

April 21, 1953

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2,636,008

DETERGENT PACKAGE AND METHOD OF MAKING SAME

Filed Sept. 3, 1949

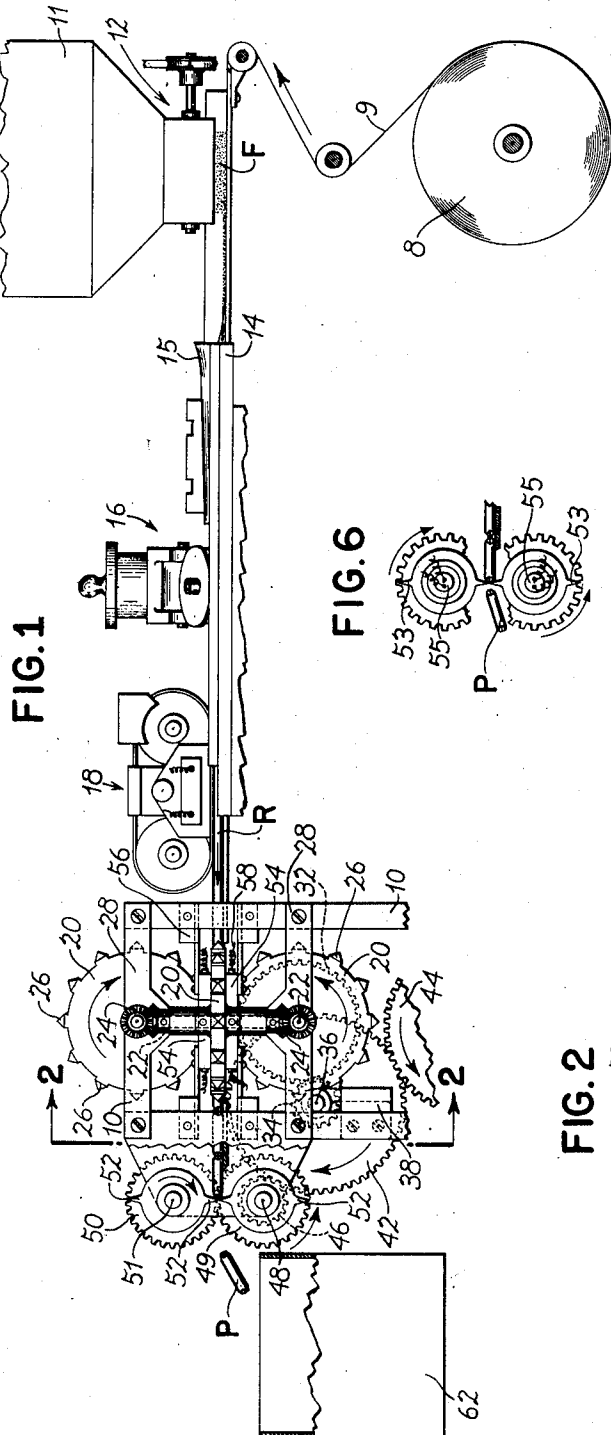


FIG. 1

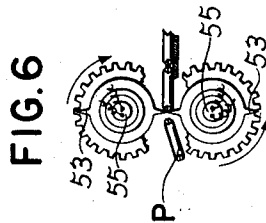


FIG. 5



FIG. 4

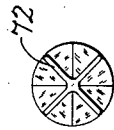


FIG. 3

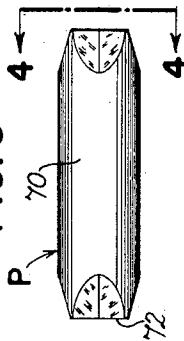
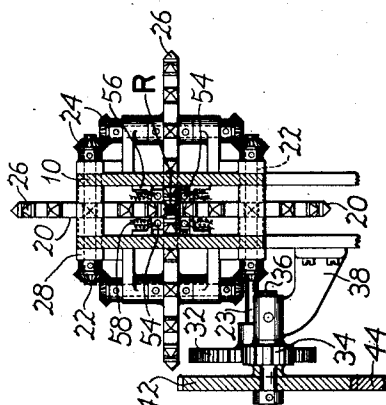


FIG. 2



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## UNITED STATES PATENT OFFICE

2,636,008

## DETERGENT PACKAGE AND METHOD OF MAKING SAME

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Application September 3, 1949, Serial No. 114,042

22 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 tubular wrapper or rod which is readily disintegratable in water during the washing operation, and also to a process for manufacturing such packages.

It may also be used for wrapping other granulated materials of generally similar characteristics, particularly for single portions of such materials that are dispersed in liquids when utilized.

