

[54] **CAN-STRAW CONSTRUCTION**
 [75] Inventor: **Robert J. Harvey**, Sudbury, Mass.
 [73] Assignee: **Mirlin Corporation**, Wayland, Mass.
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Primary Examiner—Leonard Summer
Attorney—Kenway, Jenney & Hildreth

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 99/138 R; 239/33; 99/171 B

[57] **ABSTRACT**

A container construction comprising a container having a straw sealed at both ends and means for breaking the seals without removing the straw from the container. The construction is particularly useful in conjunction with a straw coated on the interior surface with a flavoring or taste-modifying material, such as miraculin, the taste-modifying protein obtained from the berry of *Synsepalum dulcificum*.

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9 Claims, 5 Drawing Figures

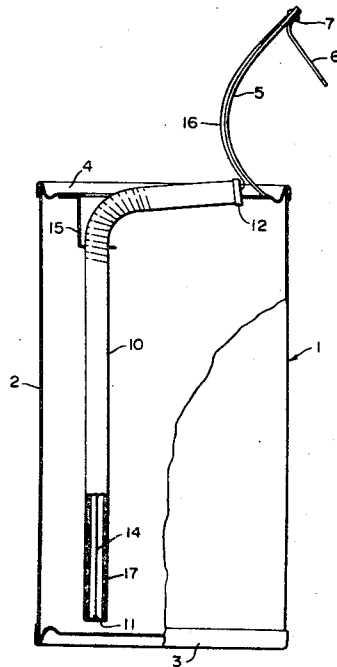


FIG. 1

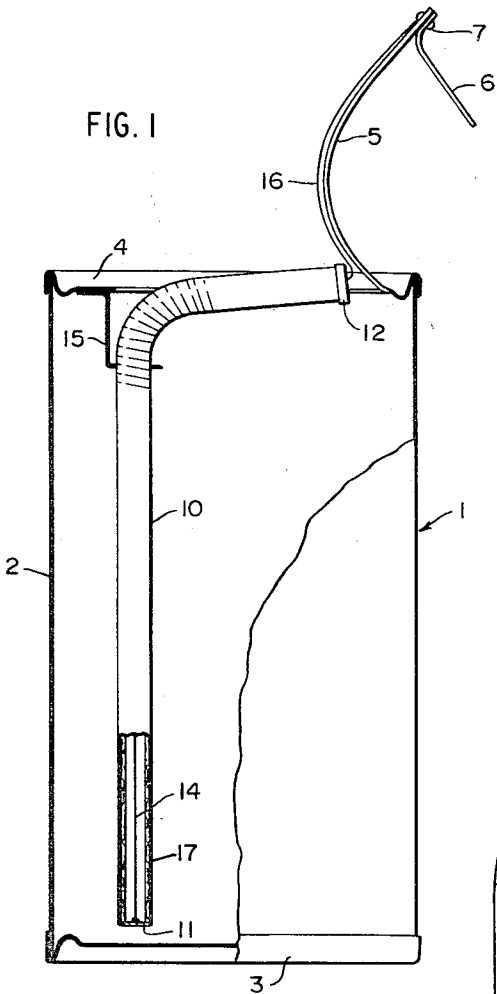


FIG. 2

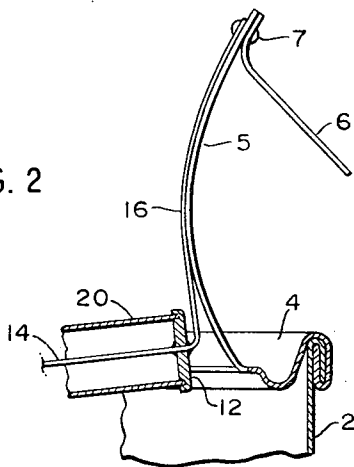


FIG. 3

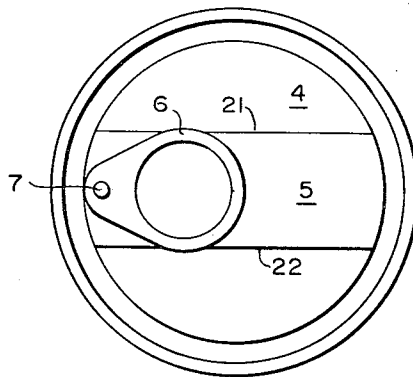


FIG. 4

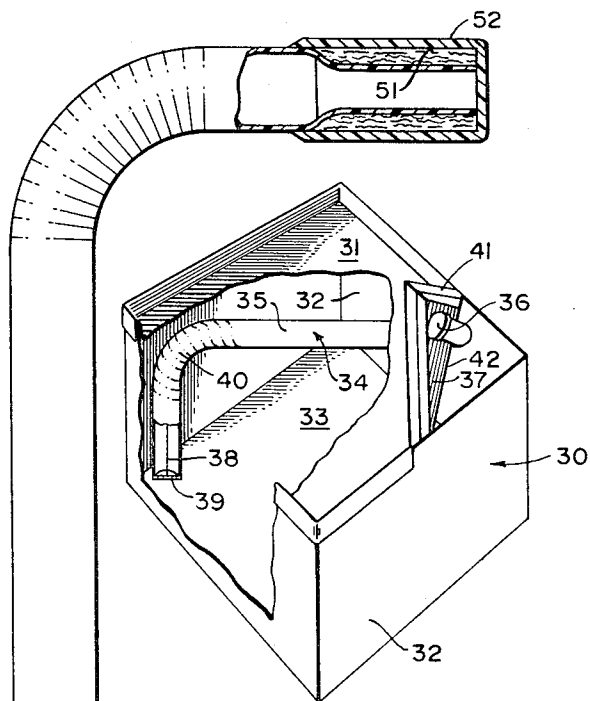


FIG. 5



INVENTOR
ROBERT J. HARVEY

BY

Kenway, Jenney & Hildreth
ATTORNEYS

CAN-STRAW CONSTRUCTION

This invention relates to a closed container containing a sealed straw and more particularly a container having a tear-out portion on one surface containing a sealed straw.

Containers having a straw incorporated therein are presently known. Straws have been incorporated in cartons and cans, including cans having a tear-out tab that requires no special opener. Generally, the straw in the container is longer than the container height and is positioned so that when it is opened, one end will be in an operative position to permit drinking the contents of the container. There also are available straws coated on the interior with a taste-modifying or flavoring composition adapted to modify the taste of liquid being imbibed through the straw. However, the coated straws are not useful from a practical standpoint in the container-straw constructions since the liquid and the straw coating tend to become admixed during storage. Furthermore, this admixing may lead to degradation of labile flavorings or taste-modifying materials such as in acidic carbonated beverages. Accordingly, it would be desirable to provide a construction that permits using coated straws in containers filled with liquid.

