens the liquid soap container. This container holds a liquid soap solution. The liquid soap is emptied into a mixing container or laundry cleaner container having adequate volume to hold about 1 gallon; the method may be adapted to smaller volumes such as 1 liter, 1 quart, ½ gallon, and other amounts. Water is added to the liquid soap with the resulting mixture stirred or shaken to blend the soap with the water. Preferably, about one quart of water is added to the liquid soap; more or less water may be added at this step, so long as the final laundry cleaner is well mixed. The actual volume of water will scale with the final volume of the mixed laundry cleaner. Preferably, the water is warm or hot tap water, in a temperature range of 95-130 deg F. The container of dry constituents is opened next. This container may consist of an envelope, pouch or other container that will maintain the dry constituents in powdered form until they are opened. The dry constituents are poured into the soap and water mixture, with the resulting mixture stirred or shaken to thoroughly incorporate the dry and wet ingredients. The mixing container or laundry cleaner container is filled with water sufficient to make 1 gallon of laundry cleaner. The actual amount of water added to the mixing container or laundry cleaner container depends upon the final amount of cleaner desired. Preferably the water is between 95-130 deg F. The mixture is stirred or shaken again to blend in the water. The mixed laundry cleaner is allowed to stand for about 20 minutes prior to use, to allow the powdered ingredients to dissolve and blend in the liquid mixture. The laundry cleaner solution is shaken or stirred well prior to each use. Approximately ½ cup of liquid laundry cleaner is used per large load of laundry.

[0044] In a second method for mixing, the laundry product or cleaner mix is illustrated in FIG. **2**. This figure illustrates one procedure that may be used by a consumer, with flexibility in the order of addition of the powdered soap, water, and other dry constituents.

[0045] The consumer first opens the powdered soap container. This container holds a dry powdered soap preferably made with natural oils, lye, water, and other natural ingredients. Other powdered soap compositions may be used that incorporate other ingredients. The powdered soap is emptied into a mixing container or laundry cleaner container having adequate volume to hold about 1 gallon. The mixing container or laundry cleaner container is partially filled with water; for example, a quart of water may be added to the dry soap with the resulting mixture stirred or shaken to dissolve the soap into the water. Preferably, the water is warm/hot, 95-130 deg F. Other volumes and temperatures of water may be used, so long as the powdered soap dissolves. The container of dry constituents is opened next. This container may consist of an envelope, pouch or other container that will maintain the dry constituents in powdered form until they are opened. The dry constituents are poured into the soap and water mixture, with the resulting mixture stirred or shaken to thoroughly incorporate the dry and wet ingredients. The mixing container or laundry cleaner container is filled with water sufficient to make 1 gallon of laundry cleaner. Preferably, the water is warm/hot, with a temperature in the range of 95-130 deg F. The mixture is stirred or shaken again to blend. The laundry cleaner mixture is allowed to sit for about 20 minutes prior to first use; this time span allows the various constituents to dissolve and mix; a longer time can be used. The container of laundry cleaner is shaken or stirred prior to each use. Approximately ½ cup of liquid laundry cleaner is used per large load of laundry. The dry ingredients may be added to the water in other orders of addition.

[0046] In a third embodiment, the method for mixing the laundry product is illustrated in FIG. **3**. This figure illustrates one procedure that may be used by a consumer, with flexibility in the order of addition of the powdered soap, water, and other dry constituents.

[0047] The consumer first opens the powdered soap container. This container holds a dry powdered soap preferably made with natural oils, lye, water, and other natural ingredients. Other powdered soap compositions may be used that incorporate other ingredients. Preferably, the powdered soap has soap particles that have no physical dimension larger than 2 mm; most preferably, the powdered soap has soap particles that have no physical dimension larger than 1 mm; the small size of the soap particles is advantageous for mixing and