Materials such as soap have heretofore been prepared in various packages for individual use, but almost without exception the soap has been in a bar or pellet form. These small pieces when wet are slippery and hard to retain in the hands of the user, and require considerable effort to produce lather, nor can the hard pellets be crushed in the hand.

Individual packages containing pulverized soap have been made. These require sturdy wrappers not readily disintegratable in water. Such packages have not proved adaptable to volume production exceeding 200 per minute.

The use of a binder presents many difficulties. As the relative amount of binder is increased the package becomes sturdier but less friable.

Modern cigarette machines produce at a rate in excess of 700 per minute. Efforts to produce "a soaprette" on a cigarette machine disclosed many difficulties heretofore considered insurmountable. The particles of a granulated soap do not adhere well to one another and, therefore, "sprinkle" from the open ends. Known methods for sealing the ends of cigarettes are slow and defeat the original reason for selecting a cigarette-type wrapper. Besides this time factor, a further problem is to provide a terminal seal, the whole of which is readily disintegratable in water.

The triple requirements of a detergent package, (1) sturdy for handling, yet (2) readily disintegratable in water, and (3) adaptable to high speed volume production, have heretofore presented an unsolved dilemma.

In order to accomplish these and other objects, we have invented an end-sealed package suitable for a single washing, disintegratable in water, sturdy for handling and adaptable to high speed volume production.

One of the main objects of this invention is to provide a package of this type whereby the ends are closed in an X or Y shaped form resembling a "bomb-tail" to firmly enclose the detergent particles for convenient handling without employing a sealed binder.

A further object of the invention is to prevent the loosening of the closed ends of the wrapper when the packages are cut from a rod consisting of a tubular wrapper filled with the particles of detergent.

2

Another object of the invention is to bond the flutes or ends of the wrapper together whereby the application of heat will activate and set the binder. Upon cooling the packages, the binder will unite the edges of the flutes in an effective sealing, wherefore the package can be handled conveniently.

Still another object of the invention is to provide a method suitable for larger volume production of such packages at a rate of 600 to 700 per minute rather than 50 to 200 per minute.

These and other objects not specifically mentioned will be apparent from the package and process for making it hereinafter described.

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

Fig. 1 is a side elevation of an apparatus embodying means for producing the package;

Fig. 2 is a sectional end elevation of the same taken on line 2-2 of Fig. 1;

Fig. 3 is a side or longitudinal view of a package with X-shaped ends;

Fig. 4 is an end view of the same taken on line 4-4 of Fig. 3;

Fig. 5 is an end view of a package with Y-shaped ends, and

Fig. 6 is a side elevation of an alternative cutting element of an apparatus embodying means for producing the package.

Referring to the drawings, the rod is formed as follows: A spool 8 feeds a continuously moving web 9 to a conveying belt (not shown) of the type employed on a conventional cigarette machine. A hopper 11 contains a mixture of detergent and binder hereinafter described. A feed regulator 12 of any suitable design deposits a predetermined flow of mix F onto the continuously moving web 9. The paper and detergent then pass through folder bottom 14 and tongue 16 which forms a rod in a similar fashion as that of a cigarette rod. Preferably this rod is circular in cross-section but good results may be obtained with one oval or rectilinear in cross-section. In the appended claims the words "tubular" or "tube-like" are intended to have this broader meaning and is not limited only to tubes circular in cross-section.

A paster 16 of conventional design applies glue to seam of said rod which is then dried and sealed by heat sealing unit 18. The rod R is thus formed and then advanced to the crimping and cutting process.

In order to crimp and seal the ends in spaced "bomb-tail" formation, a heating element 54 is secured to frame 10 of the apparatus by brackets 56. A resistance coil 58 passes through said heating element 54. This heating element 54 activates the binder in the detergent mix so that when the pyramidal studs 26 on the wheels 20 crimp the advancing rod the binder sets and seals the inner folds of the "bomb-tail."

The crimping wheels 20 are securely mounted

on shafts 22. Pyramidal studs or dies 26 are secured at regular intervals on the circumference of said wheels 20, or, if desired, they may be an integral part thereof. Shafts 22 are journaled in lugs 28 which are secured to frame 10. Bevel gears 24 are rigidly mounted on the ends of shafts 22. Two pairs of wheels 20 are positioned at right angles to each other as shown in Fig. 2 so that the beveled gears 24 mesh in such a manner that the corresponding apexes of the studs 26 of each wheel 20 are aligned to approach each other simultaneously.

The drive for the crimping wheel includes a gear 32 secured to an extended portion 23 of the shafts 22 of one of the wheels 20 and meshes with gear 34 which is loosely mounted on shaft 36.

