April 21, 1953 D. F. JURGENSEN, JR., ET AL 2,636,007

DETERGENT PACKAGE AND METHOD OF MAKING SAME

Filed Sept. 8, 1948

FIG. 2

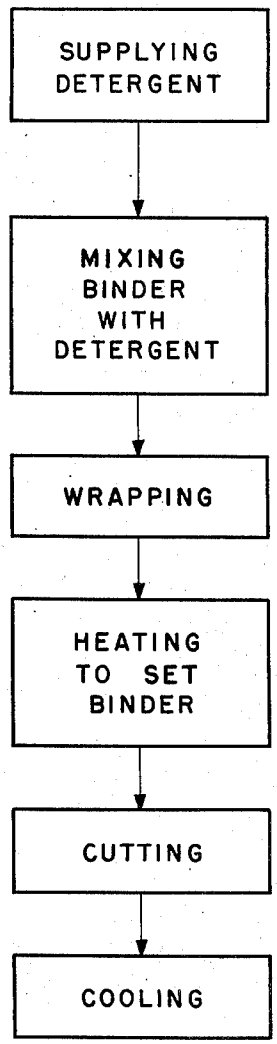
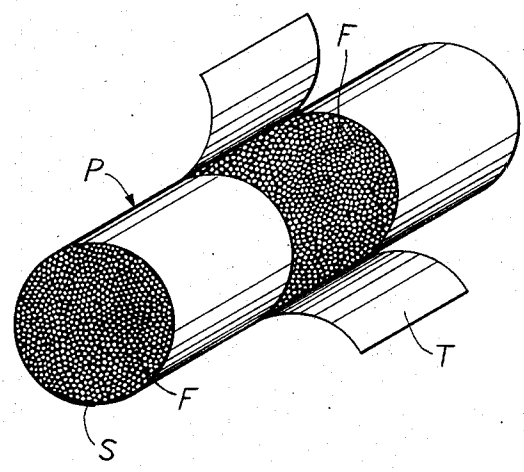


FIG. 1



INVENTOR
DELBERT F. JURGENSEN JR.
JOHN A. ABBOTT JR.
BY George S. Hastings
ATTORNEY

Patented Apr. 21, 1953

2,636,007

UNITED STATES PATENT OFFICE

2,636,007

DETERGENT PACKAGE AND METHOD OF MAKING SAME

Delbert F. Jurgensen, Jr., Tuckahoe, and John A. Abbott, Jr., Brooklyn, N. Y., assignors to American Machine & Foundry Company, a corporation of New Jersey

Application September 8, 1948, Serial No. 48,233

12 Claims. (Cl. 252—93)

1

This invention relates to detergent or soap packages suitable for use in a single washing operation and comprising particles of a suitable detergent enclosed in a wrapper which is readily disintegratable in water during the washing operation, and also to improvements in the manufacture of such packages.

One of the main objects of this invention is to provide a package of this type wherein the soap or other detergent particles are bonded together to form a coherent mass which can be handled conveniently.

A further object of this invention is to provide a package of this type having open ends from which particles of the soap or other detergent will not sprinkle out.

Another object of the invention is to bond the detergent particles together with a binder which will be readily dispersed in water during the washing operation, because of its friable nature.

Still another object of the invention is to bond the particles together with a binder distributed throughout the detergent particles in the package whereby upon heating the packages by baking them, or otherwise, the binder will be activated and caused to set. Upon cooling the packages the binder will unite the detergent particles in a firm coherent but friable mass, wherefore the package can be handled conveniently.

A further object of the invention is to prevent loosening of the detergent particles adjacent the ends of the packages when the packages are cut from a rod consisting of a tubular wrapper filled with a mixture of the detergent particles and the binder. These and other objects not specifically mentioned may be realized by the package and processes which will be hereinafter described.

In the accompanying drawings which form a part of this specification:

Fig. 1 is a perspective view of a package embodying our invention; and

Fig. 2 is a flow sheet of a suitable method for making the same.

