VERTICAL FORM, FILL, AND SEAL SYSTEM FOR HOT FILL LIQUIDS

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ABSTRACT

A vertical form, fill, and seal packaging system may comprise a source of flexible thermoplastic packaging material, a tubular folder, a product dispenser of the tubular folder, and a side sealer. The source of flexible packaging material in an elongated thin flat strip of material may comprise successive flat package blanks as integral longitudinally contiguous sections. The tubular folder may be adapted to receive a strip material and progressively forms in passage to a depending and upwardly open tubular configuration, with opposite longitudinal edge portions of the material being progressively juxtaposed in a passage so as to extend in vertical and parallel directions. The product dispenser of the tubular folder for discharging measured quantities of materials may be through a fill tube extending downward into an interior of the depending tube of packaging material through an upwardly open end. The side sealer may be used for sealing the juxtaposed vertically extending longitudinal edge portions of the tube. A method of making packages may comprise the steps of folding a single sheet of thermoplastic film into a tube; sealing an open vertical end or side around a filling tube; tucking gussets; sealing bottom; and filing an opened cavity of package with a hot material at 160°F or greater.
FIG. 5

1. FOLDING A SINGLE SHEET OF THERMOPLASTIC FILM INTO A TUBE
2. SEALING AN OPEN VERTICAL END OR SIDE AROUND A FILLING TUBE
3. TUCKING GUSSETS AND SEALING BOTTOM
4. FILLING AN OPEN CAVITY OF THE POUCH WITH A HOT MATERIAL AT 160 FAHRENHEIT OR GREATER
5. SEALING AN UPPER HORIZONTAL EDGE OF THE POUCH
6. LOWERING DOWN ONE POSITION
7. CUTTING HORIZONTALLY BETWEEN THE POUCHES
8. TRANSFERRING THE POUCH TO BOTTOM FORMING SECTION WHERE THE BOTTOM CORNERS OF THE POUCH ARE GRIPPED FOLDED UNDER AND SEALED SO THAT THEY REMAIN FOLDED UNDER AND THE SEAM IS PERPENDICULAR TO THE VERTICAL SEAM OR AT A 45 OR 90 DEGREE ANGLE WHICH FORM A GENERAL FLAT BOTTOM OR SEATING SURFACE ENABLING THE POUCH TO SET UPRIGHT.
VERTICAL FORM, FILL, AND SEAL SYSTEM FOR HOT FILL LIQUIDS

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] The present application claims the benefit of U.S. Provisional Application No. 61/250,373 filed on Oct. 9, 2009, the entirety of which is incorporated herein by reference.

BACKGROUND OF THE INVENTION

[0002] The present invention generally relates to a method and system of making thermal plastic packages, and more specifically, to a vertical, form, fill and seal system for hot filled liquids into thermoplastic packages geometrically designed to stand up properly and to be made from a single roll of thermal plastics.

[0003] Many beverages and food items have to be packaged into glass, cans, or plastic bottles which may withstand pasteurization temperatures in order to insure longer shelf life and product integrity. These conventional containers consume 40% to 65% more electrical energy to produce than packages and are considerably more expensive.

[0004] As can be seen, there is a need for a flexible thermoplastic package that can be filled at temperatures sufficiently high enough to insure pasteurization of the product being filled and at the same time to insure the sterilization of the interior itself.

SUMMARY OF THE INVENTION

[0005] In one aspect of the present invention, a method of making packages may comprise folding a single sheet of thermoplastic film into a tube; sealing an open vertical end or side around a filling tube; tucking gussets; sealing a bottom of the package; and filling an open cavity of the package with materials.

[0006] These and other features, aspects and advantages of the present invention will become better understood with reference to the following drawings, description and claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] FIG. 1 is a perspective view of a typical machine that manufactures a package;
[0008] FIG. 2 is a perspective view of an exemplary embodiment of a package;
[0009] FIG. 3 is an exploded side view of the exemplary embodiment of the package shown in FIG. 2;
[0010] FIG. 4 is a cross-sectional view of the exemplary embodiment of the package taken along line 4-4 shown in FIG. 2; and
[0011] FIG. 5 is a flow chart illustrating a method of making the exemplary embodiment of the package shown in FIG. 2.

DETAILED DESCRIPTION OF THE INVENTION

[0012] The following detailed description is of the best currently contemplated modes of carrying out exemplary embodiments of the invention. The description is not to be taken in a limiting sense, but is made merely for the purpose of illustrating the general principles of the invention, since the scope of the invention is best defined by the appended claims.

[0013] Various inventive features are described below that can each be used independently of one another or in combination with other features.

[0014] Broadly, embodiments of the present invention generally provide systems and methods of making packages.