Shaft 36 is rigidly held in bracket 38 which is securely bolted to frame 10. A large gear 42 attached to the hub of gear 34 meshes with driving gear 44 of the main drive of the cigarette machine. Gear 42 also drives a gear 46 mounted on a shaft 48 to which is secured another gear 49 meshing with a gear 50 on a shaft 51. Shafts 48 and 51 furthermore carry a pair of suitable rotating knives 52 employed to sever the individual packages from the continuous rod R in the center of the crimp provided by the crimper studs 26 of wheels 20. The completed packages then tumble to receptacle 62 or other suitable conveying means.

An alternative sealing and cutting construction is illustrated in Fig. 6 wherein there is provided knives 53 constructed similarly to knives 52. Knives 53 are provided with a heating element 55. Knives 53 then perform the double function of severing the crimped rod into individual packages and simultaneously fusing the binder in the crimped portion. This method dispenses with the necessity for heating element 54 which may thus be omitted.

The detergent powder in mixture F may be composed of any suitable detergent such as granulated soap, soap flakes, soap powder or a synthetic detergent. We prefer to use soap granules of the type sold by Procter & Gamble, Cincinnati, Ohio, under the trade name of "Ivory Snow," although many other suitable types may be used, such as "Ivory Flakes," "Oxydol," "Rinso," and "Duz." Examples of suitable synthetic detergents are "Nacconal NR" (retailed as "Swirl"), and "Dreft."

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 dispersible than the flake form. It may be noted that "Dreft" and "Swirl" are manufactured in the bead form.

For a binder a fusible material having a melting point between approximately 125° and 400° F., or a material which sets below 400° F., is desirable since the binder must not fuse at temperatures which may be encountered in normal storage (say 125° F.) and must fuse or set 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, (3) drying oils. Examples of suitable waxy materials are stearic acid, candle-lilla wax, montan wax and glycerylmonostearates.

We prefer to use stearic acid as a binder, which provides good results.

A 2% to 20% concentration by weight of stearic acid mixed with "Ivory Snow" produced a satisfactory filler resulting in an excellently

sealed bomb-tail package readily distintegratable in water. We prefer with "Ivory Snow" a 10% concentration by weight of stearic acid in granular form preferably around —100 mesh.

Stearic acid is also found to be a suitable binder for other detergents besides "Ivory Snow," including granulated soaps or synthetic detergents in bead or flake form. However, the percentage concentration varies somewhat with the detergent used, as for example 5–50% concentration suitable with "Swirl."

The four desirable qualities for suitable binder are:

- (1) Have a melting or setting point 125–400° F.;
- (2) Be non-toxic, non-caustic, non-irritant to skin;
- (3) Be chemically stable;
- (4) Form with detergent substances mixtures which are dispersible in water.

Stearic acid, though insoluble in water, still meets all these requirements. Actual use with detergents demonstrated that a mixture in which the stearic acid is in low concentration is readily disintegratable in water, no appreciable residue of the sealed bomb-tail flutes remaining during the washing operation.

It is thus apparent that the crimped ends of the packages are effectively sealed, preventing leakage of the detergent mix.

Figs. 3 and 4 of the accompanying drawings illustrate the product formed by this process. The wrapper 70 composed of a substance which is readily disintegratable in water, such as paper or water soluble plastic film encases the detergent powder. The ends of the package are crimped to form a closure consisting of two pairs of folds or vanes 72. The folds 72 are heat-sealed or glued together on their inner faces in a fashion resembling the flutes of a bomb.

Fig. 5 illustrates another embodiment of our invention wherein three flutes are similarly formed and sealed providing a Y-shaped bomb-tail 74 rather than the X-shaped form above described. Binder, of course, may be omitted provided the contents of the package is sufficiently thermoplastic to form a seal as with a high moisture content (low melting point) granulated soap. It is well known that most particulate soaps have a very low moisture content and will char before they will melt. Accordingly, binder is generally required.

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 we claim is:

1. A detergent package which is suitable for a single washing and comprises a tubular wrapper readily disintegratable in water during washing; a quantity of detergent particles filling said wrapper; an end closure on said tubular wrapper, said end closure comprising spaced fluted sealed folds resembling the fluted appearance of a bomb-tail; and a fusible binder mixed with said detergent particles and fused along the inside of said fluted folds to form a seal whereby sprinkling of the detergent particles from the wrapper will be prevented and the wrapper and said binder will

5

be readily disintegrated in water to release the detergent particles during washing.

