OPENING MEANS FOR CONTAINERS

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3,083,876 5/1963 Schneider et al ... 222/107
3,244,274 4/1966 Wasyluka ........... 206/65 T
3,404,988 10/1968 Rausing ............. 99/171
3,482,491 12/1969 Gustafson ................ 93/82
3,577,301 5/1971 Gustafson ................ 156/461

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ABSTRACT

A tetrahedral or similarly shaped container is provided with a pair of tabs at one end. By pulling apart the tabs, an opening is formed at the one end. The end seal at the tab end of the container is shaped and positioned so as to provide for the combination of ease of opening, strong seal which will not distort the configuration of the container. The spout or seal opening region of the seal lies essentially in one longitudinal half of the container, inorder to provide a seal opening structure which utilizes a minimum amount of container material, while providing reasonably large tabs. Preferably, the seal opening is proximate one side of the container, so as to provide a pour spout, particularly in repeated use containers.

14 Claims, 16 Drawing Figures
CROSS-REFERENCE TO RELATED APPLICATION

This application is a continuation-in-part of copending patent application, Ser. No. 232,751, filed Mar. 8, 1972, by Arthur W. Hopkins, for an Opening Means for Tetrahedral Container.

BACKGROUND OF THE INVENTION

1. Field of the Invention

The invention relates to seal opening mechanisms for containers and more particularly to a dispensing structure and an opening means for tetrahedral containers.

2. Description of the Prior Art

The low cost, rapid, continuous manufacture of tetrahedral shaped containers, of the type disclosed in U.S. Pat. Nos. 3,404,988, 3,244,274, and 2,919,800, coupled with low filling costs and low construction material costs, has contributed to the low per unit cost of tetrahedral containers.

There has been a persistent problem, however, with tetrahedral containers which are used for dispensing liquids. Typically, the container is provided with a dispensing hole which is covered with a tab. The tab is pulled away from the container thereby uncovering the hole and permitting the discharge of the liquid from the container. It is necessary, however, to hold the container body during the opening operation. Because of the unpredictability of the direction of exit of the liquid from the container, the user in too many instances is squirted with the liquid.

The solution to the problem of designing a seal opening mechanism for tetrahedral containers, is complicated by many factors. For example: the seal mechanism must not require the use of a great deal of additional material, because of the adverse affect on container costs; must not require complex and expensive machinery for the forming of the container and seal, because of the adverse affect on the capital expense; and must not affect the structural integrity of the container, because of the durability requirements of the container.

SUMMARY OF THE INVENTION

It has now been found that the problems of the prior art, normally encountered in opening tetrahedral containers can be overcome through the use of a novel seal configuration and end tabs which facilitate the opening of the container.

In accordance with the present invention, a container is provided with two sealed ends, preferably two flat seals lying in planes which are at substantially right angles to each other. One sealed end is provided with a seal opening mechanism. The seal opening mechanism is a region of the seal of the one sealed end, which deviates from a straight line and can be in the form of two or more lines or a portion of a circle. The region of the seal opening mechanism lies essentially in one longitudinal half of the container, and advantageously is proximate one side of the container so as to provide a pour spout.

BRIEF DESCRIPTION OF THE DRAWINGS

The objects of the invention will become evident and the invention will be more fully understood when the specification is read in conjunction with the following drawings wherein:

FIG. 1 is a perspective view of a container with opening means in accordance with the present invention;
FIG. 2 is a side view of a further modification of a container of the present invention;
FIG. 3 is a side view of a modification of the container of FIG. 2;
FIG. 4 is a perspective view of the container of FIG. 1, showing opened tabs;
FIG. 5 is a side view of a modification of a container of the present invention, shown with a straw inserted in the opening;
FIG. 6 is a perspective view of a container, in the self supporting position;
FIG. 7 is in three parts, 7A, 7B, and 7C, and shows three steps, in sequence, of withdrawing fluid form a container, using a straw;
FIG. 8 is a schematic illustration of apparatus for forming containers of the instant invention;
FIG. 9 is a side view of a pair of containers prior to being separated;
FIG. 10 is a side view of another pair of containers prior to being separated;
FIG. 11 is a side view of an another pair of containers prior to being separated;
FIG. 12 is a side view of still another pair of containers prior to being separated;
FIG. 13 is a side view of a further pair of containers prior to being separated; and
FIG. 14 is a side view of still a further pair of containers prior to being separated.

DETAILED DESCRIPTION OF THE INVENTION

It is well recognized that it is critical that the container material be free of kinks, as explained in U.S. Pat. Nos. 3,482,491, and 3,577,301 to Gustafson. The kinks tend to cause breaks in the inner plastic layer and break down the structural rigidity of the container. This is particularly true where fluid seeps through cracks in the inner plastic layer and impregnates the paper layer casing the paper to soften and increasing the possibility of leakage and bacteria buildup in the paper.

It is thus seen that any tendency of the container to flex is extremely undesirable because of the flexing having a tendency to create kinks in the container material.

The criticality of the aforerented problem prevents the "tear-open" technology as it applies to flat containers, from being directly applicable to tetrahedral containers. The tendency of the container to flex can be minimized or eliminated by means of controlling several dimensions, as disclosed in copending patent application Ser. No. 232,751.

