

A LIQUID CONTAINER

The present invention relates to a liquid container.

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Liquid containers formed of flexible material in a bag shaped configuration are known, for example, for containing beverages such as orange juice or sports drinks. The beverage is filled into the container through an upper opening and the opening is then thermally sealed. A wall of the container is formed with a hole which is normally closed by an adhesive sheet. To drink the beverage it is necessary to peel the adhesive sheet from the wall and to break a sealing film at the hole by the insertion of a straw into the interior of the container. Of course, a straw has to be provided, and if the straw is not provided, or is lost, access to the contents is difficult.

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Because of these disadvantages, another type of liquid container has been developed which includes a flexible, upwardly open bag-shaped main body having a delivery unit secured to its upper opening. This delivery unit is provided externally with a mouth portion and with a conduit extending into the interior of the container body.

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A liquid container of this latter type is light in weight and can be opened easily in comparison with other types of liquid containers such as cans and bottles. It is therefore used for containing various items such as sauces and the like as well as for beverages.

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A liquid container of the flexible body type does not need a separate straw and the above described problems are therefore overcome. However, as the liquid

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has to be filled into the container through the mouth portion of the delivery unit, air may remain in the container during filling so that the container is not sufficiently filled.

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Further, if the liquid in the flexible body container is to be poured into another receptacle, such as a cup, through the delivery unit, part of the liquid remains in the container.

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It is an object of the present invention to reduce the drawbacks of the prior art.

According to the present invention there is provided a liquid container comprising:-

15 a) a container body formed of a flexible material and having an opening therein, and

b) a liquid delivery unit secured to said opening and arranged to allow a liquid within the container body to pass therethrough, said delivery unit comprising:

20 a mouth portion positioned outside said container body,

a joining portion in sealing contact with said opening, and

25 an elongate conduit portion extending from said joining portion within said container body, said conduit portion having an open free end within the container body, and communicating at its other end with said joining portion, and wherein at least one hole is formed in said conduit portion, the or all of said holes being
30 positioned inside said container body adjacent to said opening such that there are no other holes along the length of said conduit portion.

35 A liquid container of the invention enables it to be substantially completely discharged by way of the

delivery unit either by sucking or sipping on the mouth portion, or by inverting the container and allowing the contents to pour out. In this respect, if the delivery unit is used as a straw to discharge the liquid from the container, the hole or holes is closed by the container wall because of the flexibility thereof, so that the liquid can be effectively sucked. Further, when the liquid is poured from the container, the hole(s) in the conduit portion act as a liquid discharge port, to thereby completely discharge the liquid from the container.

In a preferred embodiment, said conduit portion has a cylindrical wall, and the liquid container further comprises a pair of ribs extending downwardly in parallel with each other from the positions adjacent to the opening, said pair of ribs being formed on said cylindrical wall, wherein a plurality of holes are formed in said conduit portion adjacent said opening, said plurality of holes extending through the cylindrical wall of said conduit portion and being located between the ribs of said pair.

For example, said plurality of holes may be a plurality of slots positioned within said container body and adjacent said opening. In this case, said pair of ribs may be positioned on the outer surface of said conduit portion, and extend in an axial direction of said conduit portion.

The delivery unit may also comprise at least two flanges arranged on said mouth portion outwardly of said container body relative to said joining portion, and at least two ribs positioned between said flanges and projecting in a direction substantially perpendicular to front and rear surfaces of said container body.

The flexible material of which the liquid container is formed may comprise laminated films.

05 In a preferred embodiment, the container body is made of flexible material, and has said opening at an upper end thereof.

10 For example, the container body may have a folded construction defining a pair of side walls which are substantially V-shaped in cross-section prior to filling the container body with liquid. Preferably, the container body has front and rear walls and said pair of side walls, and said front and rear walls are thermally sealed with said side walls. The front and rear walls
15 are thermally sealed together at their lower end portions, four lower end corners of said container body are cut away, and edge lines of said cut away portions are thermally sealed.

20 The invention also extends to a combination of at least one liquid container as defined above, and a container assembling member, wherein said container assembling member comprises a channel member having a substantially C-shaped cross-section, said channel
25 member being formed with a lip portion engageable with the delivery unit of the or each said liquid container.