Referring to Fig. 1 of the drawings, it will be seen that the package P has a tubular wrapper with open ends and a filler F consisting of detergent particles bonded together by a suitable binder. The wrapper T may be formed of any suitable paper or other material which is readily disintegratable in water, such as toilet paper or cigarette paper. It will be noted that the longitudinal edges of the wrapper T are overlapped to form a seam S. A portion of the wrapper T is shown opened up in Fig. 1 to expose the underlying portion of the filler F. Preferably the dimensions of the package are such that a single washing operation may be performed with the amount of material therein.

2

The package may be formed by any suitable sequence of steps or operations. The sequence of operations indicated by the various legends in Fig. 2 may be used.

Supplying detergent

The first operation is indicated in Fig. 2 by the legend "Supplying Detergent." Any suitable detergent or detergent mixture such as granulated soap, soap flakes, soap powder, or a synthetic detergent may be used. We prefer to use soap granules of the type which are sold by Procter & Gamble, Cincinnati, Ohio, under the trade names of "Ivory Snow," although any other suitable type of soap such as "Ivory Flakes," "Oxydol," "Rinso," and "Duz" may be used. Examples of suitable synthetic detergents are "Nacconal NR" (retailed as "Swerl") which consists chiefly of sodium salts of alkyl aryl sulfonates (the composition of Swerl being described in Patents 2,364,767, 2,387,575 and 2,393,526); "Vel," which comprises acyl-glyceryl monosulfates and whose general composition is described in Reissue Patent 20,626; and "Dreft," which comprises sodium alkyl sulfates and whose general composition is described in Patent 1,968,793–1,968,797 inclusive, 1,993,431, 2,046,242, 2,256,877, and 2,264,737. Synthetic detergents are marketed in the bead (spray dried) or flake (drum dried) form. For our purposes the bead form of synthetic detergent is preferable, because it packs more easily and is generally more quickly soluble than the flake form. It may be noted that "Dreft," "Swerl" and "Vel" are manufactured in the bead form.

Mixing binder with detergent

The next operation is indicated by the legend in Fig. 2 as "Mixing Binder with Detergent." For this purpose a small percentage of a suitable low-melting compound or other binding material may be incorporated by mixing it into the detergent. A fusible material having a melting point between approximately 125° and 400° F. would be desirable as a binder, since the binder must not fuse at temperatures which may be encountered in normal storage (say 125° F.) and must fuse at temperatures below the charring point of the various materials present in the package. Suitable binders for this purpose are:

(1) Waxy materials.

(2) Resins (thermosetting or thermoplastic).

(3) Drying oils.

Any waxy material which can be powdered and has the required melting point can be used provided it is not injurious. Examples of suitable waxy materials are stearic acid, candelilla wax, montan wax, glycerylmonostearate, and "Be Square" wax made by Bareco Oil Company and powdered by the Industrial Raw Material Company, New York, N. Y., this material being a water dispersible petroleum base wax having a melting point between 190° and 195° F. We prefer to use stearic acid as a binder, because we have found it to give good results. A 10% concentration of stearic acid (—40 mesh size) mixed with "Ivory Snow" produced a satisfactory filler when it was wrapped and the binder was fused, as hereinafter described. A concentration of 5% stearic acid with "Ivory Snow" produced a reasonably good filler.

The best results with stearic acid as a binder are obtained by using —100 mesh size thereof. This mesh size produces greater stability of the filler enclosed within the wrapper after the same has been formed by fusing the binder subsequent to incorporation thereof in the detergent particles, eliminates the gritty feel on washing, and causes less discoloration of the paper used for the wrapping material. However, coarser mesh sizes of stearic acid, such as the —40 mesh size mentioned above, are suitable for the binder. With a concentration of 2½ to 20% of stearic acid as a binder with "Ivory Snow" the filler when enclosed in the wrapper, will have greater stability and will not disperse too slowly during the washing operation.

Stearic acid may also be used as a binder for other detergents besides "Ivory Snow" including the various granulated soaps or synthetic detergents in bead or flake form, which are enumerated above, or any other suitable detergent. When stearic acid is used as a binder for "Dreft" in a concentration of 2½ to 20%, or in a concentration of 5 to 50% with "Swerl," the filler after being encased in the wrapper and the fusion of the binder will have greater stability and will not disperse too slowly during the washing operation.

