

Sept. 8, 1964

S. LIPSCHUTZ ETAL
DISPENSER PACKAGE

3,147,903

Filed May 1, 1961

2 Sheets-Sheet 1

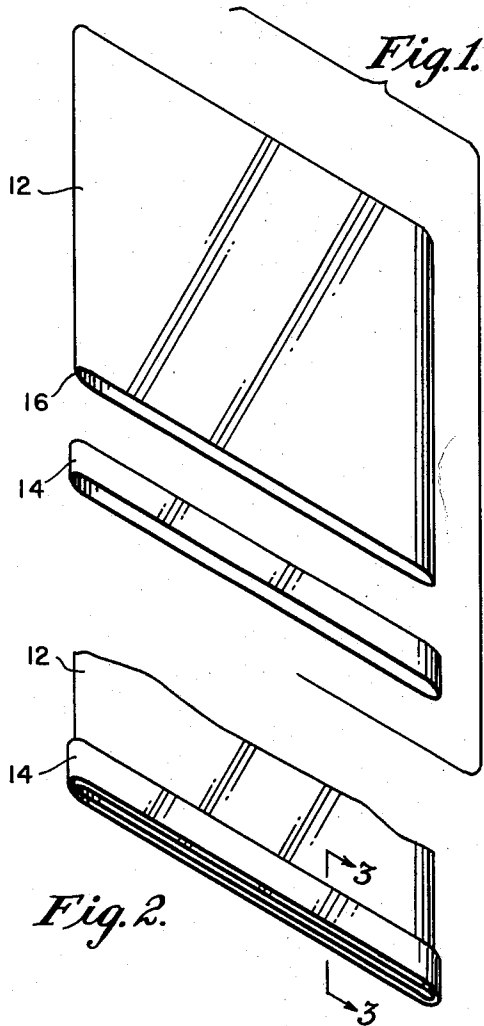


Fig. 2.

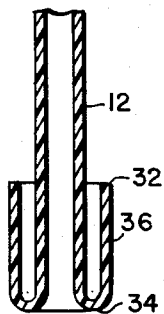


Fig. 7.

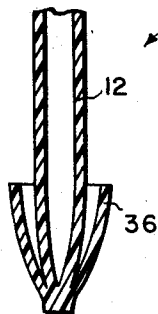


Fig. 8.

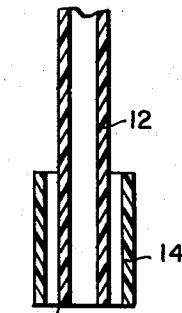


Fig. 3.

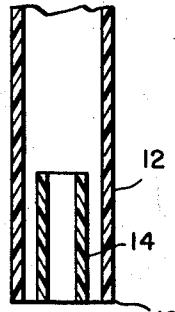


Fig. 5.

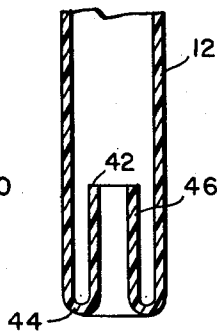


Fig. 9.

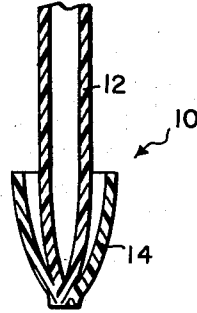


Fig. 4.

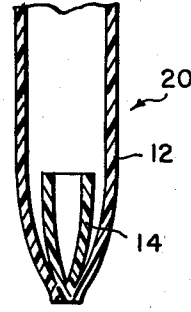


Fig. 6.

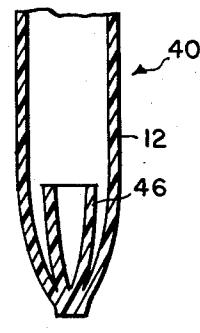


Fig. 10.