In an embodiment, the liquid delivery unit of the or each said liquid container has a flange portion
30 external of its container body and adjacent to said opening, the lip portion of said channel member being engageable with the flange portion of the or each said liquid container whereby a plurality of liquid containers may be assembled relative to said channel
35 member.

05 The combination may further comprise a packaging box for storing a plurality of said liquid containers, and a plurality of support members disposed in said packaging box for mounting thereon at least two said channel members.

10 Preferably, each said flange portion of a liquid container comprises two flange members spaced relative to each other in an axial direction of said delivery unit, the lip portion of a said channel member being engageable between said two flange members.

15 Embodiments of the present invention will hereinafter be described, by way of example, with reference to the accompanying drawings, in which:-

20 Figure 1 shows a perspective view, partly broken away, of one embodiment of a liquid container of the invention.

Figure 2 shows a side view of a delivery unit of the container of Figure 1,

25 Figure 3 shows a perspective view, partly broken away, of an alternative embodiment of a liquid container,

30 Figure 4 shows a side view of another embodiment of a delivery unit,

Figure 5 is a front view of a delivery unit,

35 Figure 6 is a side view showing parts of two delivery units movable along a guide member;

Figure 7 is a top view of a liquid container,

05 Figure 8 shows part of a flexible material used to
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10 Figure 9 shows a perspective view of a combination
of a container assembling member and a plurality of
liquid containers,

Figure 10 shows a cross-sectional view of the
combination of Figure 9,

15 Figure 11 shows schematically assemblies of
containers being transferred into a beverage filling
station,

20 Figure 12 shows a cross-section through a container
body,

Figure 13 shows a front view of another embodiment
of a container body,

25 Figure 14 shows a side view of a container body
illustrating the cutting away of corners thereof, and

Figure 15 is a bottom view of a container body
after beverage injection.

30 In the drawings, the same reference numerals have
been used to refer to the same or similar features.

35 Figure 1 shows an embodiment of a liquid container
comprising a container body 1 formed with an opening 1a
at its top. The container body 1 has a flexible
structure and is made of a flexible material.

As shown in Figure 8, the flexible material comprises a polyester film 2 having a thickness of $12\text{ }\mu$, a layer of aluminum foil 3 which is $9\text{ }\mu$ thick, a layer of stretched nylon film 4 which is $15\text{ }\mu$ thick, and a polyethylene film 5 having a thickness in the range 60-120 μ . These films may be laminated. A content delivery unit 7 is secured to the upper opening 1a of the container body 1. The content delivery unit 7 is integrally connected to the container body 1 upon sealing of the upper opening 1a.

As can be seen from Figure 1, the container body 1 has front and rear walls connected by a pair of folded side walls. Before the container body is filled with liquid it is generally flat. However, after filling it attains the filled shape illustrated in Figure 1. As can be seen, in this condition the lower end portions of the front and rear walls define a substantially flat base portion for the container body. The container body can clearly be stood on this base portion.

As shown in Figure 2, the content delivery unit 7 includes a mouth portion 9, which has a threaded portion 8, and an elongate conduit portion 10 which is integral with the mouth portion 9. The mouth portion 9 is positioned outside of the container body 1 when the content delivery unit 7 is secured to the opening 1a of the container body 1. A cap holding member 9a is formed on the delivery unit 7 near to the mouth portion 9 and is arranged to hold the lower end of a cap 16 threadingly engaged on the threaded portion 8. The conduit portion 10 extends from a joining portion 11

which joins the conduit portion 10 and the mouth portion 9. The upper opening 1a is in sealing contact with an outer peripheral surface of the joining portion 11 when the upper opening 1a is thermally sealed. A hole 12 is formed at an upper portion of the conduit portion 10. The hole is formed by partially cutting the cylindrical wall of the conduit portion 10 of the delivery unit. Upon assembly, the hole 12 is positioned inside the container body 1 and adjacent the joining portion 11 and the opening 1a. It will be seen that no other holes are provided along the length of the conduit portion 10.