dissolution. The powdered soap is emptied into a mixing container or laundry cleaner container having adequate volume to hold about one gallon. The container of dry constituents is opened next. This container may consist of an envelope, pouch or other container that will maintain the dry constituents in powdered form until they are opened. The dry constituents are poured into the same mixing container or laundry cleaner container. Alternatively, the powdered soap, washing soda, Borax, and any other dry ingredients may be preblended and loaded into the mixing container or laundry cleaner container at once. The mixing container or laundry cleaner container is filled with water sufficient to make 1 gallon of laundry cleaner. Preferably, the water is warm/hot, with the preferred temperature range being 95-130 deg F. The mixture is stirred or shaken again to blend in the water; the cleaner is allowed to sit for about 20 minutes prior to first use. More or less time may be used for the mixture to fully blend. Remix by shaking or stirring well prior to each use as the formulation may separate upon sitting. Use ½ cup of liquid per large load of laundry. In this procedure, the order of adding the dry soap and other dry constituents may be changed; this order of addition is not crucial to the procedure.

[0048] The present invention can include a container for mixing the laundry product. The container can be specifically designed to facilitate mixing. Mechanical aids to mixing may include structured surfaces within the laundry cleaner container. A laundry cleaner container **110** is illustrated in FIG. **4**, with a schematic of one possible laundry cleaner container.

[0049] The laundry cleaner container **110** is fabricated from plastic, glass, or of a paper or paperboard with impervious lining. The laundry cleaner container **110** is preferably fabricated of paper or paperboard that is prepared with an impervious coating, such as wax. The container is folded so to have a triangular portion **120** with a sealed portion **130** where the sides of the folded material meet. An aperture **140** is formed in one side of the container **110**, as shown. Preferably, the aperture **140** has a threaded plastic insert **141** that is affixed to the aperture. The threaded plastic insert is formed so that a threaded cap **145** may be used to close the aperture. The aperture **140** has a diameter of about 1-2 inches so that the laundry cleaner constituents (mix) may be poured readily into the container **110**. Alternatively, all, or a portion of the laundry cleaner constituents (mix) may be preloaded into the laundry cleaner container by the manufacturer.

[0050] If a waxed coating is not desired for the laundry cleaner container **110**, an impervious lining may be used within the body of the container and may comprise a plastic film, a wax film, a metal film, or composite thereof, sufficiently thick to retain the liquid laundry cleaner without leakage or damage to the laundry cleaner container. A cross-section A-A of the laundry cleaner container **110** is illustrated having an outer surface **160**, such as the paper or paperboard, with an inner surface **150** comprising the impervious lining. While the container **110** is illustrated with a screw-on cap **145**, other sealing mechanisms could be used, including screw-on caps, snap-on caps, foldable flaps, and other closures that permit the liquid laundry cleaner to be retained in the container without leakage, even if the container is shaken or tipped. Preferably, the laundry cleaner container holds a liquid volume of between 1 quart and 1 gallon.

[0051] While laundry cleaner container **110** is illustrated with a smooth inner surface **150**, structured surfaces could be incorporated within the laundry cleaner container to facilitate mixing of the laundry cleaner. Structured surfaces may be made by corrugating the interior surfaces of the laundry cleaner container, as well as by incorporating rough, ridged, or dimpled surfaces.

[0052] A second laundry cleaner container **210** is illustrated in FIG. **5**, including a body portion **220**, having an integrally-formed handle **230**, and a neck portion **240**. The neck portion **240** includes threaded portions **245** that mate with a threaded cap, not shown. The threaded cap is made so to hold up to approximately ½ cup of liquid laundry cleaner that is dispensed to clean a full load of clothing. The threaded cap may be increased in size should a more dilute solution be desired. The neck portion **240** has a diameter of about 1-2 inches so that the laundry cleaner constituents (mix) may be poured readily into the container **210**. Alternatively, all, or a portion of the laundry cleaner constituents (mix) may be preloaded into the laundry cleaner container by the manufacturer.

