Feb. 6, 1968 W. S. SCHNEIDER ETAL 3,367,485

VALVE MIXING CONTAINER OR PACKAGE

Filed Jan. 6, 1967

Fig. 1.

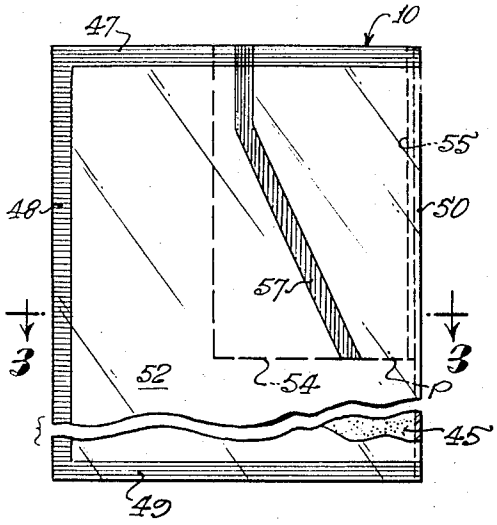


Fig. 4.

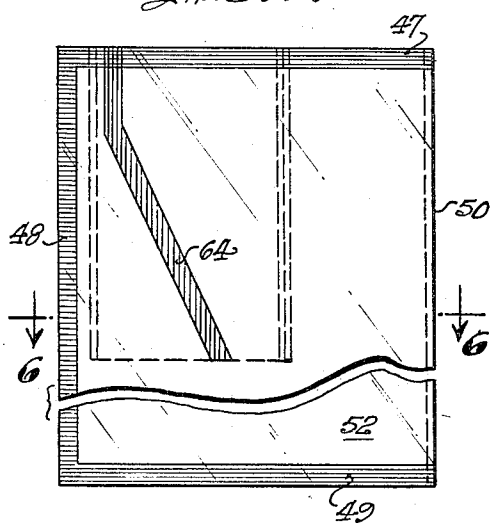


Fig. 2.

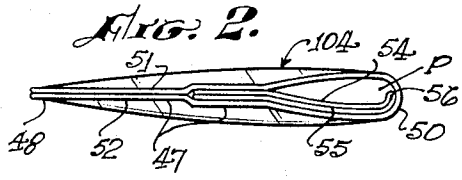


Fig. 5.

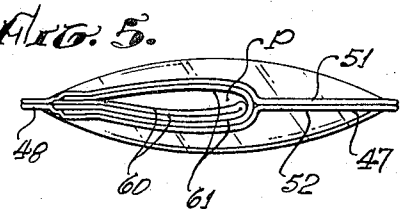


Fig. 3.

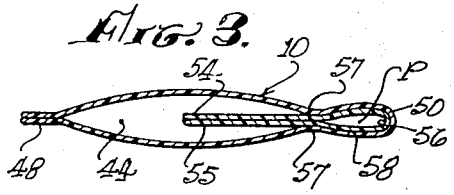
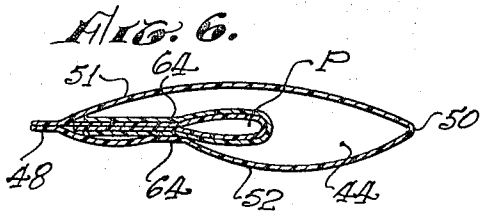


Fig. 6.



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VALVE MIXING CONTAINER OR PACKAGE

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3 Claims. (Cl. 206—47)

ABSTRACT OF THE DISCLOSURE

A package or container made of thin, flexible film is provided with a one-way valve through which a liquid or other substance can be introduced into the package. The valve closes against the escape of contents to permit kneading or mixing of the contents. The valve is provided by two sheets of film folded into a U-shape; one of the sheets may be the outer wall of the package.

The present application is a continuation-in-part of our earlier co-pending application, Ser. No. 349,267, filed Mar. 4, 1964, now Patent No. 3,297,152 for the same subject, to which reference is made for additional details.

Background of the invention

The present invention relates generally to containers and packages having flexible walls and more especially to a package holding a product to which the user will later add a liquid, or other fluent substance, and will then mix the added liquid and the initial product together by flexing or kneading the walls of the container. The package is provided with a one-way valve through which a liquid or other fluent material may be introduced into the package by the user prior to such mixing.

Many different types of products are now sold in a dry form to be later mixed by the user with a liquid, such as water, as a step in processing for use of the original contents. Examples include cake mixes, pie crust mixes, pancake mixes, and other food products which are sold in dry form and are to be mixed with milk or water by the user. Other examples where mixing of products is contemplated may be found among various non-food products such as plaster of Paris, cement mixes, and various liquid plastics of the type to which a liquid catalyst is added to harden the plastic.