[0015] FIG. 1 depicts a perspective view of a vertical form, fill and seal system 1. In an exemplary embodiment of the present invention, a source of flexible packaging material 2 in an elongated thin flat strip of material with a width which comprises successive flat package blanks as integral longitudinally contiguous sections. The flexible packaging material 2 may include FDA & USDA approved thermoplastic multilayered film which may withstand a minimum of 212 degrees F. The materials may include a single layer polymer or multilayer thermoplastic polymer bonded together, such as highly orientated polyethylene terephthalate (PET), nylon or other high barrier polymers, for example, that provide gas, moisture barrier properties.

[0016] In an exemplary embodiment of the present invention, a tubular folder 3 may be adapted to receive the strip material and progressively forms the same in passage to a depending and upwardly open tubular configuration, with opposite longitudinal edge portions of the material being progressively juxtaposed in passage through the former so as to extend in vertical and in parallel directions, for example. A product dispenser 4 of the tubular folder 3 for discharging measured quantities of materials through a fill tube extending downward into an interior of the depending tube of packaging material through an upwardly open end. Quantities of material may be selected from a group consisting of hot liquids, hot viscous materials, and liquids containing solids, which may range from 160°F to 220°F.

[0017] A side sealer 5 may be used for sealing the juxtaposed vertically extending longitudinal edge portions of the tube. An exemplary embodiment may further include a feeding machine to draw the packaging material downward and thus successively presenting integral tubular package blanks for filling, sealing and packaging formation. An exemplary embodiment may further include a package end sealer 5 which comprises a front and a rear sealing jaws relatively movable horizontally, for example, between an open position and a closed position with knives to cut within the sealing jaws to produce discrete packages dropping downward when the sealing jaws are open.

[0018] As shown in FIGS. 2-4, in an exemplary embodiment of the present invention, a package 10 may be manufactured from the system shown in FIG. 1. In an exemplary embodiment, the package 10 may have a top seal 12, fitting 14, a threaded access component 16, a threaded cap 18, and the flat bottom 20 with a bottom seal. In an exemplary embodiment, the package 10 may be made from a single roll of thermoplastic film with sizes ranging from 1 oz to 5 gallon, for example, in an alloy of two to six layers.

[0019] As shown in FIG. 5, the process of making packages may include the steps of folding single sheet of thermoplastic film into a tube in step 42; sealing an open vertical end or side around a filling tube in step 44; sealing a bottom at a horizontal portion in step 46; filling an opened cavity of the package with a hot material at 160°F or greater in step 48; and sealing the upper horizontal edge of the package at step 50. The exemplary embodiment may further include the steps of lowering the package down to one lower level position at step 52; and cutting horizontally between the packages at step 54; and transferring the package to the bottom forming section where the bottom corners of the package are gripped folded under and sealed so that they remain folded under and the seam is perpendicular to the vertical seam or at a 45 or 90 degree angle.
which form a general flat bottom or seating surface enabling the package to set upright at step 56. In an exemplary embodiment of the present invention, the process of making packages may further include the steps of adding a threaded access component onto the package; adding fitting onto the package; and screwing a cap onto the package. In an exemplary embodiment of the present invention, the process of making packages may further include the steps of using a single layer polymer that is selected from a group consisting of a highly orientated polyethylene terephthalate (PET), nylon or other high barrier polymers that provide gas, moisture barrier properties.

[0020] It should be understood, of course, that the foregoing relates to exemplary embodiments of the invention and that modifications may be made without departing from the spirit and scope of the invention as set forth in the following claims.

We claim:

1. A method of making packages comprising:
folding a single sheet of thermoplastic film into a tube;
sealing an open vertical end or side around a filing tube;
tucking gussets;
sealing substantially flat bottom of the package; and
filling an open cavity of the package with a hot material at 160°F. or greater.

2. The method of making packages of claim 1, further comprising sealing an upper horizontal portion of the package.

3. The method of making packages of claim 1, further comprising lowering the package down to one lower level position.

4. The method of making packages of claim 1, further comprising cutting between the packages.

5. The method of making packages of claim 1, further comprising transferring the package to a bottom forming section wherein:
   bottom corners of the package are gripped folded under and sealed so that they remain folded under; and
   seam is perpendicular to vertical seam or at a 45 or 90 degree angle which form a general flat bottom.

6. The method of making packages of claim 1, further comprising transferring the package to a bottom forming section wherein:
   bottom corners of the package are gripped folded under and sealed so that they remain folded under; and
   seam is perpendicular to vertical seam or at a 45 or 90 degree angle which form a seating surface enabling the package to set upright.

7. The method of making packages of claim 1, further comprising using a single layer polymer that is selected from a group consisting of a highly orientated polyethylene terephthalate (PET), nylon or other high barrier polymers or copolymers, that provide gas, moisture barrier properties.

8. The method of making packages of claim 1, further comprising adding a threaded access component onto the package.

9. The method of making packages of claim 1, further comprising adding fitting onto the package.

10. The method of making packages of claim 1, further comprising screwing a cap onto the package.

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