[0053] A mesh structure may be used within either of laundry cleaner containers **110** and **210** to facilitate mixing of the laundry cleaner constituents (mix). The laundry cleaner container **210** of FIG. **5** is shown in cross-section A-A in FIG. **6**, having a mesh structure **370** that spans all or part of the width of the laundry cleaner container. This mesh structure may be made of glass, plastic, metal, or lightweight composite materials **390** that are attached to one or more interior surfaces of the laundry cleaner container. The mesh comprises openings **380** that are sufficiently large to allow passage of the laundry cleaner concentrate. Possible mesh structures are illustrated in FIGS. **6***a, b,* and *c*. FIG. **6***a* shows a mesh that includes circular openings. FIG. **6***b* shows a mesh that includes square openings. FIG. **6***c* shows a mesh that includes circular openings. The openings of the mesh shown in FIG. **6** are not meant to be limiting and may include irregularly shaped and/or randomly shaped openings. The openings may be on a square grid, a hexagonally packed grid, or other grid. Preferably, the mesh comprises openings that are between 2 mm and 10 mm in size along their smallest dimension. The percent of open surface in the mesh may be 20-90%, preferably, 50-85%. The mesh is provided to facilitate mixing and blending of the laundry cleaner constituents and the water.

EXAMPLES

[0054] The following examples are provided to illustrate the invention. In the following embodiments, example cleaners are provided, together with a means to bring them to market, meeting the above criteria. The examples are not exhaustive; they may be modified with additives to enhance performance and to stabilize laundry cleaner composition. Alternative formulations for the concentrated laundry detergent mix, known to those skilled in the art, may also be brought to market via the same mechanism as noted here.

Method 1:

[0055] A first method for mixing the Laundry Cleaner Mix with liquid soap is illustrated in FIG. **1**. This figure illustrates one procedure that may be used by a consumer, with flexibility in the order of addition of the liquid soap and dry constituents.

[0056] The consumer first opens the liquid soap container. This container holds a liquid soap solution. The liquid soap is emptied into a mixing container or laundry cleaner container having adequate volume to hold about 1 gallon; the method may be adapted to smaller volumes such as 1 liter, 1 quart, ½

gallon, and other amounts. Water is added to the liquid soap with the resulting mixture stirred or shaken to blend the soap with the water. Preferably, about one quart of water is added to the liquid soap; more or less water may be added at this step, so long as the final laundry cleaner is well mixed. The actual volume of water will scale with the final volume of the mixed laundry cleaner. Preferably, the water is warm or hot tap water, in a temperature range of 95-130 deg F. The container of dry constituents is opened next. This container may consist of an envelope, pouch or other container that will maintain the dry constituents in powdered form until they are opened. The dry constituents are poured into the soap and water mixture, with the resulting mixture stirred or shaken to thoroughly incorporate the dry and wet ingredients. The mixing container or laundry cleaner container is filled with water sufficient to make 1 gallon of laundry cleaner. The actual amount of water added to the mixing container or laundry cleaner container depends upon the final amount of cleaner desired. Preferably the water is between 95-130 deg F. The mixture is stirred or shaken again to blend in the water. The mixed laundry cleaner is allowed to stand for about 20 minutes prior to use, to allow the powdered ingredients to dissolve and blend in the liquid mixture. The laundry cleaner solution is shaken or stirred well prior to each use. Approximately ½ cup of liquid laundry cleaner is used per large load of laundry.

Method 2:

[0057] A second method for mixing the Laundry Cleaner Mix is illustrated in FIG. **2**. This figure illustrates one procedure that may be used by a consumer, with flexibility in the order of addition of the powdered soap, water, and other dry constituents.