Without a container of this type, it is necessary to empty the product out of the package into a suitable mixing bowl or the like and then add the desired liquid. It is a convenience to the user of products of this character are sold in packages having flexible walls and into which the proper amount of added liquid may be placed, the liquid and the dry product being mixed in the package. After the desired mixture is secured, it is then ejected from the package through another opening in the package wall which is formed for that purpose. Many advantages accrue to the user, particularly the saving in time and trouble of cleaning up a bowl or vessel in which the mixture was prepared, since the flexible wall package now constitutes a disposable mixing container.

For this type of service, various designs of packages have previously been made. However, known designs of packages of this character are subject to occasional failures; and even an occasional failure is sufficient to prevent commercial acceptance of such a package. A chief problem has been to provide a one-way valve which remains securely closed during the mixing operation. In prior designs suitable for incorporation in a package made from thin, flexible, limp packaging materials, there has been no force or other means holding the valve closed. Hence, the valve is not always closed when the mixing

starts, with the result that some of the contents often enters the package and escapes by reverse flow through the valve-control passage.

Sometimes it appears that there is a separation of the elements of the valve during the mixing operation. This may be caused by the formation of a fold or wrinkle in one of the walls of the passage as a result of the mixing operation. This allows contents to enter the valve and spread the walls apart. For whatever reason the material enters the valve, the presence of material in the valve tends to hold the valve open and allows escape of additional material by reverse flow through the inlet passage.

Thus, it is a general object of the present invention to provide a novel design of a package with a valve-controlled passage through which liquid may be introduced into the product-holding space within the package and the product therein and the liquid mixed together by kneading or flexing the outer walls without causing the valve to open and allow the escape of any of the contents during the mixing operation.

Another object of the present invention is to provide a package of this type having a novel one-way valve structure of which the walls forming the inlet passage have intrinsic forces tending to hold them together at all times to close the inlet passage.

Summary of the invention

The above objects and advantages of the present invention are provided in a valved mixing package having a pair of opposed, flexible outer walls enclosing between them an interior product-receiving space. The two outer walls may be formed from a single sheet folded along one edge of the package, or they may be provided by two separate sheets joined together along their margins, typically by heat sealing or adhesive means. A quantity of the product is contained within said space.

Valve means comprise a pair of flexible members providing a pair of mutually overlying walls of which at least one wall is in addition to said outer walls since the outer wall may be one of the last mentioned pair. Thus, in one embodiment of the invention, an outer wall constitutes a portion of the valve means while in another embodiment, the valve means are provided by two members or sheets in addition to the outer walls. The members of the valve means are opposed to each other and folded into a U-shape of which the arms are generally parallel to each other and overlie one another. The two opposed walls thus provided for the valve means are joined together over an area extending inwardly from one edge of the package to define between said area of joining and said fold and inlet passage which opens to the exterior of the package at said one edge thereof, the outer walls and the wall or walls of the valve means being joined together along the edge of the package, except at the inlet passage, to close the package.

Brief description of the drawing

How the above and other objects and advantages of the present invention, as well as others not specifically referred to herein, are attained will be better understood by reference to the following description and to the drawing, in which:

FIGURE 1 is a side elevation of a package illustrating one embodiment of the invention in which an outer wall of the container forms one wall of the inlet passage;

FIGURE 2 is a top elevation of the package of FIGURE 1;

FIGURE 3 is a transverse section on line 3—3 of FIGURE 1;

FIGURE 4 is a side elevation of a package illustrating another embodiment of the invention in which two inner sheets provide both walls of the inlet passage;

FIGURE 5 is a top plan view of FIGURE 4;

FIGURE 6 is a transverse section on line 6—6 of FIGURE 4.

Description of the preferred embodiments

There is seen in FIGURE 1 a side elevation of a generally flat, envelope-like package **10** constructed according to the invention. As may be seen particularly in FIGURES 2 and 3, the package comprises a pair of flexible outer walls **51** and **52** which are made of thin sheet material. As typical of the thin flexible materials that may be used for this purpose, there may be mentioned cellulose acetate film coated on the inner face with a layer of polyethylene which, being a thermoplastic material, enables the two walls to be sealed together over any area to which heat and pressure are applied. Other films of a thermoplastic nature or with thermoplastic coatings, such as vinyl resins or rubber hydrochloride, may be used instead. In the case of films or sheets of materials which are not heat sealable, adhesives may be used instead.

The package is shown as being rectangular in outline since this shape is most commonly and easily produced on package machines; but it is to be understood that the invention is not necessarily limited to this or to any other particular shape of package.