The flexing problem can further be avoided by using a seal opening mechanism, as illustrated in FIG. 1, in which the seal opening mechanism region is small by comparison with the length of the sealed portion of the edge 17, of the container 10. The length of the seal region is also critical with regard to the maximum utilization of container material, as will be explained more fully, hereinafter.
As disclosed in U.S. Pat. No. 3,404,988 to Rausing, the container material typically comprises an outer plastic or wax layer and a plastic layer facing the interior of the container. The plastic layer is relatively more expensive than the relatively rigid layer of paper or cardboard and therefore is made as thin as possible. The mechanical stability of the package is produced by the paper or cardboard layer in combination with the structural characteristics of the tetrahedron.

The plastic inner layer must be inert to the substance to be packaged, strong and durable. It is preferably heat sealable, although pressure or heat sensitive adhesives can be used. Typical plastics which can be used are polyvinyl chloride, polyvinyl acetate and cellulose acetate, cellulose acetate butyrate, vinyl copolymers, polypropylene and polystyrene. For packaging dairy products, polyethylene is particularly desirable.

As shown in FIG. 1, a tetrahedral shaped container, indicated generally as 10, is provided with two sealed ends 12 and 14. The longitudinal seam 16 has no particular consequence in the instant invention and is shown only for the purpose of completeness. The container can be produced by a method such as shown in FIGS. 12 of U.S. Pat. No. 2,962,843, and thus be formed without a seam. More typically, a method such as represented in FIG. 2, of the aforementioned patent, or FIGS. 9 and 9A of copending application Ser. No. 232,751 would be used.

The sealed ends 12 and 14 lie in planes which are at right angles to each other. The container has a region which extends beyond the seal 14. This region 18, consists of tabs which are used to open the container.

The longitudinal axis of the container is represented by the line LA, in FIG. 2. The seal 24 lies transverse or normal to the longitudinal axis of the container 10. It can be seen that the seal deviates from a straight line, in the region SOM, thus forming a seal opening means. The region 18 can house a drinking straw 22. In this instance, the open peripheral edges 26, 27, and 28 of the container would be loosely or weakly sealed, inorder to protect the straw 22. The edge 26 can be left uncut in the forming operation, as explained hereinafter.

As shown in FIG. 3, the region 18 can house a straw which is of limited length, thus providing a more compact structure. The length of the straw is limited to a length about equal, or slightly less than the length of the straight seal 30. In this case, the length of the region of the seal opening means SOM, is kept to a minimum, inorder to permit the straw to be of sufficient length. The edge 36 can be left uncut, or can be sealed, as desired. The seams along the edges 37 and 38 should be weak, so as to permit ready access to the straw 32 and so that two tabs are provided for pulling against the seal opening means SOM. The seals 12 and 30 cannot be weak seals of the type used along edges 36, 37 and 38, because of the need to withstand the fluid pressures which can be built up inside of the container 10. The function of the tabs 40 and 42 is illustrated in FIG. 4, wherein it is shown that the tabs 40 and 42 are pulled apart, in the directions indicated by the arrows 40A and 42A respectively. The pressure on the seal opening means SOM, as more fully explained in copending patent application Ser. No. 232,751, results in the seal opening in a desired and controlled manner.

The proper utilization of the flaps 40 and 42, requires that the container be cut in the region of the flaps, along edge 41. The cut is necessitated by the close proximity of the seal opening means to the edge 41 of the container 40. Additionally, it can be advantageous to provide a longitudinal cut in the flaps, as indicated by the line 19, in FIG. 1.

The incorporation of a straw into the container structure provides the advantage in institutional applications, such as school, of eliminating the need for the separate dispensing of straws. This not only expedites the dispensing of the straws but also assures the use of only one straw per container.

As shown in FIG. 3, the container can be dimensioned so as to enable the user to conveniently and completely empty the container with the straw provided. The side 51 of the container can be made shorter in length than the straw 52. In the case of a container such as illustrated in FIG. 2, the side 51 would be made shorter than the edge 57. In the case of a container such as illustrated in FIG. 3, the side 51 is made shorter than the straight portion 53, of the end seal 54.

As shown in FIG. 6, the container 60 can support itself upon its triangular base 62, with the opening 63, at its upper end. It is evident that in this position, one could empty the fluid contents of the container to an appreciable extent, even with a short straw.

As illustrated in FIGS. 7A. 7B and 7C, a container 70 can be provided with an end seal 75 which comprises a short straight section 72, a seal opening means section 73, and a long straight section 74. The function of the short straight becomes evident from FIGS. 7B and 7C, wherein it is seen that the container can be rotated as the contents are withdrawn, until the last portion is contained within the region bounded by the short straight section 72 and the side 76. This modification enables a user to withdraw the last drop of liquid, even though the straw has a length less than the length of the sides 76 and 77.

The techniques used in the manufacture and filling of the tetrahedral container are well known in the art. For example, U.S. Pat. No. 3,299,605 relates to the making of container from a web of material and U.S. Pat. Nos. 3,482,491 and 3,577,301 disclose the production of tetrahedral hollow articles.

