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FREE FALL AERIAL DELIVERY CONTAINER FOR LIQUIDS

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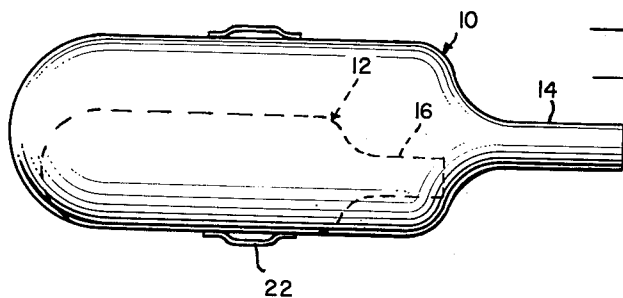


Fig-1

Fig-3

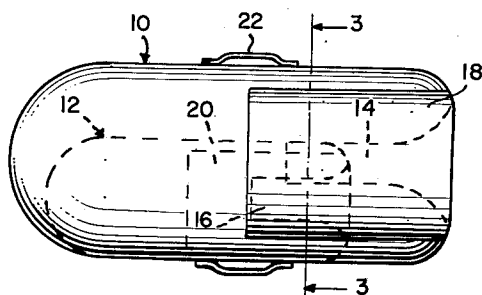


Fig-5

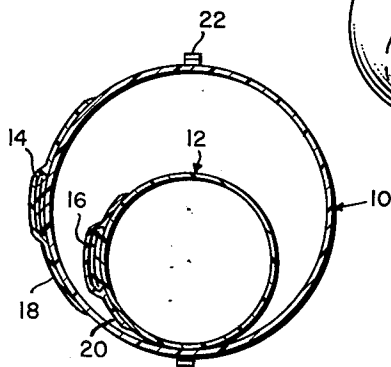


Fig-4

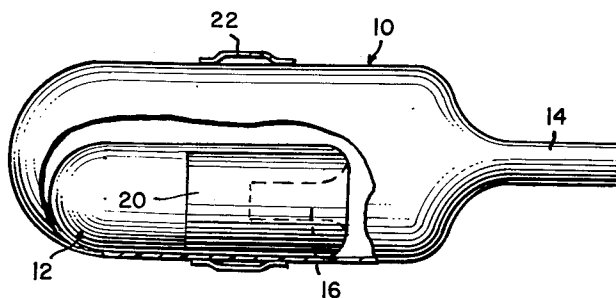
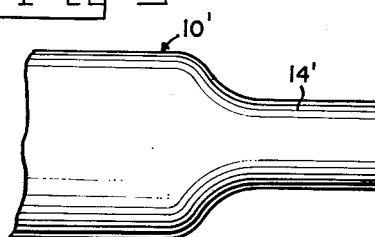


Fig-2

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FREE FALL AERIAL DELIVERY CONTAINER
FOR LIQUIDSRobert L. Oakley, % C. H. Noble, Box 45, Genoa, Nebr.
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2 Claims. (Cl. 206-46)

(Granted under Title 35, U.S. Code (1952), sec. 266)

The invention described herein may be manufactured and used by or for the United States Government for governmental purposes without payment to me of any royalty thereon.

This invention relates to high speed aerial delivery of liquids in free fall containers and, more particularly, to a container which can successfully deliver liquids and other materials from high speed air vehicles to the ground by unretarded free fall delivery.

Much experimentation has been done to solve the problems involved in delivering food and liquids to emergency areas. Most of these efforts have been directed toward the provision of an outer container protecting an inner one which is made rigid and strong enough to withstand the shock and impact of free fall. Other attempts have been made to retard the fall of loads being delivered in various ways such as the attachment of a parachute.

The object of the present invention is to introduce a shock absorbing characteristic and provide a container which can withstand a free fall without employment of any retarding means.

A further object of the invention is the provision of a flexible outer container which will be strong enough to remain unbroken on impact and which will retain the liquid contents of an inner container in the event that the inner container is broken during the fall.

A further object of the invention is the free fall delivery of liquids and other emergency materials at a minimum cost.

A further object of the invention is the provision of a multiplicity (two or more) impervious flexible bags or containers of varying sizes, one inside another, wherein the inner bag will be filled with liquid or other material and the outer bag remain empty or only very slightly inflated and wherein the inner bag will absorb the shock of impact.

A further object of the invention is the provision of a bag as noted above wherein the outer bag being empty or only very slightly inflated is impervious to breakage and remains intact retaining the liquid contents of the smaller bag if and when the inner bag is ruptured or broken.

In the drawing:

FIG. 1 is a side view of the device showing an inner flexible container in phantom.

FIG. 2 is a side elevation of the device with portions broken away to show the inner container filled and sealed.

FIG. 3 is a side view of the device sealed and ready for storage or drop.

FIG. 4 is a cross section taken substantially on the line 3-3 of FIG. 2.