[0058] The consumer first opens the powdered soap container. This container holds a dry powdered soap preferably made with natural oils, lye, water, and other natural ingredients. Other powdered soap compositions may be used that incorporate other ingredients. Preferably, the powdered soap has soap particles that have no physical dimension larger than 2 mm; most preferably, the powdered soap has soap particles that have no physical dimension larger than 1 mm; the small size of the soap particles is advantageous for mixing and dissolution. The powdered soap is emptied into a mixing container or laundry cleaner container having adequate volume to hold about 1 gallon. The mixing container or laundry cleaner container is partially filled with water; for example, a quart of water may be added to the dry soap with the resulting mixture stirred or shaken to dissolve the soap into the water. Preferably, the water is warm/hot, 95-130 deg F. Other volumes and temperatures of water may be used, so long as the powdered soap dissolves. The container of dry constituents is opened next. This container may consist of an envelope, pouch or other container that will maintain the dry constituents in powdered form until they are opened. The dry constituents are poured into the soap and water mixture, with the resulting mixture stirred or shaken to thoroughly incorporate the dry and wet ingredients. The mixing container or laundry cleaner container is filled with water sufficient to make 1 gallon of laundry cleaner. Preferably, the water is warm/hot, with a temperature in the range of 95-130 deg F. The mixture is stirred or shaken again to blend. The laundry cleaner mixture is allowed to sit for about 20 minutes prior to first use; this time span allows the various constituents to dissolve and mix; a longer time can be used. The container of laundry cleaner is shaken or stirred prior to each use. Approximately ½ cup of liquid laundry cleaner is used per large load of laundry.

Method 3:

[0059] A third method for mixing the Laundry Cleaner Mix is illustrated in FIG. **3**. This figure illustrates one procedure that may be used by a consumer, with flexibility in the order of addition of the powdered soap, water, and other dry constituents.

[0060] The consumer first opens the powdered soap container. This container holds a dry powdered soap preferably made with natural oils, lye, water, and other natural ingredients. Other powdered soap compositions may be used that incorporate other ingredients. Preferably, the powdered soap has soap particles that have no physical dimension larger than 2 mm; most preferably, the powdered soap has soap particles that have no physical dimension larger than 1 mm; the small size of the soap particles is advantageous for mixing and dissolution. The powdered soap is emptied into a mixing container or laundry cleaner container having adequate volume to hold about one gallon. The container of dry constituents is opened next. This container may consist of an envelope, pouch or other container that will maintain the dry constituents in powdered form until they are opened. The dry constituents are poured into the same mixing container or laundry cleaner container. Alternatively, the powdered soap, washing soda, Borax, and any other dry ingredients may be preblended and loaded into the mixing container or laundry cleaner container at once. The mixing container or laundry cleaner container is filled with water sufficient to make 1 gallon of laundry cleaner. Preferably, the water is warm/hot, with the preferred temperature range being 95-130 deg F. The mixture is stirred or shaken again to blend in the water; the cleaner is allowed to sit for about 20 minutes prior to first use. More or less time may be used for the mixture to fully blend. Remix by shaking or stirring well prior to each use as the formulation may separate upon sitting. Use ½ cup of liquid per large load of laundry. In this procedure, the order of adding the dry soap and other dry constituents may be changed; this order of addition is not crucial to the procedure.

Example 4

Laundry Cleaner Mix with Liquid Soap Component

Ingredients:

[0061] 1 cup liquid soap (preferably unscented)

[0062] ¼ cup washing soda, mixed with ¼ cup of Borax

[0063] 1 gallon water, approximately, divided

[0064] Mixing container or laundry cleaner container to hold 1 gallon.

Example 5

Laundry Cleaner Mix with Powdered Soap Component

[0065] Ingredients:

[0066] ¼ cup powdered soap (preferably unscented)

[0067] ¼ cup washing soda, mixed with ¼ cup of Borax

[0068] Water, approximately 1 gallon, divided

[0069] Mixing container or laundry cleaner container to hold 1 gallon.

Example 6

Laundry Cleaner Mix with Powdered Soap Component Version 2

[0070] Ingredients:

[0071] ¼ cup powdered soap (preferably unscented)

[0072] ¼ cup washing soda, mixed with ¼ cup of Borax

[0073] Water, approximately 1 gallon, divided

[0074] Mixing container or laundry cleaner container to hold 1 gallon.

[0075] The laundry cleaners of Examples 4 through 6 may be mixed using the Methods 1, 2 or 3.