Examples of suitable thermosetting resins are "Bakelite 2220–148," a phenol-formaldehyde resin manufactured by the Bakelite Corporation; melamine resin manufactured by the American Cyanamide Company; and "Uformite," a urea-formaldehyde resin manufactured by the Resinous Products and Chemical Company. These binders in a 10% concentration with "Ivory Snow" produced a product which was not quite as stable as that produced with stearic acid. A further example of a suitable thermosetting resin which sets at a relatively low temperature and is suitable for use as a binder is "Hyten" Core Binder manufactured by the Houghten Company. When 20% of this binder in the form of a fine powder was mixed with "Ivory Snow" and heated a filler having satisfactory properties was obtained.

Rosin and "Truline Binder" (a modified rosin manufactured by Hercules Powder Company are examples of thermoplastic binders which are suitable for use with various detergents.

Any suitable drying oil may be used as a binder. When linseed oil was sprayed on "Ivory Snow," and the resulting product was dried in an oven at 150° F., a filler having increased stability was obtained, and its washing properties were quite satisfactory. It will be understood that other drying oils such as tung oil may be used.

If powdered binder material is used it can be blended with the detergent particles in any suitable equipment commonly used for mixing dry, pulverized materials, e. g. a McClellan mixer.

If a waxy or other type of material which cannot be reduced to a powdered form conveniently, such as paraffin, or a liquid or a low-melting compounds, such as stearic acid or a thermoplastic resin, is to be used as a binder for the detergent particles, it may be fused or dissolved in a solvent and sprayed in liquid form on to the detergent particles. In one case "Ivory Snow" was sprayed with melted paraffin having a melting point of 140° F., using a hand-operated spray gun. When the "Ivory Snow" was wrapped after spraying, and heated to set the binder, it was found that there was only a very slight sprinkling from the open ends of the wrapper when the package was dropped on the floor. Moreover, the washing properties of the "Ivory Snow" were satisfactory.

In two other cases two different grades of paraffin having melting points of 140° F. and 156° F., respectively, were sprayed on to "Ivory Snow" in a tumbling conical mixer of the general type shown in the co-pending application of Jack Sandler, Serial No. 642,382, now Patent No. 2,477,009 issued July 26, 1949 and commonly known as a Hungerford Plasti-maker. This type of mixer has a spray nozzle extending into the center of the barrel through a hollow bearing shaft, and the spray is turned on intermittently while the material to be coated is tumbled in the barrel. The material so sprayed was packed in a tubular wrapper in the manner hereinafter described. The filler in the packages so produced tended to sprinkle only very slightly through the open package ends, and dispersed very well during washing following heating to set the binder.

Wrapping

A third step in the sequence of operations is indicated in Fig. 2 by the legend "Wrapping." This operation may be performed by manually packing the mixture of detergent and binder with a round rod into a preformed tube which may be formed of cigarette paper, or other suitable material which is readily disintegratable in water during the washing operation, until the tube is filled.

When powdered stearic acid is used as a binder with "Ivory Snow" or "Dreft," it is preferred to pack the mixture of detergent and binder into the tube until a density of 0.25–0.45 gram per cubic centimeter is obtained. With this range of densities the filler will not disperse too slowly during the washing operation. The same is true if a density of 0.10–0.30 gram per cubic centimeter is provided when powdered stearic acid is used as a binder for "Swerl."

Heating to set binder

The filled tube may be heated in an oven, or in any other suitable manner, to a temperature at which the particular binder material used will be set sufficiently to unite the detergent particles into a firm coherent but friable mass.

When a concentration of 15% powdered stearic acid was used as a binder with "Ivory Snow," "Vel," "Dreft," or "Swerl" as a filler for the package, sufficient setting of the binder was obtained by heating in an oven at 200° F. for approximately four minutes. Moreover, when hot air was circulated at a temperature of 300° F. through the oven the binder in an "Ivory Snow" stearic acid mixture was properly set in 45 seconds. Temperatures much above 300° F. should preferably not be used to set the stearic acid

binder because the filler would tend to shrink away from the wrapper. The packages so formed with "Ivory Snow" and "Dreft" were quite stable and it was possible to drop them on the floor repeatedly without damaging them.

