ABSTRACT OF THE DISCLOSURE

This invention pertains to a flexible plastic container for flowable materials having segregated internal compartments separated by seals. The materials within the container are confined within certain compartments and upon the application of external pressure the seals are adapted to give way to permit said materials to flow into adjacent compartments.

It is a general object of the invention to provide a container for packaging and transporting flowable materials which will absorb and dissipate forces of pressure applied thereto.

It is a further object to provide a container having sealed internal compartments formed by releasable closures which are adapted to give way upon the application of pressure to said container and cause the material therein to be distributed throughout the internal extent thereof.

A still further object is that of providing a container with sealed segregated compartments of the character described which is adapted to accommodate materials that cannot be premixed too far in advance of usage.

Another object is to provide a shock absorbing container for flowable materials which is adapted to absorb and dissipate forces of impact when caused to fall free from an elevated level.

A further object is to provide a shock absorbing container which is expendable, of light weight construction and relatively inexpensive to manufacture.

Further objects and advantages of the invention will become apparent from the following more detailed disclosure.

To deliver needed flowable materials such as fuel or water to isolated areas not accessible by conventional modes of transportation and to deliver such goods swiftly and with extreme accuracy, it has been found desirable to free fall these materials from low flying aircraft.

The containers in which such materials are delivered must be able to withstand and absorb the initial forces of impact when dropped from an elevated level.

A form of a free fall container is shown and described in U.S. Patent 3,117,606 which issued on Jan. 14, 1964, to one D. F. Hastings. This container assumes more or less a pear-shaped outline when containing the material intended to be transported therein. The base portion is adapted to retain this material while the upper or so-called tail portion is gathered forming a stem about which an adhesive coated tape is wrapped. Upon impact this tape is adapted to break away as a result of the laterally acting component forces acting upon the walls of the container's base portion, thereby increasing the volume of the container and the dissipation of said forces.

With this particular type of container it is necessary that the initial forces of impact be applied to the base portion of said container, for should it hit at other points about the container the sudden laterally acting forces of the material contained therein would be sufficient to rupture the walls of the container resulting in a loss of its contents.

The shock absorbing container according to the instant invention has a configuration which does not restrict it to a particular section to receive the initial forces of impact when dropped from an elevated level. This container is generally cylindrical with sealed end portions and preferably three internal compartments formed by two sheets of flexible plastic material which are sealed about their peripheral edges to the interior walls of the container. Although the preferred form of the container is as described above, it should be understood other configurations would also be suitable and the number of internal compartments could vary to meet the requirements of its specific purpose.

When utilized as a container to free fall flowable materials from an elevated level, said materials are contained within the intermediate compartment. Upon impact of the container, the abrupt stopping of the flowable material instantly converts the energy created during dropping to laterally acting forces which seek to spread the material over a larger area. These forces are effective in rupturing the seals to the empty adjacent compartments and permits the flowable material to be distributed throughout the internal extent of the container thereby absorbing and dissipating the forces created upon impact.

The internal compartments of the container may be formed in a number of ways to effectively perform their intended function, such as being made of a material having less tensile strength than the material from which the container itself is fabricated and which in itself will rupture to permit the flow of materials to the adjacent compartments. The end compartments may also be formed by gathering the flexible material of the container together adjacent its ends and then sealing them by means of releasable closures which may be in the form of clips or bands and which will break away or expand upon impact of the container.

This form of container also lends itself to the mixing of materials which cannot be premixed too far in advance of usage. This container can be made in a variety of forms to meet the requirements of its intended purpose; however, basically it would be like the above container having two or more internal compartments formed of flexible material in which it would rupture or its sealed edges upon the application of external pressure. Examples of materials which are adapted to be mixed within a flexible container are calcium chloride and water for forming a hot pack or a cold pack with the mixing of ammonium nitrate and water.

The invention will be described hereinafter in greater detail by reference to the accompanying figures of drawing in which:

FIG. 1 is a perspective view of the flexible container according to the invention showing by means of dotted lines the internal compartments formed therein;

FIG. 2 is a view in side elevation of the container shown in FIG. 1 with portions thereof cut away to show the manner in which the material within the intermediate compartment is adapted to break through and flow into the adjacent compartments upon impact when dropped from an elevated level;

FIG. 3 is a view in side elevation of part of a modified form of container in which the end compartments are formed by releasable closures;

FIG. 4 is a view similar to that of FIG. 3 and partially in perspective showing the release of one form of closure; and

FIG. 5 is a perspective view of another modified form of container which is adapted to serve as a means for storing and mixing separate materials which cannot be premixed too far in advance of usage.