In accordance with the present invention there is provided a container-straw construction that prevents liquid stored in the container from contacting the interior of the straw prior to use, yet permits immediate use of the straw when the container is opened. This invention comprises a closed container having a straw therein, sealed at both ends, with a removable seal. One end of the straw is located near the top of the container to permit ready access to it after opening the container. The container is opened by removing a portion of the container top such as with a tear-out tab or by folding a portion of the top. The seal on the bottom portion of the straw is broken or removed either by means associated with the movable or foldable container top or by positioning the straw. The seal on the top portion of the straw can be pulled off automatically while opening the container or it can be removed by hand.

FIG. 1 is a side view in partial cross-section of a partially-opened cylindrical can having a straw therein.

FIG. 2 is a detail cross-sectional view of the top of the can and straw of FIG. 1.

FIG. 3 is a top view of the can of FIG. 1 when sealed.

FIG. 4 is an isometric view in partial cross-section, of a carton having a rectangular cross-section and containing a sealed straw.

FIG. 5 is a partial cross-sectional view of a straw construction particularly useful herein.

Referring to FIGS. 1, 2 and 3, the can 1 comprises conventional side walls 2, bottom 3, and top 4, which are sealed in any conventional manner. The top 4 has a tab 5 comprising a ring 6 attached to the top 4 around lug 7. The tab 5 is formed by scoring the can top along lines 22 and 21 to facilitate opening the can 1. The straw 10 is sealed with an impervious membrane 11 at the bottom portion and a cap 12 at the top portion. A thread or fiber 14 extends from the cap 12 to the seal 11 along the length of the straw 10. The straw 10 is held in position by virtue of the folds 13 and by being passed through an opening in flange 15 attached to the top 4 of the can thereby permitting bending the straw 10 without exerting tension on the fiber 14 while maintain-

ing membrane 11 intact. A section 16 of fiber 14 is attached to the tab 5 along the inside surface. When the can is to be opened, the ring 6 is pulled to tear the tab 5 from the top of the can 4. When the tab 5 is pulled, tensile force on the cap 12 is exerted to tear it from the straw 10. Simultaneously, the tension on the thread 14 is sufficient to tear the seal 11 on the bottom portion of the straw 10. When the tab 5 is removed, the fiber 14 also is removed, and the top end of the straw 10 is accessible for use. This construction prevents contact of the liquid in the container 1 with the interior of the straw 10 and thus, is particularly adaptable for use with straws coated on the inside surface. The straw 10 can be coated with a stable miraculin composition 17.

Referring to FIG. 2, the top portion 20 of straw 10 is sealed, cap 12 having fiber 14 attached thereto. The top section 16 of the fiber 14 is attached to tab 5 and detaches cap 12 from straw 10 when tab 5 is pulled from the can.

