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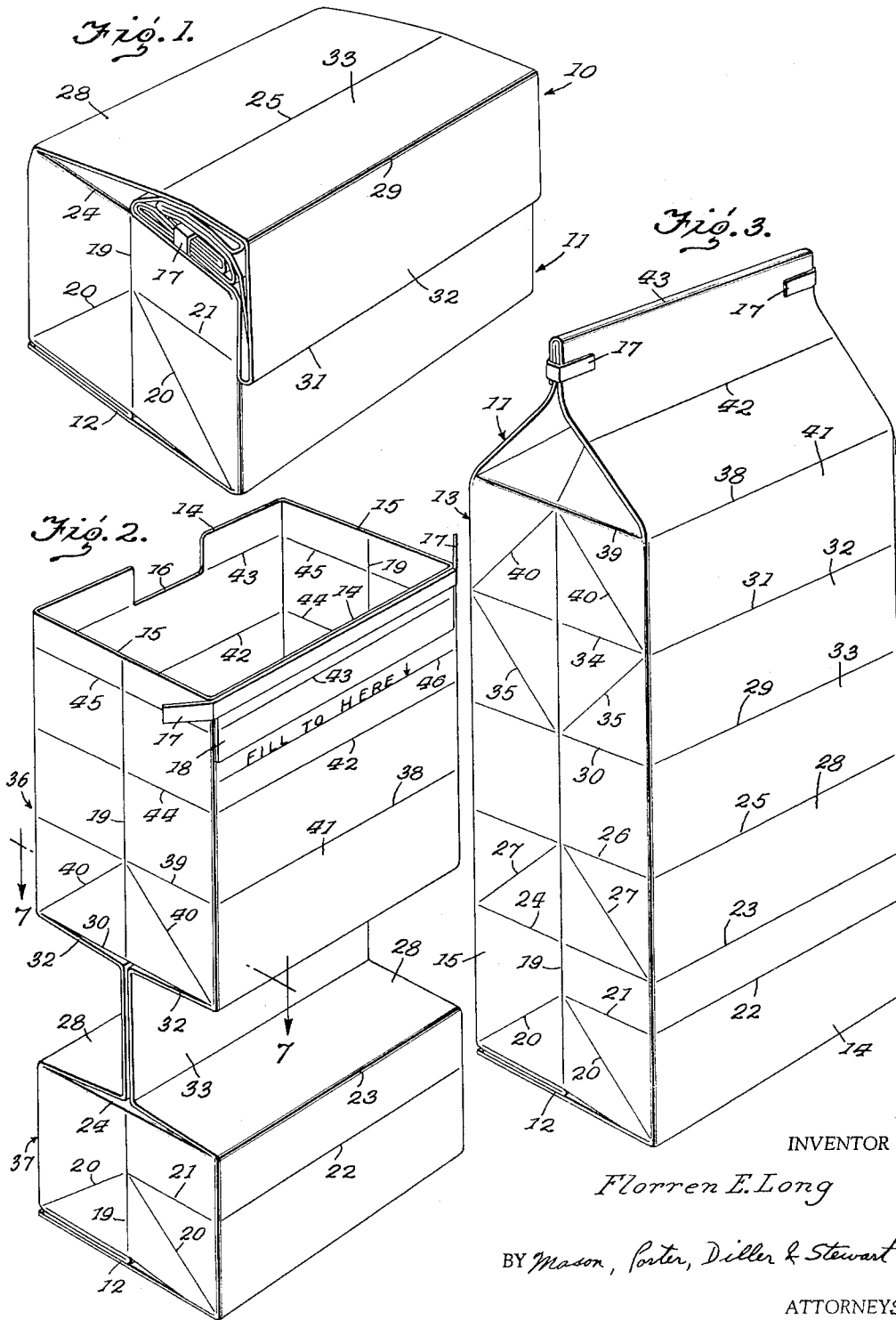
F. E. LONG