FIG. 5 is a fragmentary view of the device showing a modified form of enlarged neck opening.

Referring more in detail to the drawing, an outer bag or container is designated by the numeral 10. This container is made of any suitable impervious flexible very strong material. Certain plastics are highly suited to this use. Examples of material possessing the required characteristics of tenacity, pliability, resistance to rupture under stress, and impermeability for containment of fluids are: polyethylene, extruded or cast vinyl plastics, Pliofilm, neoprene and neoprene treated nylon cloth. It is understood that suitable plasticizers may be used with any of

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these for obtaining a suitable degree of pliability and tensile strength. Neoprene can be used only for containers for materials which are not intended for use as food.

The outer bag has been used in capacities of 8 and 10 gallons but it is to be understood that the invention is not so limited. An inner bag or container, represented by the numeral 12, is made of impervious flexible and very strong material. With regard to relative capacities of inner and outer containers, a five gallon capacity inner container has been used within an outer container, as described above of 8 or 10 gallons. It is conceivable that this outer bag of a capacity of 8 or 10 gallons may be placed inside still another bag of 12-15 gallon capacity. Aside from the question of capacities, the invention is intended to include three or even more containers graduated as to size and contained one within the other.

The outer container 10 is provided with a narrow extended neck portion 14 through which the inner container is inserted preferably unfilled. The neck portion 14 can later serve as a pouring spout, as for example, for transferring gasoline to vehicle gasoline tanks. The inner container is similarly provided with a proportionately smaller neck portion or spout 16 which may also serve as a pouring spout in the event the inner container 12 is left intact.

After the inner container has been placed within the outer container and filled, both containers may now be closed and sealed by any suitable closing means. The means shown in the drawings consists of a section or band of closing or sealing tape 18 for the outer bag and a section of similar closing tape 20 for the inner bag. This tape may be of a suitable pressure sensitive material. As will be seen by an examination of FIGS. 3 and 4, the necks or spouts 14 and 16 are each folded over and lie in flattened condition against the respective exterior bag surfaces and the bands of tape placed thereover and sealed against the bodies of the containers. Other sealing means may be employed. The respective spouts could be rolled, tied or clamped with plastic or metal clamps.

A slight volume of gas or air may be introduced into the outer container for cushioning effect or the container may be left completely empty except for the smaller container inside of it. As before stated, the inner container 12 may rupture during the impact with the ground following the fall. The outer container however resists rupture and thus retains and delivers the contents of the smaller container. Since the inner container is distended and taut, and because of the internal forces exerted upon it by the liquids contained therein during impact, it will receive most of the shock of impact and may rupture in consequence. These shocks forces however will be dissipated upon rupture of the inner bag allowing the outer bag to remain intact.

Ties, spring clamps, locking clamps are other possible means for sealing the containers. The pressure sensitive tape, however, is the preferred choice because it is pliable and adds no rigid metal parts which might more easily cause rupture of either container. Another possible alternative for sealing either container is a screw-type cork. Also possible is a soft rubber or plastic area of the self-sealing type which would permit filling through use of a hypodermic-type needle such as is used in basket balls. A one-way valve such as used in tire tubes or life rafts would also be suitable. The essence of the invention lies in one or more pliable rupturable containers enclosed within a nonrupturable pliable container. The method of sealing the containers may be by any desired or expedient means. Handles 22 may be provided for expedience.

In the devices so far described, the outer bag is provided with a relatively narrow neck or spout. It is evi-

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dent in this form of the invention that the small bag must be inserted within the larger one prior to being filled. It is conceivable, however, and within the scope of the invention that the outer bag may be made with a larger neck opening, such as shown at 14' in FIG. 5. The small container may then be filled and sealed and introduced into the larger container through the enlarged neck after being filled. It is also possible that the neck 14 of FIG. 1 or the neck 14' of FIG. 5 may be elastic, or otherwise expansive.

While the invention is shown and described in connection with one form for illustrative, rather than restrictive purposes, it is obvious that changes and modifications may be made by those skilled in the art without departing from the scope and spirit of the invention as defined in the accompanying claims.

I claim:

1. An aerial free fall delivery container comprising an outer rupture-resistant, fluid-impervious and pliable outer container, a smaller fluid-impervious and pliable inner container at least partially filled with liquid contained therein and providing air space therebetween, said inner and outer containers having curved surfaces throughout, means for effecting a fluid tight closure on said outer con-

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tainer, means for effecting a fluid tight closure on said liquid filled inner container, said liquid filled inner container receiving and dissipating the shock force of a free fall landing, said outer container retaining the liquid contents of said inner container if and when said inner container is ruptured.

2. The method of delivering liquids by aerial free fall delivery comprising completely filling a pliable container with liquid to be delivered, inserting said container in a larger pliable container providing space therebetween and effecting fluid-tight closures of both containers, absorbing the shock force of a free fall landing by the rupture of the inner container, and retaining the liquid to be delivered in the outer container.

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