Powdered rosin (—100 mesh in 5% and 10% concentrations was used with various detergents. The same procedure was used in making packages with a rosin binder. The filled tubes were heated at 250° F. in an oven, since rosin melts at approximately 200° F., for approximately four minutes. The packages made were entirely satisfactory even when as little as 5% rosin was used as a binder.

If desired, only the ends of the detergent-binder filler need be heated to form a seal. For this purpose, the ends of a tube filled with a Dreft-stearic acid filler were heated by pressing against a flat surface heated to a temperature of 212° F. A satisfactory sealing of the ends of the package was thereby obtained.

If desired, the binder may be omitted in the filler of the tube and packages of a predetermined length may be cut therefrom by a hot knife, or by applying a flat hot surface to the ends of the packages to fuse the filler in the ends thereof, or by exposure thereof to infra-red heat, to thereby form a heat sealed film. Packages containing "Dreft" and "Swerl" were sealed satisfactorily in this manner.

Cutting

It is preferred to cut packages P of a predetermined length suitable for a single washing operation with a hot knife from a tube formed of toilet paper, cigarette paper or other suitable wrapping material, and filled with the detergent-binder mixture while hot after the baking operation. It has been found that when the cutting operation is performed at this time sprinkling of the detergent particles from the ends of the package is minimized. It appears that if the package is cut while the filler is cold that the granules in the ends thereof are loosened. The packages may be severed with a cold knife while the filler is still hot to minimize the tendency to sprinkle out of the ends.

However, equally good results may be obtained if the cold packages are cut to the required length by a heated knife, although the filler is unheated. Moreover, when a thermoplastic binder is used, the mixture of detergent and binder particles may be heated to fuse the binder before enclosing the filler in the wrapper and the step of baking the filled tube may be omitted. The packages may be severed from the tube so formed while the filler is still hot whereby loosening of the granules in the package ends will be avoided and sprinkling from the package ends will be minimized. By heating the detergent-binder mixture before enclosing it in the wrapper a further advantage results in that the paper tube will be less permeated with molten binder which would cause a flecked appearance of the tube.

Cooling

After a package P of a predetermined length suitable for a single washing operation has been cut from a tube filled with a hot detergent-thermoplastic binder mixture whose binder has been fused, it is cooled to room temperature to solidfy the binder. Thus the detergent particles will be held together by the binder in a firm coherent mass which will not disintegrate upon handling.

When used for washing the hands the detergent package P is moistened with water while held in the user's palms. The package is then quite friable and the wrapper T and the binder disintegrate rapidly under the influence of water and pressure, releasing the detergent particles for the washing operation.

It will be understood that various changes can be made in the construction of the package described above and the methods described for manufacturing the same within the scope of the appended claims. It is intended that all matter contained in the above description or shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense except to the extent such limitations are imposed by the appended claims.

What is claimed is:

1. A detergent package which is suitable for a single washing operation and comprises a tubular wrapper which has open ends and is readily disintegratable in water during washing, a quantity of detergent particles filling said wrapper, and a fused binder mixed with said detergent particles and retaining them in a firm coherent mass the proportion of binder to soap being such that sprinkling of the detergent particles from the open ends of the wrapper will be prevented and the wrapper and said coherent mass of detergent binder particles will be readily disintegrated in water to release the detergent particles during washing.

2. A detergent package which is suitable for a single washing operation and comprises a tubular wrapper which has open ends and is readily disintegratable in water, a quantity of detergent particles filling said wrapper, and a quantity of powdered thermo-setting resin dispersed throughout said detergent particles, the proportion of said resin to said detergent particles being sufficient when fused therewith to form a firm friable mass readily disintegratable in water, the resin particles being set to retain the detergent particles in a firm quickly friable mass whereby the wrapper and the thermo-setting resin will be disintegrated to release the detergent particles during the washing operation.

3. A detergent package which is suitable for a single washing operation and comprises a tubular wrapper which has open ends and is readily disintegratable in water during washing, a quantity of detergent particles filling said wrapper, and a quantity of thermoplastic resin particles dispersed throughout said detergent particles, the resin particles being set to retain the detergent particles in a firm quickly friable mass which will be disintegrated to release the detergent particles during the washing operation.