3,144,931

COLLAPSIBLE FOLDED BAG STRUCTURE WITH SPACED INTERMEDIATE FOLDS

Filed Dec. 14, 1959

2 Sheets-Sheet 1



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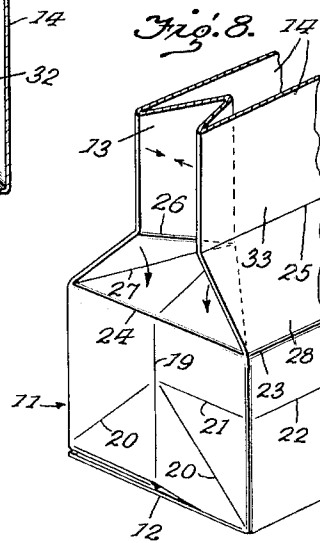
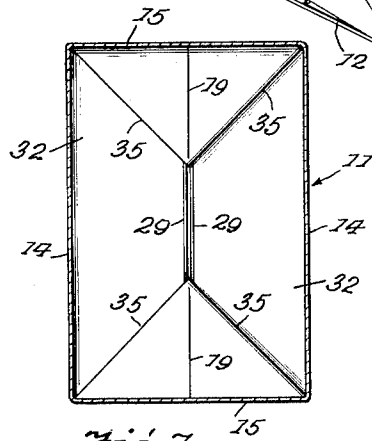
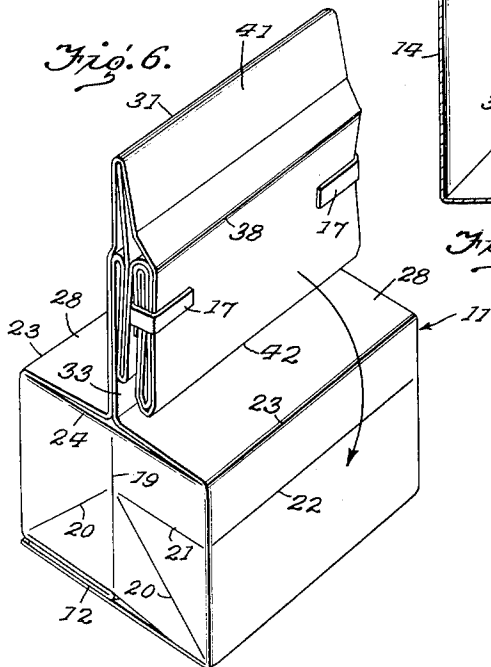
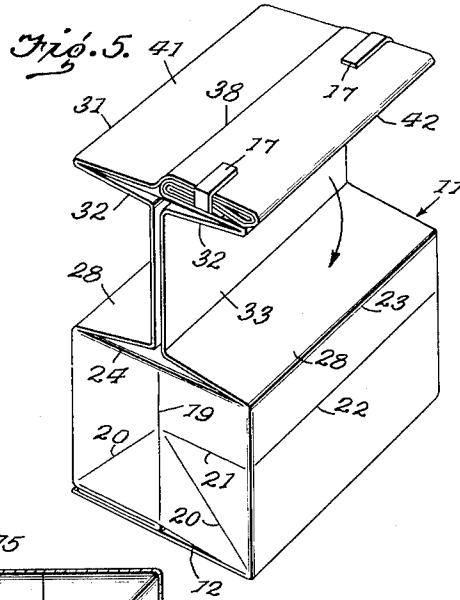
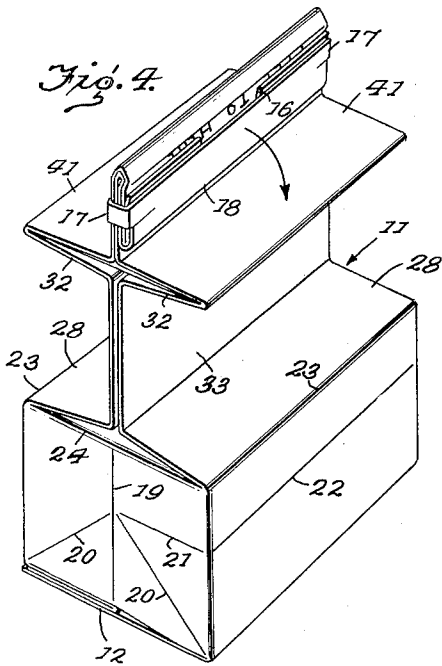
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2 Sheets-Sheet 2



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COLLAPSIBLE FOLDED BAG STRUCTURE WITH
SPACED INTERMEDIATE FOLDSFloren Emerson Long, Fredericktown, Ohio, assignor to
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8 Claims. (Cl. 206-46)

This invention relates in general to new and useful im-
provements in bag construction, and more particularly
relates to a bag which is particularly adapted to be used
in independently confining two materials and then func-
tioning as a shaker in the mixing of the materials.