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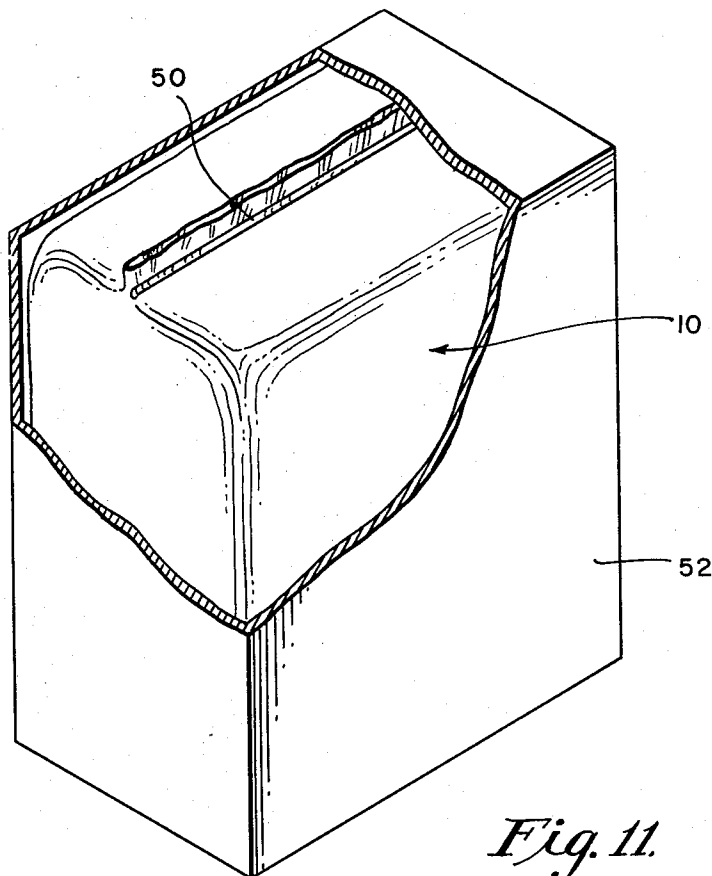


Fig. 11.

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3,147,903

DISPENSER PACKAGE

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Filed May 1, 1961, Ser. No. 106,733

6 Claims. (Cl. 229-14)

This invention relates to containers for corrosive liquids and, more particularly, it relates to containers of the multiple unit type.

It has been the prior practice in the industry to package corrosive liquids such as acids or alkalis in containers consisting of a relatively rigid outer unit made of fiberboard enclosing a flexible inner unit of non-corrosive material such as polyethylene, cellulose acetate and the like. The flexible inner unit heretofore used has consisted of inner and outer flexible bags entirely separated from each other except for a single common line of sealing at the bottom thereof. The purpose of this construction is to protect against leakage or inadvertent rupture of the unit resulting in a flow thereof into the outer unit. This flow must be avoided as the corrosive liquid will quickly damage the outer unit and leak into the surrounding area.

It has been discovered that the aforementioned combination of flexible inner and outer bags has not proved to be adequate. Because a liquid is contained within the inner bag, the bag combination must resist a characteristic of liquids under confinement known as hydrostatic shock. This occurs whenever the bags must be moved such as when being transported to the user's site. Whenever the bags are shaken in any way, pressure waves are generated within the liquid which cause it to tend to move in a lateral direction or to force the sides of the bag away from each other. In the case of a solid, the pressure wave is almost immediately dissipated but, with a liquid, the pressure waves rebound from the sides of the bag and move toward an opposing side. Moreover, where there is more than the slightest degree of shaking or vibration, many pressure waves in varying directions are established which create unusual stresses against the bottom seam of the bag where, of course, the hydrostatic pressure is greatest. Where the bottom seam is exposed to the unusual pressure waves for any degree of time, there is a danger that it will rupture.

The foregoing problem was effectively solved in pending application Serial No. 14,838 filed March 14, 1960. In this application, there was provided a combined inner and outer flexible bag with open upper ends coaxially arranged and the bags being separate from each other except at their bottom edges which were joined by a double line of heat sealing comprising an upper and a lower seal separated by an air space. In this construction, the lower seal and the air space thereabove supported the upper seal. The outer bag tended to assist the inner bag in resisting hydrostatic shock and the tendency of the liquid in the inner bag to spread the walls thereof.

The manufacture of this bag, however, involved a series of manipulative steps. One process of manufacture included forming pairs of closely spaced lateral seals in a flexible tube at relatively widely spaced intervals. The tubing was then severed approximately at mid-points between adjacent seal pairs to form units comprising two half sections open at one end and having a common edge. The unit was then reversed by turning one of the half sections inside out so as to telescope over the other open half section. The half section so reversed becomes the outer bag.

Another process of making the multiple bag assembly comprised providing a first and second section of flexible

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tubing, one end of the first tubing section was heat sealed and the other end open. The ends of the second tubing section were both open. The second tubing section was telescoped over the first tubing section and heat sealed to the first tubing section in such a manner that the walls of the second tubing section were heat sealed to short legs depending from the heat seal formed in the first tubing section. The heat sealing operation also included a simultaneous cutting or trimming action performed by the hot knife. The second heat seal was so formed as to be spaced from the first heat seal by a cushioning air space.

However, it was noted that the foregoing manipulative operations tended to increase the cost of the bag unit and, therefore, it became desirable that this be minimized. This problem was solved in pending application Serial No. 95,591 filed March 14, 1961, now U.S. Patent 3,106,329, granted October 8, 1963, wherein a single flexible bag with a single seal along its lower edge was provided. Tape means were positioned to lie against this seal and meet at a common point below the seal to provide a cushioning air space below the seal and above the meeting area of the tape. Such an assembly functioned to support the heat seal and also resisted the spreading tendencies present by virtue of the relatively dense liquid contained in the bag. This assembly also provided an effective solution to the previously discussed problem of hydrostatic shock.

