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(54) **Flexible containers.**

(57) A flexible container suitable for dispensing liquid contents by evacuation. The inner surface of the container wall is perforated or embossed. This avoids the need for an insert to assist with dispensing when the flexible container collapses due to evacuation of the contents.

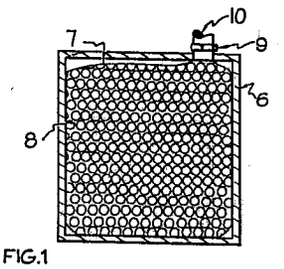
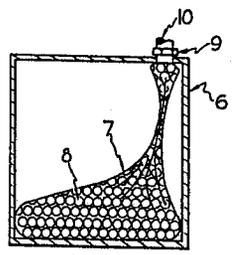


FIG.1

FIG.2



EP 0 251 812 A2

Description

FLEXIBLE CONTAINERS

This invention relates to flexible containers for liquids particularly of the "bag in box" type.

Difficulty has been encountered in dispensing the liquid contents of such flexible containers when the contents are pumped out of the flexible container, because the removal of the contents evacuates the container which causes it to collapse, thus bringing the inside surfaces of the bag into close contact, substantially free from creases, which prevents any further egress of the contents.

Where the outlet is located on the top of the container the collapse of the bag seals off the liquid contents from the dispensing outlet. One attempt to overconme this problem has been disclosed in U.S.A. Patent 4,138,036 which provided a helical coil extending from the dispensing spout into the bag. Australian Patent Application 34411/84 discloses a flexible bag having a liquid passage integral with a wall of said bag which enables fluid to be dispensed by bag evacuation. Other forms of flow guide are disclosed in Australian Patent Applications 46844/85 and 40144/85. U.S.A. Patent 4,381,846 discloses an insert of flexible mesh to aid in dispensing liquid.

These conventional solutions all rely on insertions to provide flow guides and this involves additional manufacture steps and costs.

It is an object of this invention to provide a construction for a flexible container for liquids which enables it to be used in dispensing liquid through an outlet disposed at the top of the flexible container by pumping the liquid contents through said outlet.

To this end the present invention provides a flexible container in which the inner lining of the flexible container is at least partially treated to provide an embossed or perforated surface.

Surprisingly this construction enables the liquid contents of the flexible container to be pumped out without the evacuation of the container preventing egress of the liquid contents through the outlet. Any pattern of perforations or embossing, which provides a network of interconnecting voids is suitable. This enables the liquid contents to flow through this network of voids to the outlet when the pump is operated to apply a vacuum or suction effect.

The perforations or embossing may vary in size to suit liquids with no solid content or to suit liquid/particulate suspensions such as orange juice, tomato juice etc. It will be clear that some testing will be required to match suitable embossing or perforation to different liquid/suspensions.

The size of perforations may range from a fraction of a micron as found in fabric material such as a spun bonded polyethylene fibre fabric, to as large as 2mm. Effective spacing of perforations is usually less than 5mm. Larger holes will tend to weaken the web if they are placed close enough to be effective.

Embossing is characterised by the raised section of the surface being of the order of 1-2 microns to 500 microns, spaced the same order of magnitude apart. The limiting factor is that embossing will promote trapped air in the empty bag and in some applications this is required to be kept at a very low level e.g. less than 50 cc.

Where laminated wall materials are used,. materials such as, Poly 10 um- vacuum metallised polyester 12mic - Poly 50mic or 12um Polyester - 9 um Foil - 50um Poly are suitable laminants. It is undesirable to laminate a perforated liner because the perforation will be filled in. It is possible however to laminate an embossed layer or alternatively to emboss the laminant itself.

A preferred form of the invention is illustrated in the accompanying drawings in which figure 1 is a schematic section view of a full container and figure 2 is a sectional view of a partially empty container.

The container as shown in figures 1 and 2 comprise a flexible container 7 disposed in a rigid support box 6. The flexible container 7 is formed from synthetic plastic film which may be a laminate or two layers of film sealed together at the seams. The internal film layer or liner is in accordance with this invention perforated by perforations 8. Alternatively the internal layer could be embossed.