Figure 3 shows an alternative construction of a liquid container having a delivery unit 7 provided with two supporting flanges 14 which extend generally transversely relative to the axial extent of said delivery unit 7 and are positioned between the threaded portion 8 and the joining portion 11. The flanges 14 are spaced relative to each other in the axial direction of the delivery unit 7, and each is generally octagonal in shape. The container body has a three dimensional shape upon injection of the beverage, and two sides of each octagonal flange 14 extend substantially parallel to the front and rear surfaces of the container, while two sides of the remaining six sides of each flange extend substantially perpendicular to the front and rear surfaces of the container body 1.

Ribs 15 project from an outer peripheral surface of the mouth portion 9 in a direction substantially perpendicular to the front and rear surfaces of the container body 1 and extend in the axial direction of the delivery unit 7. These ribs 15 are positioned between the flanges 14. As best shown in Figures 5 and 6, the ribs 15 extend to the free ends of the flanges 14, and lower end portions of the ribs 15 are cut away

as shown in Figure 6. These ribs 15 are provided in order to prevent the flanges 14 of one liquid container (A) from engaging the flanges 14 of a neighbouring liquid container (B) when these containers are moved along a guide member 17, as indicated in Figure 6.

In the construction illustrated in Figure 4, a conduit portion 10, which extends from the joining portion 11, is provided. The conduit portion 10, adjacent the joining portion 11 and within the container body, is provided with a plurality of slots 12 and a pair of ribs 13 which extend in the axial direction of the delivery unit and hence of the conduit portion 10. The slots 12 are arranged to be symmetrical relative to one another. The conduit portion 10 is arranged to have a length which positions its lower open end at or near to the bottom of the container body 1 when the content delivery unit 7 is fixedly secured to the opening 1a of the container body 1.

When the content delivery unit 7 is used as a straw or sipper, the cap 16 is removed from the mouth portion 9 so that the mouth portion 9 can be inserted into a human mouth. Upon sucking or sipping, the wall of the container body 1 is urged toward the hole 12 (Figure 2) or slots 12 (Figure 4) formed in the conduit portion 10 because of the flexibility of the container body. Thus, the hole 12 or slots 12 are closed by the wall. As a result, a beverage is sucked from the open lower end of the conduit portion 10.

When the content delivery unit 7 is used as a pouring device, the user holds the container body 1 by hand and inclines it so that the beverage can be discharged through the hole or slots 12 of the conduit portion 10 and out of an opening in the mouth portion 9.

As the hole or slots 12 are positioned at the upper portion of the conduit 10, the beverage is completely discharged out of the container body 1 by inverting the container.

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To fill the liquid containers described, each container body 1 is suspended by a guide member 17 of a beverage filling apparatus (not shown) by way of its supporting flanges 14. The ribs 15 formed between the
10 flanges 14 prevent the flanges of one container from becoming engaged with the flanges of a neighbouring container. A plurality of the container bodies can therefore be aligned in a row without disturbance during beverage injection thereinto. The hole 12 (Figure 2) or
15 the plurality of slots 12 (Figure 4) in the conduit portion 10 enable air in the container to discharge to atmosphere therethrough during beverage injection, and thus a sufficient quantity of the beverage can be injected into the container.

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The ribs 15 also prevent the delivery unit 7 from thermal contraction during cooling after the process of forming the delivery unit by injection molding. This improves the resultant dimensionals stability of the
25 delivery unit. Furthermore, and as shown in Figure 4, ribs 13 may be provided for reinforcing the part of the conduit portion 10 at which the slots 12 are formed.

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As described above, as beverage is filled into each container body, a smooth discharge of air through the hole or slots 12 is provided, to ensure effective filling. In addition, the hole or slots enable effective discharge of the beverage out of the container
35 body. Further engagement between neighbouring container bodies is obviated to facilitate regular alignment

thereof during injection of the beverage.