There has long been a need for a collapsible container
that can be marketed in its collapsed form with a dry
or concentrated product which requires dilution or mixing
with water or other liquids before use, wherein the con-
tainer can be expanded at the point of use to accommo-
date the liquid addition. Most attempts to accomplish
this have revolved about formed, rigid metal components
that telescope into one another, with the result that they
are unduly expensive.

Accordingly, an object of the invention is to provide
an inexpensive bag which may be readily folded to di-
vide the bag into two separate compartments which are
temporarily sealed relative to each other, the compartments
including a lower compartment which may contain the
shipped product, and an upper compartment, into which
water or other liquids may be poured in measured quan-
tities, the bag then being openable to permit the liquid
to flow into the packaged product, and the upper end of
the bag being sealable so that the bag may then be closed
and function as a shaker for mixing the liquid and the
packaged product.

Another object of the invention is to provide a novel
package for a dry or concentrated product which requires
mixing with water or dilution, the package having the
product packaged in the lower portion thereof, and in-
cluding a bag having an elongated tube portion which
extends above the packaged product, the tube portion
being provided with preformed fold lines to facilitate the
folding of the tube portion to define a lower compartment
in which the packaged product is disposed, and an open
upper compartment, the compartments being sealed and
the upper compartment being adapted to have liquid
poured thereinto and measured therein, the two compart-
ments being later communicated with each other by open-
ing of the tube portion and the upper end of the tube
portion being sealed so that the bag may function as a shaker
in mixing the liquid and the packaged product.

A further object of this invention is to provide a novel
method of packaging a dry or concentrated product and
later mixing water with the dry product or diluting the
concentrated product, the method including the packaging
of the product in a bag having an elongated tube portion
which is of a much greater length than that required for
the product, closing the lower portion of the tube portion
and opening the upper portion of the tube portion to
define a sealed compartment above the packaged product,
pouring the desired amount of water or other liquid into
the compartment, then opening the tube portion to per-
mit the liquid to run into the lower portion of the bag, and
finally closing the upper end of the tube portion and
utilizing the bag as a shaker to mix the liquid and packaged
product.

Still another object of the invention is to provide a col-
lapsible folded bag structure with spaced intermediate
folds, the arrangement of the fold lines being such that
the bag may be divided into two compartments, the com-
partments including a lower compartment defined by the

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original bottom of the bag and an intermediate top of
the bag folded from the tube portion of the bag, and a
second compartment which is open at the top and has the
bottom thereof defined by an intermediate bottom also
folded from the tube portion of the bag, whereby the bag
may be readily folded to define two separate compartments
to facilitate the measuring of two materials prior to the
mixing thereof within the same bag.

With the above, and other objects in view that will
hereinafter appear, the nature of the invention will be more
clearly understood by reference to the following detailed
description, the appended claims, and the several views
illustrated in the accompanying drawings.

In the drawings:

FIGURE 1 is a perspective view showing the package
as supplied to the user.

FIGURE 2 is a perspective view showing the package
of FIGURE 1, with the upper portion of the bag thereof
opened to define a compartment for receiving liquid or
other material which is to be mixed with the packaged
product.

FIGURE 3 is a perspective view of the package, with
the bag opened except for the top thereof, the top being
sealed and the bag being usable as a shaker to mix to-
gether the packaged product and the added liquid or other
material.

FIGURES 4, 5 and 6 are perspective views on a re-
duced scale, showing the sequence of folding the tube
portion of the bag in the initial formation of the package.

FIGURE 7 is a horizontal sectional view, taken along
the section line 7-7 of FIGURE 2, and shows the details
of the bottom of the upper compartment of the bag pro-
duced by the folding of the tube portion of the bag.

FIGURE 8 is a fragmentary perspective view showing
the manner in which the tube portion of the bag is folded
inwardly to define an intermediate top for the lower com-
partment, thus sealing the packaged product.