2. A detergent package which is suitable for a single washing and comprises a tubular wrapper readily disintegrable in water during washing; a quantity of detergent particles within said wrapper; a crimped end closure at each end of said tubular wrapper, said end closure comprising a plurality of crimped folds; and a fusible binder mixed with said detergent particles, said binder being fused within said folds to retain the detergent particles in a firm coherent mass and seal the inner folds of said crimped ends whereby sprinkling of the detergent particles through the ends of the wrapper will be prevented and the coherent mass of detergent and binder particles will be readily disintegrated in water to release the detergent particles during washing.

3. A detergent package which is suitable for a single washing operation and comprises a tubular wrapper readily disintegrable in water during washing; a quantity of detergent powder within said wrapper; an end closure at each end of said tubular wrapper, said end closure comprising spaced fluted sealed folds; and a quantity of waxy material having a melting point between approximately 125° and 400° F. dispersed through the detergent particles, the waxy material being fused in the said folds of said fluted ends to retain the detergent particles within the package whereby sprinkling of the detergent particles is prevented and the wrapper and said binder will be readily disintegrated in water to release the detergent particles during washing.

4. A detergent package which is suitable for a single washing operation and comprises a tubular wrapper readily disintegrable in water; sealed fluted ends on said tubular wrapper; a quantity of detergent particles filling said wrapper; and a quantity of powdered stearic acid dispersed through the detergent particles, the stearic acid being fused in the folds of said fluted ends to retain the detergent particles within the wrapper to prevent sprinkling during handling of the package and the stearic acid being readily disintegrable in water to release the detergent particles during washing.

5. A detergent package which is suitable for a single washing operation and comprises a tubular wrapper readily disintegrable in water during washing; a crimped end closure consisting of a plurality of folds; a quantity of detergent particles filling said wrapper; and a quantity of powdered stearic acid, having a mesh size between 50 to 200 mesh, dispersed through the detergent particles, said stearic acid being fused within said folds to retain the detergent particles in a firm coherent mass, and seal said inner folds of said crimped ends whereby sprinkling of the detergent particles through the ends of the wrapper will be prevented, so the stearic acid will be readily disintegrated during washing to release the detergent particles.

6. A detergent package which is suitable for a single washing operation and comprises a tubular wrapper readily disintegrable in water; a quantity of detergent particles filling said wrapper; a fluted end closure; and a quantity of powdered thermo-setting resin dispersed throughout said detergent particles, the resin particles being set within the inner folds of said fluted ends whereby the wrapper and thermo-setting resin will be disintegrated to release detergent particles during the washing operation.

7. A detergent package which is suitable for a

6

single washing operation and comprises a tubular wrapper readily disintegrable in water during washing; a quantity of detergent particles filling said wrapper; an end closure consisting of fluted folds; and a quantity of thermoplastic resin particles dispersed throughout said detergent particles, the resin particles being set to seal the detergent particles within the inner folds of said fluted ends, whereby said wrapper and said resin will disintegrate to release the detergent particles during the washing operation.

8. A detergent package which is suitable for a single washing operation and comprises a tubular wrapper readily disintegrable in water during washing, which tubular wrapper has sealed fluted ends; a quantity of detergent particles filling said wrapper; and a quantity of powdered rosin dispersed through said detergent particles, the rosin being set within the inner folds of said fluted ends whereby said rosin particles will be disintegrated to release the detergent particles during the washing operation.

9. A detergent package which is suitable for a single washing operation and comprises a tubular wrapper readily disintegrable in water, which tubular wrapper has crimped ends; 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 coherent mass within the inner folds of said crimped ends and which will be readily disintegrable in water to release the detergent particles during the washing operation.

10. A detergent package suitable for a single washing which comprises a tubular wrapper readily disintegrable in water; a quantity of detergent particles capable of being fused by heat enclosed within said wrapper; and a crimped end closure, said detergent particles being fused within the folds of said crimped end thereby effectively seaming said end.

11. A package suitable for a single washing comprising a water disintegrable tubular wrapper comprising a longitudinally sealed elongated rod, and a quantity of granulated detergent particles filling said wrapper; and end closure at each end of said tubular wrapper, said end closure comprising fluted sealed radial folds; and a fusible binder mixed with said detergent particles and fused within said fluted folds whereby sprinkling of the granulated particles from the wrapper will be prevented and the wrapper and said binder will be readily disintegrated in water to release the detergent particles.

12. The process of manufacturing detergent packages readily disintegrable in water and suitable for a single washing operation comprising forming a rod consisting of a tubular wrapper, a mixture of detergent particles including a fusible binder enclosed within said wrapper; crimping said rod and said mixture containing said binder at substantially equidistant points along said rod; heating the crimped portions to fuse a portion of said binder therein and thereby form a firm closure; and severing the rod at said crimped portions into individual end-sealed packages.