4. A detergent package which is suitable for a single washing operation and comprises a tubular wrapper which has open ends and is readily disintegratable in water during washing, a quantity of detergent particles filling said wrapper, and a quantity of powdered rosin dispersed throughout said detergent particles, the rosin being set to retain the detergent particles in a firm quickly friable mass which will be disintegrated to release the detergent particles during the washing operation.

5. A detergent package which is suitable for a single washing operation and comprises a tubular paper wrapper which has open ends and is readily disintegratable in water during washing, a quantity of detergent particles filling said wrapper, and a quantity of resin particles dis-

persed through the detergent particles and set to retain the detergent particles in a firm quickly friable mass which will be readily disintegrated to release the detergent particles during the washing operation.

6. A detergent package which is suitable for a single washing operation and comprises a tubular paper wrapper which has open ends and is readily disintegratable in water, a quantity of detergent particles filling said wrapper, and a quantity of drying oil sprayed on the detergent particles and sufficiently polymerized to retain the same in a firm quickly friable mass which will be readily disintegrated to release the detergent particles during the washing operation.

7. The process of manufacturing detergent packages suitable for a single washing operation comprising forming a package comprising a tubular wrapper which has open ends, and a mixture of detergent particles and a sufficient fusible binder to form a coherent friable mass with said detergent particles when fused enclosed within said wrapper, heating said package adjacent the ends thereof only to fuse the binder therein at the package ends whereby upon cooling of the packages the detergent particles will be sealed at the package ends.

8. The process of manufacturing detergent packages comprising mixing sufficient fusible binder to form a coherent friable mass with said detergent particles when fused with a supply of detergent particles; heating the mixture so formed to fuse the binder; enclosing the heated mixture in a tubular wrapper, which is readily disintegratable during washing, to form a rod; and severing detergent packages of a predetermined length from said rod while said mixture is still hot whereby upon cooling of said packages the detergent particles therein will be united in a firm coherent mass which will be readily disintegrated to release the detergent particles during washing.

9. The process of manufacturing detergent packages having an opening therein comprising forming packages comprising a water friable wrapper a mixture of detergent particles and sufficient binder to form a coherent friable mass with said detergent particles when fused, and heating said packages to set the binder therein to unite the detergent particles in a firm coherent and friable mass.

10. The process of manufacturing detergent packages comprising forming a rod comprising a tubular wrapper with a mixture therein of detergent particles and sufficient binder to form a coherent friable mass with said detergent particles when fused, cutting sections of predetermined length from said rod, and heating said sections to set the binder therein whereby upon cooling of said sections the detergent particles will be united in a firm coherent friable mass which can be conveniently handled.

11. The process of manufacturing detergent packages which comprises packing in a wrapper having at least one opening therein a mixture of detergent particles and sufficient binder to form a coherent friable mass with said detergent particles when fused, which is readily disintegratable during washing, until the density of the mixture packed in the tubular wrapper is between approximately 0.25–0.45 gram per cubic centimeter, and heating the package so formed to set the binder whereby upon cooling of said mixture the same will form a firm coherent mass which will be readily disintegrated during the washing operation to release the detergent particles.

12. A detergent package having an opening therein which is suitable for a single washing operation and is readily disintegratable in water, comprising a mixture of detergent particles and a fused binder within a water friable wrapper, the proportion of binder to detergent particles being sufficient to form with said detergent particles a coherent friable mass within said wrapper, whereby same may be conveniently handled and sprinkling of the detergent particles from said wrapper will be prevented.

DELBERT T. JURGENSEN, JR.
JOHN A. ABBOTT, JR.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
270,998	Taylor	Jan. 23, 1883
1,077,835	Kelly	Nov. 4, 1913
1,436,928	Zink	Nov. 28, 1922
1,746,984	Bausch	Feb. 11, 1930
1,948,570	Ferenci	Feb. 27, 1934
2,251,080	Taber	July 29, 1941
2,291,079	Hofferbert	July 28, 1942
2,329,694	Bodman	Sept. 21 1943
2,389,736	Muise	Nov. 27, 1945
2,456,437	Miles	Dec. 14, 1948
2,539,395	Banks	Jan. 30, 1951
2,553,513	Denison	May 15, 1951

FOREIGN PATENTS

Number	Country	Date
290,221	Great Britain	Sept. 13, 1928
576,100	Great Britain	Mar. 19, 1946