Examples 7

Laundry Cleaner Mix with Enzymes

[0076] Ingredients:

	1 Qt. Finished Quantity		
	Ex. 7.1	Ex. 7.2	Ex. 7.3
Water (g)	875	875	875
Borax (g)	11	11	11
Washing Soda (g)	17	17	17
Soap (g)	4	4	4
Powdered Enzyme (g)	12	6	0

Examples 8

Laundry Cleaner Mix with Enzymes

[0077] Ingredients:

	1 Qt. Finished Quantity			
	Ex. 8.1	Ex. 8.2	Ex. 8.3	Ex. 8.4
Water (g)	875	875	875	875
Borax (g)	22	11	11	22
Washing Soda (g)	17	34	17	34
Soap (g)	4	4	8	8
Powdered Enzyme (g)	6	6	6	6

[0078] Examples 7.1-7.3 and 8.1-8.4 illustrate laundry cleaner mixes that include one or more enzymes. The examples shown here are specific to the use of powdered enzymes such as "Clean Power", sold by Genencorp. The "Clean Power" product consists of a blend of protease and amylase. This blended enzyme, when used in the laundry cleaner mix, dissolves readily with the other components of the formulation.

[0079] The laundry cleaner mixes of Examples 7 and 8 may be mixed using either of the Methods 2 or 3.

[0080] The formulations described above were observed to dissolve easily in 10 minutes at water temperatures between 95-103 deg F.

Control

[0081] As a control, three laundry solutions were prepared using different soap products. Each of Fels Naptha, Ivory, and all-natural soap (made from olive oil, water, lye, palm oil, coconut oil and shortening) were grated using a Zyliss Rotary Cheese Grater, having a grating drum to produce finely grated cheese. As noted in the table that follows, the all-natural soap produced particles with a longest dimension no longer than 2 mm, and a narrow dimension typically smaller than 1 mm. In contrast, the Fels Naptha and Ivory soaps produced longer particles of soap when grated, with lengths more commonly up to lcm and widths of about 1 mm. The all-natural soap could not be grated into larger particles; even when prepared with a coarse grater the all-natural soap produced particles with no dimension larger than 2 mm, and most particles with no dimension larger than 1 mm.

[0082] To produce the control liquid laundry cleaners, 3 clean glass quart-size Mason jars were used. To each jar were added 11 g of Borax, 17 g of Washing Soda, and 2 g of the grated soap (all-natural, Fels Naptha, or Ivory). These dry constituents were dissolved by adding approximately 2 cups of warm tap water (109-110 deg F.) to each Mason jar, capping and shaking each jar for 15 seconds. The Mason jars were opened, with enough warm tap water added to fill each jar to within 1 inch of the top. The jars were recapped and each shaken again for 10 seconds. The laundry cleaning solutions were allowed to rest for 10 minutes, then observed to note the dissolution and mixing of the liquids. The results are listed in the table that follows. As noted in the table, all of the solutions had some undissolved Borax, resulting from clumps of dry Borax that were not broken up prior to mixing. While the finely grated all-natural soap was fully dissolved after ten minutes, both the Fels Naptha and Ivory soaps remained undissolved, with the particles of soap floating on the surface of the laundry cleaner solutions. The three jars of laundry cleaner were recapped and each shaken for 15 seconds, then allowed to rest for another 10 minutes. After this second ten minute period, more of the Borax had dissolved, but the Fels Naptha and Ivory soaps remained floating on the surfaces of the cleaning solutions.

Soap	Notes
All-Natural: grated soap particles were 2 mm max in length, with all smaller than 1 mm in width; most were smaller. Soap has a dry, powdery feeling.	Soap and other ingredients completely dissolved after 10 minutes, except large clumps of Borax that were not previously broken apart.
Ivory: grated soap particles were up to about 1 cm in length, and up to 1 mm in width. Soap has a moist and waxy feeling; a softer soap relative to the all-natural.	Soap was not completely dissolved - still see the soap pieces floating on top of the solution. All other ingredients dissolved, except large clumps of Borax that were not previously broken apart.
Fels Naptha: grated soap particles were up to about 1 cm in length, and up to 1 mm in width. Soap has a waxy feeling; a softer soap relative to the all-natural, but not as moist relative to the Ivory.	Soap was not completely dissolved - still see the soap pieces floating on top of the solution. All other ingredients dissolved, except large clumps of Borax that were not previously broken apart.