The two opposed outer walls **51** and **52** are of similar shape. In this illustrative embodiment of the invention, the two outer walls are provided by folding at **50** along a median line a single sheet of web whereby the fold **50** forms one edge of the package. The two walls are then heat sealed together at their margins as indicated at **47**, **48**, and **49** along the three remaining edges of the container to join the outer walls together, except as noted below, to form an interior product containing space **44** within which is a quantity of the dry powdered product **45**.

As will become apparent later, the package may be formed from two separate webs rather than a single web and the invention is independent of the particular means employed to join together the outer walls of the package. Consequently, the word "joined" is used in a broad sense to denote any connection between the two walls.

The presence of the fold **50** in the outer wall is utilized advantageously in this embodiment of the invention and simplifies the construction of the wall means defining the valved inlet passage.

A single sheet of flexible material, similar to the outer walls **51** and **52**, is folded over upon itself along a line **56** to provide two inner walls **54** and **55**. Thus, the two halves **54** and **55** of the sheet overlie each other. This inner sheet is inside the outer wall with fold **56** therein coincident with fold **50** in the outer walls. Thus, the two sheets forming the outer walls and the inner walls are opposed to each other and are both folded into a U-shape of which the arms are generally parallel to each other.

Each wall **54** and **55** of the inner sheet is joined to the opposing outer wall, **51** and **52** respectively, by a heat seal indicated at **57**. The heat seal covers a narrow elongated area which extends inwardly from one edge of the package, in this case the edge of the package having the heat seal area **47**. Heat seal **47** along one margin of the package seals the outer walls **51** and **52** together where they oppose each other; and for the remainder of the length of the side of the package, it seals the inner walls **54** and **55** to each other and to one of the outer walls, in this case the wall designated **52** in FIGURE 2. For a portion of the distance between heat seal **57** and fold **50**, outer wall **51** is not sealed to the opposed inner wall **54**, within the area **47**, thereby leaving unsealed and open the outer end of inlet passage P which extends into the package between outer wall **51** and inner wall **54**. While normally these two walls are in contact with each other, they may be spread apart as shown in FIGURE 2 to permit entry into the inlet passage P of liquid or other fluent material which it is desired to introduce into the package.

This construction produces an inlet passage which, considered in its entirety, is of U-shape beyond the area of seal **47**; and the passage is between the walls provided by the folded inner sheet and an opposing portion of the outer walls of the package. Even though inwardly of or below seal **47**, the inlet passage can, in theory, become more or less U-shaped for practical purposes, it does not, since the upper end of the U-shape is partially closed by seal **47** joining together walls **52** and **55** along one arm of the U-shape.

In manufacture, heat seals **57** are placed with the web forming the outer walls and the inner sheet superposed and flat so that the two wall forming members are first joined to each other at two seals **57** before folding over on themselves approximately through 180° to provide the concentric folds **50** and **56**. As a consequence of this construction, the curved or arched wall on the inside of the curve, in this case the inner sheet forming walls **54** and **55**, has a slight compression in it while the other or outer wall has a slight tension. These intrinsic forces in the two members are sufficient to cause the walls to be held in mutual contact as shown in FIGURE 3, thus normally closing the inlet passage P, especially at its inner end. However, because of the flexible nature of these walls, they can be separated at any time to admit liquid to flow through the inlet passage, the weight of entering liquid forcing the walls apart. Liquid or other fluent material can thus be admitted into the product receiving space **44**.

After the outer web is folded with the sheet **54**, **55** inside, and while the package is being formed, heat and pressure are again applied over the areas of the two seals **57** which now overlie each other, to seal together at **58** the inner opposed faces of the two walls **54** and **55**. This adds a desired degree of stability to the configuration of the inlet passage but is not necessary to a complete definition of the package. Seal **58** is made possible at this position when the inner sheet forming the two walls **54** and **55** is of material heat sealable on both sides.

FIGURE 4 illustrates another embodiment of the invention which resembles the package illustrated in FIGURES 1–3, except as specifically noted. The chief difference is that a second inner wall-forming sheet is added to replace the outer wall as a part of the inlet passage, thereby making it practical to locate the passage P without reference to the fold **50** in the outer wall. The two outer walls **51** and **52** are again illustrated as being portions of a single web folded over on itself with the fold **50** along one edge of the package. The package is completed by sealing the two outer walls together by heat seals at marginal areas **47**, **48** and **49** to enclose the interior product-receiving space **44**. However, it will be obvious without illustration that in this particular embodiment of the invention, it is equally satisfactory to provide the outer walls **51** and **52** from separate webs, in which case there would be a marginal sealed area along the fourth side of the container replacing fold **50** and similar to seal **48**.