As set forth in copending application Ser. No. 232,751 a band-like web of material is continuously withdrawn from a supply roll. As previously noted, the material should possess a certain degree of stiffness combined with a minimum tendency to crease and to tear, because of the requirements in using the material for a container and because of the stresses which the web of material experiences during the forming operation. The material is therefore preferably a paper coated with polyethylene or the like.

The web travels over a horizontal guide roller from which is drawn downwards to be formed into a tube. The formed tube continues to travel and at predetermined intervals two sealing jaws are brought together, forming the seams 80 and 81.

The tube 101 continues to travel downward and at a further predetermined interval, the heat sealing jaws are brought together to form a transverse seam 106 and create a pair of tetrahedral containers 107 and 108.

At any desired point in time, the contents of a pair of tetrahedral containers can be cut into a plurality of individual containers. The pair of cutting jaws 110 and 111 are brought together to form a straight cut across the seal 106. Another pair of cutting jaws (one of which
S is shown) are brought together to form the cut between the seals 80 and 81. The cutting jaw 112, has a complex cutting edge. The contour of the cutting edge is determined by the type of flap edge which is desired. The wing like region 115 of the cutting blade 114 is required in order to permit the flaps to be separated and pulled apart easily.

The material saving feature of the instant invention can best be seen by comparing the structure 90 and 100, of FIGS. 9 and 10, respectively. Given two pairs of containers of equal capacity, it is evident that the containers of structure 100, use more material, because of the need for two equal flap or tab zones, 110 and 112. The modification of FIG. 9 depending upon the dimensions of the container, can typically use from 5 to 20 percent less material.

In order to achieve the maximum material savings, while preserving optimum seal and flap characteristics, it is evident from FIGS. 11 and 12 that the seal opening means SOM, of adjacent containers, must be located in opposite longitudinal halves of the container, with respect to the container structures before being cut into single structures.

Advantageously, adjacent legs 120 and 122 of the seal opening means, do not cross the center line or longitudinal axis of the container. While each seal can extend as much as thirds of the way across a container, such a configuration causes unnecessary complexity and some material wastage. It is particularly essential for the leg of the seal opening means (such as 130 of FIG. 13) to be spaced from the peak 133 of the adjacent seal opening means 135.

Viewing the opposing seal opening means relationships from another standpoint, it can be seen that the apex of the seal opening means should be close to, or proximate a side 145 of the container, inorder to attain optimum material savings. This configuration permits the seal opening means to be essentially contained in one longitudinal half of the container.

What is claimed is:

1. A hollow container comprising: a cylindrical body portion having a pair of transversely sealed ends, each of said ends of said cylindrical body portion lying substantially in a plane, the plane of one of the ends of said cylindrical body portion being at approximately a right angle to the plane of the other end of said cylindrical body, one of said sealed ends having tab sections extending beyond the end seal, said seal deviating from a straight line in a region which lies essentially in one longitudinal half of the container.

2. A hollow container having a cylindrical body portion and a pair of sealed ends, each of said end seals being transverse to the longitudinal axis of said container and substantially offset with respect to the plane of the other of said seals, thereby causing said cylindrical body portion to be non-circular in cross-section, one of said seals having at least a region which deviates from a straight line, said region being proximate a side of the container, and a tab region, said tab region being unsealed free ends of said container adjacent to said one of said seals.

3. The structure of claim 2, wherein said cylindrical body portion is in the form of a tetrahedron.

4. The structure of claim 2, wherein the plane of said seals are at right angles to each other.

5. The structure of claim 1, further comprising a tab region, said tab region being bounded on one side by said one of said seals and extending beyond said one of said seals, said region being sealed at its peripheral edges, and a drinking straw enclosed within said tab region.

6. The structure of claim 2, wherein said one of said seals has a pair of sealed sections which extend into the tab region.

7. A hollow container having a cylindrical body portion and a pair of sealed ends, each of said sealed ends having end seals transverse to the longitudinal axis of said container and lying substantially in a plane, the plane of one of said seals being substantially offset with respect to the plane of the other of said seals, thereby causing said cylindrical body portion to be non-circular in cross-section, a tab region, said tab region being formed by ends of said container which extend beyond one of said seals, and a drinking straw in said tab region, said tab region being sealed along its peripheral edges.

8. The structure of claim 7, wherein said cylindrical body is in the form of a tetrahedron.

9. The structure of claim 7, wherein the planes of said seals are at right angles to each other.

10. The structure of claim 7, wherein said one of said seals has a pair of seal sections which extend into said tab region.

11. A hollow tube having a plurality of spaced seals, adjacent seals lying in non-parallel planes and each seal lying in a plane parallel to an alternate seal, thus forming a plurality of hollow containers, every other seal being a composite seal and including two mirror image seals having a region which deviates from a straight line, said region being essentially in one longitudinal half of said container which includes the region.

12. The structure of claim 11, wherein said two mirror image seals are spaced apart forming a tab region.

13. The structure of claim 11, wherein said containers are in the form of tetrahedron.

14. The structure of claim 11, wherein alternate seals lie in planes at right angles to each other.