The outlet 9 of the flexible container 7 is fitted into the top of the support box 6 and connected via conduit 10 to a dispensing pump.

When the dispenser is activated and the liquid contents of the container 7 are drawn out the container 7 collapses under atmospheric pressure as shown in figure 2. Without presence of the perforated inner liner the collapsed container walls would restrict egress of the liquid contents of the container.

A 20 litre flexible bag of Coca Cola concentrate was pumped out using a "sureflo" diaphragm pump. The time taken and the remaining liquid in the bag was noted.

This trial was carried out with a perforated liner according to this invention and with a flexible bag having a long tube.

The results were as follows:

	Time to empty	Trapped Liquid
Original Coca Cola bag	6 min	360 gms.
Perforated bag (invention)	6 min	65 gms.

In conclusion - the perforated bag provides a more efficient system in evacuating the bag than conventional flow guides without the need of additional insertions into the container.

Claims

1. A flexible container for liquid products adapted for emptying by pumping or evacuation in which the inner lining of the container is at least partially treated to provide an embossed or perforated surface.
2. A flexible container as claimed in claim 1 wherein the container wall is a laminate of synthetic plastic film and the internal film layer is embossed.
3. A container composed of a flexible synthetic plastic wall material wherein the layer of said wall material forming the internal surface of the container is at least partially embossed or perforated in a pattern extending toward the container outlet, said container being capable of holding liquid products and of being emptied by evacuation of its liquid contents.

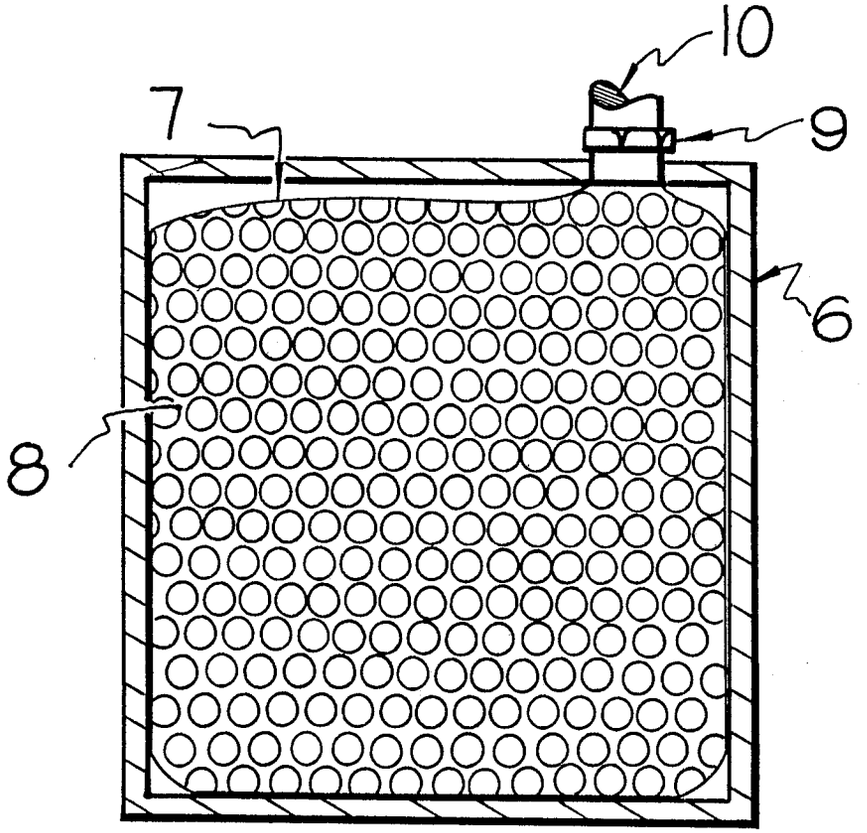


FIG.1

FIG.2