The wall means defining the inlet passage here comprises a pair of inner wall-forming sheets or members **60** and **61**. The inner two wall members are preferably substantially the same size and shape and overlie one another so that when the two wall members are folded over together, both members are in a general U-shape with the arms of the U generally parallel, one member **61** being outside of and around the opposing member **60**.

Along the top edge of the package at sealed area **47** the two halves of wall member **61** are sealed respectively on the outside face to the inner faces of outer walls **51** and **52**, as may be seen in FIGURE 5, while walls **51** and **52** are sealed to each other over the remaining length of seal **47**. Inside of the member **61** is the folded member **60** of which the two inner opposed faces are

sealed together along their entire top edge at the level of top seal **47**. One-half or one wall of the inner wall member **60** is then sealed to the opposing face of the other wall member **61**, while approximately the remaining half or the other wall of the inner member is left unsealed in order that opposing portions of wall members **60** and **61** can be separated as shown in FIGURE 5 to provide an access opening to inlet passage P. As shown in FIGURE 5, this inlet passage opens to the edge of the package at which heat seal **47** is located.

In the manufacture of the package, the two wall members **60** and **61** are brought into mutual overlying and opposing relation and then sealed together in two locations along the heat sealed areas **64** while the two sheets are flat. After they are thus connected to each other, the two sheets together are folded over through 180° into the U-shape shown in FIGURES 5 and 6, and they are then placed between package walls **51** and **52** in a position to be sealed to the outer walls along the marginal sealed area **47** at one edge of the completed package.

After the wall members **60** and **61** defining the inlet passage are placed between outer walls **51** and **52**, heat and pressure are then applied to seal these two inner wall members to at least one of the outer walls at an area preferably coincident with heat sealed areas **64**, as shown in FIGURE 6. The two areas **64** are preferably positioned to overlie one another when the walls **60** and **61** are folded into the U-shape. Also, preferably, the inner opposing faces of the wall members **60** are sealed together over this same narrow elongated area in order to stabilize these wall members and the configuration which they assume in order to define inlet passage P.

Because these two wall forming members are folded over after being fastened together, it will be realized from the foregoing description that the intrinsic compression and tension forces, respectively, in the wall members **60** and **61** and the folds in them hold the wall members normally in mutual contact. This is particularly the case at the inner or exit end of the inlet passage P, thereby to prevent reverse flow of fluid through the passage.

With this configuration of the wall means forming the inlet passage, passage P is located between opposing faces of the two inner wall members **60** and **61**. Below or beyond seal **47**, the inlet passage may be considered to have a U-shape conforming to the members **60** and **61**. However, the upper end of the passage is closed at one side or leg of the U-shape by the seal between wall members **60** and **61** at the level of marginal seal **47** while the other leg of the U-shape is open at the inlet end, as shown in FIGURE 5. Liquid or other fluent material introduced into the upper end of the passage can force the walls **60** and **61** apart because of their flexible nature and flow into the product receiving space **44**. It is preferable, although not necessary, that seal **64** be inclined with respect to the fold in members **60** and **61** so that the inlet passage is larger at the outer or inlet end, thereby making it easier to introduce material into the passage. The exit or inner end of the passage is thus smaller, making more effective the action of holding the opposing walls in contact to prevent accidental discharge of content from space **44**.

Since it will be apparent that various changes in the detailed design, shape, and arrangement of the elements constituting the present invention may occur to persons skilled in the art without departing from the spirit and scope of the invention, it is to be understood that the foregoing description is considered as being illustrative of, rather than limitative upon, the invention as defined by the appended claims.

We claim:

1. A valved mixing package comprising:

a pair of opposed, flexible outer walls enclosing between them an interior product-receiving space;

a quantity of a product in said space;

and valve means comprising a pair of flexible members providing a pair of walls of which at least one wall is in addition to said outer walls, the members of the valve means being opposed to each other and folded into a U-shape of which the arms are generally parallel to each other;

the two walls of valve means being joined over an area extending inwardly from one edge of the package to define between said area and said fold an inlet passage open to the exterior of the package at said one edge;

and said outer walls and the walls of the valve means being joined together at said edge of the package except at said inlet passage.

2. A valved mixing package as in claim **1** in which the outer walls are formed from a single sheet folded over on itself;

and the valve means comprises a second sheet folded over on itself and inside the outer walls, the inlet passage being between one of the outer walls and an adjoining portion of the second sheet.

3. A valved mixing package as in claim **1**, in which the valve means comprises a pair of overlying inner sheets in addition to the outer walls folded over together into said U-shape, the inlet passage being between opposing portions of the two inner sheets.

No references cited.

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