13. The process of manufacturing detergent packages readily disintegrable in water and suitable for a single washing operation comprising forming an elongated longitudinally sealed rod comprising a wrapper enclosing detergent and fusible binder mixed; constricting said rod radially at substantially equally spaced points

to bring together opposing portions of said wrapper with said binder to form the ends of a plurality of axially aligned connected package elements; applying heat to said constricted portions of said rod between said elements to fuse said binder and seal said end of said elements; and severing said heat-sealed elements at said heat-sealed portions thereby forming individual packages.

14. The process of manufacturing detergent articles comprising forming an elongated longitudinally sealed rod comprising a tubular wrapper, a detergent filler in said wrapper, a fusible binder dispersed through said detergent filler; crimping said rod at predetermined intervals to form substantial radial folds with binder therein; and severing individual detergent packages of a predetermined length from the rod with a hot knife whereby the binder will be fused within said radial folds and individual packages will be formed having a plurality of sealed radial folds on each end.

15. The process of manufacturing detergent packages readily disintegratable in water and suitable for a single washing operation comprising forming a longitudinally sealed rod comprising a circular tubular wrapper, a detergent filler within said wrapper and a fusible binder dispersed throughout said detergent; applying heat and pressure at substantially equally spaced points along the length of said rod to bring opposing portions of said wrapper with said binder into sealed relation with each other; and severing said rod at substantially the center of said sealed portions thereby forming individual end-sealed packages.

16. The process of manufacturing detergent packages readily disintegratable in water and suitable for a single washing operation comprising forming a longitudinally sealed rod comprising a tubular wrapper, a detergent filler within said wrapper and a fusible binder dispersed throughout said detergent; applying heat and radial pressure at substantially equally spaced points along the length of said rod to fold adjacent portions of said wrapper into sealed relation with each other to form radial flutes with fused binder therein; and severing said rod at substantially the center of said sealed portions thereby forming individual end-sealed packages.

17. The method of packaging powdered or granular detergent material which consists of incorporating a heat fusible sealing agent in said material; continuously forwarding a web of wrapping material; feeding a continuous stream of said material onto said wrapper; folding said wrapper in circular form about said stream to form a continuous wrapped rod of said material; radially crimping said rod and said material containing said fusible sealing agent at intervals to form radial pleats in the same; heating said pleats to fuse the sealing agent therein and thus form closures at intervals along the rod; and cutting the rod through said closures to form individual packages.

18. A detergent package suitable for a single washing which comprises a tubular wrapper readily disintegratable in water; a quantity of detergent particles enclosed within said wrapper, and a fusible binder mixed with said detergent particles; and a crimped end closure, said binder being fused within the folds of said crimped end thereby effectively sealing said end.

19. The process of manufacturing detergent

packages readily disintegratable in water and suitable for a single washing operation comprising, forming a rod consisting of a tubular wrapper and a detergent filler capable of being fused by heat enclosed within said wrapper; crimping said rod and said fusible filler at substantially equidistant points along said rod; heating the crimped portions to fuse a portion of said detergent therein and thereby forming a firm closure; and severing the rod at said crimped portions into individual end-sealed packages.

20. The process of manufacturing detergent packages readily disintegratable in water and suitable for a single washing operation comprising, forming an elongated longitudinally sealed rod comprising a wrapper enclosing a detergent filler capable of being fused by heat; constricting said rod radially at substantially equally spaced points to bring together opposing portions of said wrapper with said filler to form the ends of a plurality of axially aligned connected package elements; applying heat to said constricted portions of said rod between said elements to fuse said filler and seal said end of said elements; and severing said heat-sealed elements at said heat-sealed portions thereby forming individual packages.

21. The process of manufacturing detergent packages readily disintegratable in water and suitable for a single washing operation comprising, forming an elongated longitudinally sealed rod comprising a wrapper enclosing a detergent filler capable of being fused by heat; constricting said rod radially to bring together opposing portions of said wrapper with said filler to form an end closure; and applying heat to said constricted end portions of said rod to fuse said filler and seal said constricted opposing portions.

22. The process of manufacturing detergent packages readily disintegratable in water and suitable for a single washing operation comprising, forming a rod consisting of a tubular wrapper, a mixture of detergent particles including a fusible binder enclosed within said wrapper; crimping said rod and said contained mixture at substantially equidistant points along said rod; and heating the crimped portions to fuse a portion of said binder therein and thereby form a firm closure.

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#### 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 | 1946           |