[0083] Having thus described several embodiments of the claimed invention, it will be apparent to those skilled in the art that the foregoing detailed disclosure is intended to be presented by way of example only, and is not limiting. Various

alterations, improvements, and modifications will occur and are intended to those skilled in the art, though not expressly stated herein. These alterations, improvements, and modifications are intended to be suggested hereby, and are within the spirit and the scope of the claimed invention. Additionally, the recited order of the mixing procedures is not intended to limit the claimed processes to any order except as may be specified in the claims. Accordingly, the claimed invention is limited only by the following claims and equivalents thereto.

1. A laundry product comprising one or more containers of concentrated, premeasured, ready-to-mix constituents that are mixed without the use of heat to yield a container of dilute liquid laundry cleaner.

2. The laundry product of claim **1** wherein the one or more containers of concentrated, premeasured, ready-to-mix constituents comprises at least one constituent selected from the group consisting of dry constituents, liquid constituents or combinations thereof.

3. The laundry product of claim **1** wherein the one or more containers of concentrated, premeasured, ready-to-mix constituents comprises one or more envelopes and/or pouches containing ⅛-2 cups of dry laundry cleaning constituents.

4. The laundry product of claim **1** wherein the one or more containers of concentrated, premeasured, ready-to-mix constituents comprises one or more containers holding ⅛-2 cups of liquid laundry cleaner constituents.

5. The laundry product of claim **1** wherein the one or more containers of concentrated, premeasured, ready-to-mix constituents comprises one or more containers holding ⅛-2 cups of liquid and dry laundry cleaner constituents.

6. The laundry product of claim **1** wherein the constituents include Borax.

7. The laundry product of claim **1** wherein the constituents include washing soda.

8. The laundry product of claim **1** wherein the constituents include powdered soap.

9. The laundry product of claim **1** wherein the constituents include powdered soap with soap particles that have no physical dimension larger than 2 mm.

10. The laundry product of claim **1** wherein the constituents include liquid soap.

11. The laundry product of claim **1** wherein the constituents include one or more enzymes.

12. The laundry product of claim **1** wherein the constituents include at least one member selected from the group consisting of anionics, nonionics, soap, phosphate, zeolite, Na-carbonate, copolymers, citrate, PBS-4, PCS, TEAD, Na-Sulfate, silicates, perfumes, and dyes.

13. A laundry product comprising one or more containers of concentrated, premeasured, ready-to-mix constituents that are mixed without the use of heat to yield a container of dilute liquid laundry cleaner, wherein said one or more constituents comprises at least one natural soap and at least one enzyme.

14. A laundry product kit comprising a ready-to-mix laundry cleaner concentrate and a laundry cleaner container in which to mix the laundry cleaner concentrate.

15. The laundry product kit of claim **14**, wherein said ready-to-mix laundry cleaner concentrate comprises one or more envelopes and/or containers of laundry cleaner constituents.

16. The laundry product kit of claim **14**, wherein said ready-to-mix laundry cleaner concentrate comprises laundry cleaner constituents that include one or more enzymes.

17. The laundry product kit of claim **14**, wherein the interior of the laundry cleaner container has structured surfaces.

18. The laundry product kit of claim **14**, wherein the interior of the laundry cleaner container has a mesh surface.

19. The laundry product kit of claim **14**, wherein the interior of the laundry cleaner container has a mesh surface spanning at least part of the width of the laundry cleaner container.

20. The laundry product kit of claim **14**, wherein the interior of the laundry cleaner container has a mesh surface with openings that are 2 mm-10 mm along their smallest dimension.

21. A laundry container comprising interior structured surfaces for mixing a ready-to-mix laundry cleaner concentrate.

* * * * *