05 Figures 9 to 11 illustrate a combination of the
invention of liquid containers and a container
assembling member. As shown, the container assembling
member comprises a channel member 20 which has a
generally C-shaped cross-section. The channel member 20
is formed with a lip portion comprising two spaced and
aligned linear lips 22. The channel member 20 is
10 mounted in a recess 25 of a support member 23 so that
the lips 22 are disposed at the upper portion of the
channel member 20. The support member 23 may be
located, for example, in a packing box. The channel
member 20 has an internal space whose vertical length h
15 is sufficiently long to permit the mouth portion 9 of a
liquid container to be received within the channel
member 20. By this means, a container is held by the
channel member 20 in its inverse position and can be
smoothly slid therealong. A portion of the mouth
20 portion 9 between the two flanges 14 has a generally
rectangular cross-section and its width is smaller than
the width w of the spacing between the two lips 22 to
allow smooth engagement of the flanges with the lips 22.
The axial length of the spacing between the flanges 14
25 is greater than the thickness of each of the lips 22.

For the transportation of a plurality of the liquid
containers, the liquid containers are inverted and are
successively inserted into the interior of the channel
30 member 20 from one of its longitudinal open ends 21 so
that flanges 14 are slidingly engaged with the lips 22.
In this case, the container bodies 1 are all aligned in
the same direction so that the containers are regularly
assembled with respect to the channel member 20.

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A plurality of channel members 20 can be mounted to
extend substantially parallel with respect to one

another on the support member 23 of a packaging box as shown in Figure 10. In this case, one of the container bodies 1 assembled with one of the channel members 20 is interposed between adjacent container bodies assembled with the other of the channel members as is indicated. In this manner compact packaging can be provided as the container bodies in the two rows of containers are staggered with respect to one another. The or each support member 23 can form the bottom of a packaging box. A plurality of support members 23 may also be disposed in one box separated from one another in the vertical direction.

Where the containers are to be filled with a beverage, the channel 20 may act as a guide for introducing the containers into a beverage filling station 24 as is indicated in Figure 11. It is thus unnecessary to pre-align the containers ready for the injection of beverage thereinto.

The combination of the containers and the container assembling member described above enables a plurality of containers, which do not have a self-standing facility prior to liquid injection, to be regularly assembled on each channel member. Large numbers of the assembled containers can then be packed into a package box. This provides very effective packaging for the containers which provides a high yield of acceptable containers. For example, the packaged containers are protected against deterioration of their corner portions because frictional contact therebetween is prevented, and wrinkle of the flexible container bodies does not occur. The regularly juxtaposed containers are also available for successive injection of the beverage thereinto without any pre-alignment of the containers being necessary.

In the embodiments described above, the flexible container body 1 has a rectangular shape (see Figure 3) prior to the liquid injection, and is folded as shown in Figure 12. As shown in Figure 13, lower rectangular corners of the container body may be cut away as one means of ensuring that the container is self-standing after liquid injection. As is shown in Figures 12 and 14, the container body has four rectangular corners 1b, 1c, 1d and 1e in the foregoing embodiments. The four bottom corners may be cut away as shown in Figure 13 and the cut away edge portions thermally sealed together at 30.

The container body 1 has front and rear walls connected by a pair of side walls which, in the unfilled condition, are folded to have a generally V-shaped cross-section. The container body 1 also has four side sealing portions 31a, 31b, 31c and 31d, and a bottom seal portion 32. When the V-shaped folded side walls of the container body 1 are opened as indicated by arrows Y in Figure 12, the side walls attain the shape shown in Figure 14. In this Figure, which shows a side view, the solid lines show the structure of a cut away container body, and the broken lines show the container body without cut away corners. In Figure 14, a length L is defined between an inner folded bottom end 33 and an inner edgeline of the side sealing portion 31. The length L is also set between the inner edgeline (upper edgeline in Figure 14) of a lower end seal 34 and an inner edgeline of the side sealing portion 31 to determine an upper point 35. Then the upper point 35 and the internally folded bottom end 33 are connected by lines 36, and the thermal sealing 30 is effected along the lines 36. After the thermal sealing, the broken line portions can be removed.

With this structure, when the folded container body is inflated by the liquid injection, the bottom portion 2 shown in Figure 13 of the body is folded so as to provide a rectangular shape when viewed from underneath as shown in Figure 15. This container is capable of self-standing because of the gravity or weight of its contents. Since the lower end corner portions are cut away, the lower end portions of the container body are easily bent, so that the container can maintain upstanding posture because of the weight of the beverage.