However, in the actual formation of the heat seal, a problem of providing a seal of adequate strength has existed for a long time. The applicants' efforts in this regard have proved to be rather successful. Nevertheless, it has been noted that whenever a heat seal member is pressed against two or more plies to be sealed together, the resulting heat seal formed by virtue of pressure exerted upon the thermoplastic plies by the hot member may be of insufficient thickness. This problem becomes a very serious one when working with a thermoplastic material, such as, polyethylene which flows quite readily under the action of heat. For instance, in sealing polyethylene plies, each having a thickness of 8 mils, it has been discovered that the ensuing seal should be of a thickness of at least 8 mils in order to withstand the weight, the spreading tendencies and the hydrostatic shock occasioned by the presence of the contained corrosive liquid.

It is, therefore, an object of the present invention to provide a novel dispenser package which will resist the destructive pressure caused by hydrostatic shock.

A further object of the present invention is to produce a heat seal of adequate thickness to provide the necessary resistance to forces tending to spread it apart.

Yet another object of the present invention is to provide a novel dispenser package with but a single flexible bag which is easily manufactured with a minimum of manipulative steps and which possesses the desirable properties of the dispenser packages previously discussed.

The foregoing, as well as other objects of the invention, are achieved by providing a package comprising a multiple unit container, the container including an outer unit of substantially rectangular shape and relatively rigid construction and an inner unit comprising a single flexible bag. The inner unit is formed by providing a tube of thermoplastic material such as polyethylene, cellulose acetate and the like with an open upper end and an open lower end. A narrow ring or band of thermoplastic material in a first and second embodiment of the invention may be positioned adjacent the lower end of the tube, either inside the tube or outside the tube. The lower heat seal is then formed and a seal of adequate thickness is provided.

In other embodiments of the invention, the lower edge of the tubular thermoplastic material is folded outwardly, similar to the cuffs of trousers, or inwardly to form a

narrow ring or band of thermoplastic material and the heat seal thereafter provided as aforesaid.

The foregoing invention has particular application to thermoplastic materials such as polyethylene which flow quite readily under the application of heat, as for instance, during heat sealing. Such a flow is so rapid that the resulting heat seal may be too thin to provide the necessary result. With the present invention, a seal of adequate thickness is achieved.

Other objects and many of the attendant advantages of this invention will be readily appreciated as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings wherein:

FIG. 1 is an exploded perspective view showing the tubular member and the reinforcing band about to be placed either therein or thereover prior to the sealing operation;

FIG. 2 is a perspective view wherein the band of FIG. 1 has been placed over the tubular member;

FIG. 3 is an enlarged sectional view taken along the lines 3—3 of FIG. 2;

FIG. 4 is a view similar to FIG. 3 but wherein the heat seal has been formed;

FIG. 5 is a sectional view similar to FIG. 3 but showing a second embodiment of the present invention;

FIG. 6 is a sectional view similar to FIG. 5 but wherein the heat seal has been formed;

FIG. 7 is a sectional view similar to FIG. 3 but showing a third embodiment of the present invention;

FIG. 8 is a sectional view similar to FIG. 7 but wherein the heat seal has been formed;

FIG. 9 is a sectional view similar to FIG. 3 but showing a fourth embodiment of the present invention;

FIG. 10 is a sectional view similar to FIG. 9 but wherein the heat seal has been formed; and

FIG. 11 is a perspective view of a multiple unit container embodying the present invention, the outer unit of the container being broken away to expose the inner tubular member.

Referring now in greater detail to the various figures of the drawing wherein similar reference characters refer to similar parts, there is shown in FIG. 1 an assembly which, when properly heat sealed, constitutes a first embodiment of the present invention. Such an assembly is united at its lower edge along the seal 10 of FIG. 4.

This package is manufactured by providing, as shown in FIG. 1, a tube 12 of thermoplastic material and a relatively narrow band 14 of thermoplastic material of a diameter substantially the same as the tube 12. Thus, as shown in FIGS. 2 and 3, the band 14 is of such dimensions that it may be positioned about the lower edge 16 of the tube 12 and, thereafter, a hot member is brought to bear thereagainst in order to achieve the heat seal 10 of FIG. 4. During the heat sealing operation, the lower edge is also trimmed, as shown in FIG. 4.

Thus, the unit of FIG. 4 will possess a lower seal of adequate thickness. In practice, both the tube 12 and the band 14 have a wall thickness of about 8 mils. In other words, the heat sealing member is brought to bear against a total thermoplastic material thickness of 32 mils, as shown in FIG. 3. In spite of the tendency of the polyethylene to flow quite freely from the area of the seal, a heat seal 10 of at least 8 mils, as shown in FIG. 4, is reliably obtained.