Referring to FIG. 4, the carton 30 having a top 31, side walls 32 and bottom 33 contains a flexible plastic straw 34. The straw 34 is sealed at both ends and is bent so that its top section 35 extends across the diameter of the container in close proximity to the top 31. The top section 35 is sealed with cap 36. The cap is attached to the inside surface 37 of the top 31 to facilitate access to the straw when the carton 30 is opened. The straw 34 has a thread 38 attached to the inside surface of cap 36 and to a tear seal 39. The folds 40 in straw 34 permit bending the straw with little or no tension on fiber 38 thereby preserving the seal 39. The top 31 is opened by pulling the strip 41 upward from the carton 30 so that its top 31 bends along score 42 thereby exposed cap 36. When cap 36 is pulled, the seals at both ends of the straw 34 are broken and the liquid in container 30 can be drunk. If desired, the top section 35 of the straw 34 can be adhered to the surface 37 along a portion of its length to provide additional stability to the straw thereby preventing tension from being applied to the seal 39 during storage. Furthermore, the top of the carton can comprise a removable tab that extends the diameter of the carton access to the straw 34. Referring to FIG. 5, the straw 50 can be coated in the exterior surface with a taste modifying material 51 along the portion of the straw normally placed in the mouth. The coating is protected with impervious membrane 52 that is sealed to the straw 50. The straw is placed in the can by being bent as shown. When ready for use, the container is opened to expose the top portion of the straw and the membrane 52 is broken to expose the tongue to the taste modifying material prior to drinking the liquid.

While the invention has been described with reference to a thread as the means for breaking the seal at the bottom of the straw, it is to be understood that other means can be employed. Thus, in one aspect of this invention, the bottom inside surface of the can or a portion thereof is coated with a soft plastic or gel material into which the bottom portion of the straw can be embedded to prevent the liquid in the container from entering the straw interior. When the straw is ready for use, it is merely lifted from contact with this soft material to expose the interior of the straw to the liquid.

In one aspect of this invention, the straw employed in the construction is coated on its interior surface with a taste-modifying material capable of rendering normally sour-tasting liquid sweet-tasting comprising stable miraculin obtained from the red fruit of the plant *Synsepalum dulcificum* Daniell, Sapotaceae. This material and its use as an interior coating for straws is described in detail in my copending application Ser. No. 28,963 filed Apr. 15, 1970, now U.S. Pat. No. 3,620,770.

The straw is coated with a non-toxic alkaline material admixed with confectionery sugar and stable miraculin in a configuration so that the first liquid to pass through the straw is neutralized by the alkaline material prior to contacting the miraculin and the first mouthful is sweetened by the confectionery sugar prior to the time the miraculin has been able to become effected. One coating configuration comprises a straw coated with the mixture of alkaline material and powdered sugar at the bottom end along the inside surface, and coated with miraculin on the top end along the inside surface. Another configuration comprises coating both ends of the straw along the inside surface with the mixture of alkaline material and powdered sugar while the central portion of the inside surface is coated with miraculin. A third configuration comprises coating the straw with miraculin along all or a portion of its length and coating the miraculin layer with the mixture of alkaline material and powdered sugar along the entire length of the straw. When the liquid in the container is non-acidic, the straw interior need not be coated with alkaline material. Suitable alkaline materials include calcium carbonate, bicarbonate of soda, magnesium carbonate, aluminum trisilicate, aluminum hydroxide complexes such as aluminum hydroxide-magnesium carbonate codried gels, aluminum hydroxide or mixtures thereof.

It is to be understood that this invention can be used in conjunction with straws coated with any flavoring material. Furthermore, this construction is adapted for use with any container for liquids including cans, cartons, or the like. The only requirements are that the straw retained in the container be sealed at both ends to prevent liquid from entering the interior of the straw and that means be provided for breaking the seals at

the bottom of the straw.

I claim:

1. A container construction comprising
 - a. a hollow container having a bottom, side walls and a top,
 - b. a straw in said container sealed at both ends,
 - c. said top having a manually removable or foldable closure to expose said straw for use
 - d. means for breaking said seals without removing the straw from the container comprising a thread in the straw and attached to each seal.
2. The construction of claim 1 wherein the interior of the straw is coated with stable miraculin.
3. The construction of claim 1 wherein the closure comprises a tab defined by scores in the container top and having means attached thereto for manually tearing the closure from the top.
4. The construction of claim 2 wherein the interior of the straw is coated with stable miraculin.
5. A container construction comprising
 - a. a hollow container having a bottom, side walls and a top,
 - b. a straw in said container sealed at both ends,
 - c. said top having a manually removable tab to expose the straw for use, said tab defined by scores in the container top,
 - d. means for connecting the seal at the top of the straw to the inside surface of the removable tab, and
 - e. a thread in the straw attached to both seals for breaking the seal at the bottom of the straw without removing the straw from the container.
6. The construction of claim 5 wherein the inside surface of the straw is coated with stable miraculin.
7. The construction of claim 5 having means for maintaining said straw stationary relative to the container prior to use.
8. A straw having one end adapted for insertion into the mouth coated on the outside surface at said end with a taste-modifying material for direct application to the tongue, said coating being sealed at said one end with a removable liquid impermeable membrane.
9. The straw of claim 8 wherein said taste modifying material is stable miraculin.

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