In the embodiment of the invention illustrated herein,
the package received by the ultimate user is illustrated in
FIGURE 1, and is generally referred to by the numeral
10. The package 10 includes a bag, generally referred to
by the numeral 11, in the bottom portion of which a
product or material is packaged.

The bag 11 includes a conventional sealed bottom 12
and an elongated rectangular cross-sectional tube portion
13, the tube portion 13 being much longer than that re-
quired to package the initial product or material. The
tube portion 13 includes a pair of side walls 14 and a
pair of end walls 15. Any desired type of sealed longi-
tudinal seam may be provided for the tube portion 13.

The upper end of the tube portion 13 is open, and
one of the side walls 14 is provided with a thumb notch
16 to facilitate the opening of the tube portion from its
folded state of FIGURE 1. A conventional tin tie
strip 17 is secured to the opposite one of the side walls
14 at the upper end of the tube portion 13. The tie
strip 17 is carried by a paper strip 18 which is suitably
secured to the outer surface of the one side wall 14.

The end walls 15 are provided with centrally located
preformed fold lines 19 which may extend the full length
thereof. The lower part of each of the end walls 15
is also provided with a pair of preformed diagonal fold
lines 20 which converge upwardly from the intersection
of the end wall 15 with the bottom 12, the diagonal fold
lines 20 meeting along the fold line 19. Each of the
end walls 15 is also provided with a transverse fold
line 21 which extends generally from the intersections
of the fold lines 19 and 20 to one of the side walls 14.
The one side wall 14 is also provided with a transverse
fold line 22. The fold lines 19, 20, 21 and 22 permit
the folding of the tube portion 13 to a flat state, and the

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folding of the bottom 12 to a position generally coplanar with the folded tube portion. Thus the bag 11 may be shipped in a relatively flat state.

The side walls 14 are provided with transverse fold lines 23 which are spaced above the bottom 12 a sufficient distance to provide the necessary storage capacity within the bottom of the bag 11 for the product or material to be packaged. The transverse fold lines 23 are aligned with transverse fold lines 24 extending across the end walls 15. A second set of transverse fold lines 25 and 26 extend across the side walls 14 and the end walls 15, respectively. The end walls 15 are each provided with a pair of upwardly converging diagonal fold lines 27 which extend upwardly from the intersections of the fold line 24 with the side walls 14 to the intersection of the fold line 26 with the fold line 19.

The fold lines 23 and 25 on each of the side walls 14 define a panel 28. When the tube portion 13 is folded along the fold lines 23, 24, 25, 26 and 27, the panels 28 assume positions generally parallel to the bottom 12, as is best illustrated in FIGURE 2, and form an intermediate top along the length of the bag 11, the top, together with the bottom 12, defining a lower compartment in which the product or material packaged in the package 10 is positioned.

A transverse fold line 29 extends across each of the side walls 14 in spaced relation above the transverse fold line 25. Each of the end walls 15 is provided with a transverse fold line 30 which is aligned with the transverse fold line 29. Each of the side walls 14 also has a transverse fold line 31 which is spaced above the transverse fold line 29. The transverse fold lines 29 and 31 combine to define a panel 32. Also, the transverse fold lines 25 and 29 on each of the side walls 14 define a panel 33.

Each of the end walls 15 is provided with a transverse fold line 34 which is aligned with the transverse fold line 31. A pair of diagonal fold lines 35 extend upwardly along each of the end walls 15 from the intersection of the fold line 30 with the fold lines 19 and terminate at the intersections of the fold line 34 with the side walls 14.

The fold lines 29, 30, 31, 34 and 35 permit the folding of the upper part of the tube portion 13 to define an upper compartment. The upper compartment will be referred to by the numeral 36, and the lower compartment will be referred to by the numeral 37, to distinguish the two hereinafter. In the folding of the tube portion 13, those portions of the end walls 15 disposed intermediate the fold lines 26 and 30 will be folded inwardly into face-to-face engagement and the panels 33 will move together on opposite sides of the portions of the end walls 15. At the same time, the panels 32 will swing to generally horizontal positions facing the panels 28 and defining an intermediate bottom in the bag 11, the intermediate bottom functioning as a temporary bottom for the compartment 36. At this time, it is pointed out that the compartment 36 may be sealed relative to the compartment 37 by gripping the opposite sides of the panels 33.