Now referring to the figures of the drawing, there is shown in FIG. 1 a container generally indicated by...
numeral 10 of cylindrical configuration and which is fabricated from thermoplastic sheet or film of sufficient thickness to withstand the initial shock of impact and be compatible with the material adapted to be contained therein.

The ends of the container are identified by numerals 11 and 12, respectively, and are of a material like the cylindrical portion of the container. These ends of the container are sealed around their peripheral edges to the sides of the container by any of the several suitable methods well known to those conversant in the art.

Within the container there are provided three separate compartments which are depicted by numerals 13, 14 and 15 (FIG. 1). These compartments are formed by two sheets of flexible plastic material 16 and 17 of a shape conforming to the internal configuration of the container and are sealed about their peripheral edges of the inner walls of the container. These plastic sheets 16 and 17 are disposed in spaced relation whereby as shown in FIG. 1 numeral 14 identifies the center or intermediate compartment and numerals 13 and 15 depict the end compartments. The material to be transported and delivered by the free fall method is adapted to be confined within the limits of the intermediate compartment 14 and as shown in FIG. 2 is identified by numeral 16.

A modified form of a shock absorbing container is shown in FIGS. 3 and 4 and is depicted generally by numeral 17. In these figures of drawing only a portion of the center compartment and one end compartment are illustrated and it should be understood that the remainder of the container is of like configuration.

The container is generally cylindrical and is fabricated from a flexible plastic material like that of the above container. The illustrated end of this container is identified by numeral 18 and is of a material like the remainder of said container. These ends are also sealed about their peripheral edges to the ends of the container. To form the three separate compartments in this container the flexible plastic material is gathered together adjacent the ends thereof and releasable closures 19 are assembled at these points to form end compartments 20 (one only shown) and the center or intermediate compartment 21. The releasable closures 19 may be any one of a variety of types which are commercially available such as break away clips or bands which give way when a pre-determined number of pounds per square inch of pressure is applied to the container, or they may be of the resilient type which will expand as a result of said pressure.

FIG. 5 shows another modification of a flexible plastic container 22 and although it is illustrated in cylindrical form it could be made into various shapes such as a bug or pouch and still perform its intended function effectively.

This container includes flexible plastic end members 23 and 24 which are also sealed about their peripheral edges to the ends of said container. Two separate internal compartments 25 and 26 are formed within the container by means of a centrally disposed divider 27. Divider 27 is also of a flexible plastic material conforming in shape to the internal configuration of the container with the edges thereof being sealably attached to the inner walls of said container.

Compartment 25 and 26 are adapted to hold different materials which cannot be pre-mixed too far in advance of usage and it should be understood that the number of compartments can vary to accommodate the number of ingredients required in a particular mixture.

In operation, the containers shown in FIGS. 1, 2, 3 and 4 are adapted to contain flowable material within the intermediate compartments. These containers are adapted to be dropped with their contents from an elevated level and upon impact the energy created by the contents of the container during its free fall which is suddenly converted into laterally acting forces is substantially dissipated by breakthrough of the container's contents into the end compartments thereof.

This breakthrough can be controlled in a number of ways such as the rupturing of the seals of the plastic material forming the separate compartments or the flexible material itself which forms the dividing partitions can have less tensile strength than the outer surfaces of the container and will rupture. A still further means of control is that of a registered coating on the dividing partitions which can be made to break through at a given pounds per inch of pressure. The cutaway portions of the container shown in FIG. 2 illustrate the rupturing of the plastic sheets 16 and 17 which form the compartment dividers and the manner in which the contents of the center compartment are caused to flow into the end compartments.

The form of container shown in FIG. 5 contain two different types of materials that are adapted to be mixed just prior to usage and by subjecting the container to external pressure, the sealed portion of divider 27 is ruptured and manual manipulation of the flexible container will mix the materials as desired. The breakthrough of divider 27 can also be controlled in the same manner as described above for the containers shown in FIGS. 1 and 2.

While one embodiment and a modification of the invention have been disclosed, it is to be understood that the inventive concept may be carried out in a number of ways. This invention is, therefore, not to be limited to the precise details described, but is intended to embrace all variations and modifications thereof falling within the spirit of the invention.

We claim:

1. A free fall, shock absorbing, flexible plastic container comprising an elongated cylindrical body, end portions sealed thereto, sheets of flexible plastic material axially spaced within said tubular body with their peripheral edges sealably attached to the inner walls of said cylindrical body thereby dividing said body into three aligned compartments, said sheets having a tensile strength less than that of the material of the tubular body and ends, the intermediate compartment having a fluent material to be delivered by a free fall, the end compartments being empty and serving as relief spaces to receive the fluent material when the external forces on the dropped container cause the fluent material to rupture the sheets.

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U.S. Cl. X.R.
150—1; 229—56