It will be appreciated that it is possible to arrange containers in a combination of the invention to facilitate the arrangement of a plurality of containers within a packing box. In addition, the combination is capable of regularly juxtaposing the containers for a subsequent beverage filling step at a beverage filling station. In an embodiment, the combination is capable of preventing the containers from being damaged during their transportation, yet assembling large numbers of the containers in a packaging box.

While the invention has been described in detail and with reference to specific embodiments thereof, it will be apparent that various changes and modification can be made without departing from the scope of the invention.

The containers described and illustrated herein are also described and claimed in our copending applications Nos. 2229992 and 2230510 divided out of the present application.



CLAIMS

1. A liquid container comprising:
 - 05 a) a container body formed of a flexible material and having an opening therein, and
 - b) a liquid delivery unit secured to said opening and arranged to allow a liquid within the container body to pass therethrough, said delivery unit comprising:
 - 10 a mouth portion positioned outside said container body,
 - a joining portion in sealing contact with said opening, and
 - 15 an elongate conduit portion extending from said joining portion within said container body, said conduit portion having an open free end within the container body, and communicating at its other end with said joining portion, and wherein at least one hole is formed in said conduit portion, the or all of said
 - 20 holes being positioned inside said container body adjacent to said opening such that there are no other holes along the length of said conduit portion.
2. A liquid container as claimed in Claim 1, wherein
25 said conduit portion has a cylindrical wall, and further comprising a pair of ribs extending downwardly in parallel with each other from the positions adjacent to the opening, said pair of ribs being formed on said cylindrical wall, wherein a plurality of holes are
30 formed in said conduit portion adjacent said opening, said plurality of holes extending through the cylindrical wall of said conduit portion and being located between the ribs of said pair.
3. A liquid container as claimed in Claim 2, wherein
35 said plurality of holes are a plurality of slots



positioned within said container body and adjacent said opening.

05 4. A liquid container as claimed in Claim 3, wherein said pair of ribs are positioned on the outer surface of said conduit portion, and extend in an axial direction of said conduit portion.

10 5. A liquid container as claimed in any preceding claim, wherein said delivery unit further comprises at least two flanges arranged on said mouth portion outwardly of said container body relative to said joining portion, and at least two ribs positioned
15 substantially perpendicular to front and rear surfaces of said container body.

20 6. A liquid container as claimed in any preceding claim, wherein said flexible material comprises laminated films.

25 7. A liquid container as claimed in any preceding claim, wherein said container body is made of flexible material, and has said opening at an upper end thereof.

30 8. A liquid container as claimed in any preceding claim, wherein said container body has a folded construction defining a pair of side walls which are substantially V-shaped in cross-section prior to filling the container body with liquid.

35 9. A liquid container as claimed in Claim 8, wherein said container body has front and rear walls and said pair of side walls, said front and rear walls being



thermally sealed with said side walls, and said front and rear walls being thermally sealed together at their lower end portions, four lower end corners of said container body being cut away, and edge lines of said cut away portions being thermally sealed.

10. A combination of at least one liquid container as claimed in any preceding claim, and a container assembling member, wherein said container assembling member comprises a channel member having a substantially C-shaped cross-section, said channel member being formed with a lip portion engageable with the delivery unit of the or each said liquid container.

11. A combination as claimed in Claim 10, wherein the liquid delivery unit of the or each said liquid container has a flange portion external of its container body and adjacent to said opening, the lip portion of said channel member being engageable with the flange portion of the or each said liquid container whereby a plurality of liquid containers may be assembled relative to said channel member.

12. A combination as claimed in Claim 11, further comprising a packaging box for storing a plurality of said liquid containers, and a plurality of support members disposed in said packaging box for mounting thereon at least two said channel members.

13. A combination as claimed in Claim 11 or 12, wherein each said flange portion of a liquid container comprises two flange members spaced relative to each other in an axial direction of said delivery unit, the lip portion of a said channel member being engageable between said two flange members.



14. A liquid container substantially as hereinbefore described with reference to the accompanying drawings.

05 15. A container assembling member in combination with a container substantially as hereinbefore described with reference to the accompanying drawings.

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