In order to facilitate the folding of the tube portion 13 in the formation of the initial package 10, each of the side walls 14 is provided with a transverse fold line 38 which is spaced above the fold line 31. Each end wall 15 is also provided with a transverse fold line 39 which is aligned with the fold lines 38. Also, each of the end walls 15 is provided with a pair of upwardly converging diagonal fold lines 40 which extend upwardly from the intersections of the fold lines 34 and 35 to the intersections of the fold lines 39 and 19. The fold lines 31 and 38 define panels 41 on the side walls 14.

As is best illustrated in FIGURE 4, during the initial folding of the bag 11 in the formation of the package 10, the side walls 14 are folded inwardly above the temporary bottom for the compartment 36, and the panels

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41 are swung inwardly and downwardly so as to oppose the panels 32. The tube portion 13 is flattened above the panels 41 for the purpose of effecting a seal.

Referring once again to FIGURE 2 in particular, it will be seen that each of the side walls 14 is provided with a pair of spaced transverse fold lines 42 and 43 disposed above the fold line 38. Also, each of the end walls 15 is provided with a pair of transverse fold lines 44 and 45 which are aligned with the fold lines 42 and 43, respectively.

In the formation of the package 10, the bag 11 is provided in its open state. The product or material to be packaged is placed in the lower part of the bag 11, and the tube portion 13 is folded so that the panels 28 form a temporary top for the compartment 37 in which the product or material is packed. The tube portion 13 is also folded so that the panels 32 and 41 are disposed in opposed relation and the panels 33 are vertically disposed. That portion of the tube portion 13 disposed above the panels 41 is flattened and extends generally vertically above the panels 41. The flattened upper part of the tube portion 13 is then first folded along the fold lines 43 and 45, and then along the fold lines 42 and 44, after which the tin tie 17 is pivoted into place in the manner best shown in FIGURE 4. Next, the upstanding folded part of the tube portion 13 above the panels 41 is swung into overlying relation with respect to one of the panels 41, as is best illustrated in FIGURE 5. Then the panels 41 and 32 are swung in the same general direction as was the upper part of the tube portion 13 so that all of the tube portion 13 disposed above the panels 28 is generally vertically disposed. The upstanding part of the tube portion 13, as viewed in FIGURE 6, is then swung over upon one of the panels 28 with a part thereof extending down and around the lower compartment 37. The package 10 is then sealed in this position, either by means of a suitable adhesive, an adhesive strip or a band, none of which is illustrated. The package 10 is now completed and is ready to be shipped to the ultimate user.

When the ultimate user desires to utilize the package 10, the retaining means holding it in the position illustrated in FIGURE 1 are released, and the tube portion 13 is unfolded until it assumes the position of FIGURE 4. The tin ties 17 are then released, and while gripping the panels 33, the upper portion of the bag 11 is opened so that the bag 11 will appear as is illustrated in FIGURE 2. Then, while gripping the panels 33 to assure the sealing of the compartments 36 and 37 relative to each other, the necessary second material is poured into the compartment 36. In order to assure that the proper quantity of the second material will be placed in the compartment 36, the tube portion 13 is provided with a fill line 46 on at least one of the side walls 14, together with suitable indicia indicating the purpose of the line 46.

After the second material, which is normally a liquid, is placed within the compartment 36, while the upper part of the tube portion 13 is gripped, the panels 33 are released. Then, an upward tension is applied on the upper part of the tube portion 13 with the result that the part of the tube portion 13 intermediate the compartments 36 and 37 will open and permit the contents of the compartment 36 to run into the lower part of the bag 11.

After the bag 11 has been opened to permit the contents of the compartment 36 to run downwardly into the lower part of the bag 11, the upper end of the bag 11 is sealed by sealing the upper end of the tube portion 13. This is accomplished by flattening the extreme upper part of the tube portion 13 and folding the tube portion 13 along the fold lines 43 and 45, after which the tin tie 17 is clamped about the upper part of the tube portion 13 to provide the necessary seal.

After the upper end of the bag 11 has been sealed, it

is in the form of a large container having a capacity much greater than the combined volumes of the materials in the compartments 36 and 37. Thus, the materials may be readily shaken with the bag 11 acting as a shaker so as to mix the materials.

Although the contents of the compartments 36 and 37 have been broadly described as materials, in most instances the contents of the compartment 36 will be a liquid. On the other hand, the contents of the compartment 37 will either be a dry material or a concentrate. Several of the many uses of the invention are dry pancake mix, dry cake mixes, dry patching plaster, powdered whole milk or powdered non-fat milk, and other dry or concentrated products. Also, the bag 11 may be utilized in packaging concentrates, such as frozen citrus concentrates. The liquid to be added in most instances will be water, although it is visualized that milk and other diluents may be added.

The bag 11 has two main requirements in most instances. First, it must have sufficient rigidity to function as a shaker. Secondly, in most instances, it must be liquid-tight. A typical bag construction would be a laminate formed of 60# bleached kraft paper, 0.00035 inch aluminum foil and 0.001 inch polyethylene film. However, any of a wide variety of thermoplastic films may be used as the inner material in lieu of polyethylene, and the paper may vary. Also, the aluminum may be excluded if optimum product protection is not necessary and the necessary stiffness of the structure is provided by other means. It is also to be understood that the paper may be dispensed with and replaced with certain plastic films.

From the foregoing, it will be seen that novel and advantageous provision has been made for carrying out the desired end. However, attention is again directed to the fact that variations may be made in the example method and apparatus disclosed herein without departing from the spirit and scope of the invention, as defined in the appended claims.

I claim:

1. A bag particularly adapted for use in independently confining two materials and then functioning as a shaker in the mixing of the materials, said bag comprising a rectangular bottom and an elongated rectangular cross sectional tube portion, said tube portion having side and end walls, said end walls having preformed positive central fold lines extending a major portion of the length thereof to facilitate the infolding of said end walls between said side walls, cooperating sets of preformed positive transverse fold lines on said side and end walls and diagonal fold lines on said ends walls to facilitate the temporary inward folding of intermediate portions of said side walls to positions generally paralleling said bottom to temporarily define two separate compartments, said sets of pre-formed positive transverse fold lines being spaced apart so as to define when folded an upstanding temporary flattened portion intermediate of said separate compartments to assure the temporary sealing of said compartments relative to each other, and means at

the upper end of said tube portion for manually releasably sealing said bag.

2. The bag of claim 1 wherein said bag is formed of a paper aluminium foil laminate to utilize the inherent moisture resistant and rigidity properties thereof.

3. The bag of claim 1 wherein said bag is formed of a paper aluminum foil thermoplastic film laminate with the paper being disposed outermost.

4. The bag of claim 1 wherein said bag is formed of a paper thermoplastic film laminate to utilize the inherent moisture resistant and rigidity properties thereof.

5. The bag of claim 1 wherein the temporary upstanding flattened portion intermediate said separate compartments is generally perpendicular to the bottom of the bag and disposed in the plane of the central fold lines of said end walls.

6. A package comprising a bag having a powdered material in the lower portion thereof for mixing with a liquid, said bag being in the form of an elongated tube having a bottom, said tube being folded above said powdered material to form a temporary intermediate top wall closing off a lower compartment, means for manually releasably closing the upper end of said tube, the portion of said tube disposed intermediate said intermediate top wall and said tube upper end defining an upper compartment for receiving the liquid and being initially completely flattened along longitudinal fold lines and folded upon itself and upon said intermediate top wall along transverse fold lines to provide a compact package, and said bag being openable into a single compartment to define a shaker for the purpose of mixing said powdered material with the liquid, said tube having positive diagonal fold lines above said intermediate top wall cooperating with said transverse fold lines to define a temporary intermediate bottom wall for said upper compartment when the upper portion of said tube is opened, and a portion between said temporary intermediate bottom wall and said temporary intermediate top wall flattened along longitudinal fold lines to define an upright combination grip and sealing portion whereby the ease in which said compartments are sealed from one another may be facilitated by centrally gripping said upright flattened portion.

7. The package of claim 6 wherein the portion of said tube between said intermediate top wall and said intermediate bottom wall remains flat when said intermediate bottom wall is formed to define an upright combination grip and sealing portion.

8. The package of claim 6 wherein the upper portion of said tube is provided with means for indicating the desired level of liquid within said upper compartment.

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