As shown in FIGS. 5 and 6, the reinforcing band 14 may be positioned inside the tube 12 and the heat seal formed along the lower edges thereof to produce the heat seal 20 of FIG. 6.

In studying the seals of both FIG. 4 and FIG. 6, as well as the other completed seals of this invention, it is to be noted that substantially the entire height of the band 14 projects upwardly from the seal to aid the tube 12 in resisting the hydrostatic shock of the contained corrosive liquid.

As shown in FIG. 7, in a third embodiment of this invention, the lower edge 32 of the tube 12 is folded or bent outwardly about a fold line 34 to form a reinforcing band or cuff 36. This assembly is then sealed to form the heat seal 30, as shown in FIG. 8.

The last embodiment of the invention of FIGS. 9 and 10 is formed in a manner similar to that shown in FIGS. 7 and 8. In the embodiment of FIGS. 9 and 10, the lower edge 42 is folded inwardly about fold lines 44 to form an upwardly projecting inward band or reinforcing flap 46. As shown in FIG. 10, this assembly is then sealed to form the heat seal 40.

After the lower seal has been formed, the upper edge of the tube 12 is sealed and the thusly formed bag is placed inside of a relatively rigid outer container in a manner disclosed and claimed, as for instance, in the pending applications Serial No. 9,898, filed February 19, 1960, now Patent No. 3,065,894, No. 43,532, filed July 18, 1960, and No. 105,486, filed April 25, 1961, now Patent No. 3,065,895.

The use of bag 10 is illustrated in FIG. 11. As seen therein, after bag 10 is filled it is sealed along its top edge as at 50. It is then placed within outer rigid box 52, which is closed and sealed. Bag 10 contains a liquid which will subsequently be dispensed. Although the complete package is shown containing the embodiment generally illustrated at 10, it is to be understood that any of the other embodiments can be used with equal effectiveness.

An upper corner of the inner flexible bag is then cut off, the corrosive liquid dispensed in the inner flexible bag, the corner sealed as by heat sealing and the top flaps of the relatively rigid outer container closed thereabout.

As shown in great detail in the prior copending application Serial No. 845,851, filed October 12, 1959 a dispensing probe is directly thrust through the wall of the relatively rigid outer container to pass through the wall of the flexible inner container. Inasmuch as the inner container is comprised of a material which is resilient as well as flexible, it adheres tightly about the probe in so-called "plastic memory." As the probe is hollow and includes a communicating opening, the corrosive liquid may flow into the opening and through the probe to be dispensed through a hose affixed thereon, the dispensing being controlled by clamping means on the hose.

It is thus seen that the present invention provides an inner flexible bag which possesses a highly reliable lower seam of adequate thickness which is simply and quickly established. By virtue of the present invention, it is not necessary to employ a double bag or two-ply unit comprising inner and outer bags in order to achieve the necessary reliability. In the present invention, it is necessary to employ but a single tube and a complementary reinforcing band or a single tube with its lower edges turned to form inner or outer flaps. The resulting sealing is of adequate thickness even though the thermoplastic material may have a tendency to quickly flow under the action of the heat. The completed seal also provides adequate resistance to hydrostatic shock.

It is to be noted as shown in any of FIGS. 4, 6, 8 and 10 that the completed seal basically comprises a lower member which supports an upper member. For instance, in FIG. 4, the reinforcing band is the lower member which supports the tube, the upper member. When the seal 10 is formed, the polyethylene flows away from the hot member and fills in the area between the band and the tube. In this manner the seal of adequate thickness is provided. Moreover, the present seal may be formed in other places, such as, at the top edge of the tube.

Obviously, many modifications and variations of the present invention are possible in the light of the above teachings. It is, therefore, to be understood that within the scope of the appended claims, the invention may be practiced otherwise than as specifically described.

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What is claimed as the invention is:

1. A package comprising a multiple unit container including an outer unit of substantially rectangular shape and relatively rigid construction and an inner unit adapted to have a liquid sealed therein, said inner unit comprising a flexible plastic bag having an open upper end and a heat seal along its lower edge, and a separate narrow band of flexible plastic material overlapping the lower portion of said bag with its lower edge coinciding with and heat sealed to the lower edge of the said plastic bag, said band being otherwise free and unsecured to the bag, wherein said seal is thickened to prevent rupture of said seal caused by hydrostatic shock of liquid sealed within said inner unit.

2. The invention of claim 1 wherein said narrow band of material projects outwardly of said flexible bag.

3. The invention of claim 1 wherein said narrow band of material projects inwardly of said flexible bag.

4. The invention of claim 1 wherein said flexible bag and said narrow band comprise polyethylene.

5. A package of liquid comprising a multiple unit container including an outer unit of substantially rectangular shape and relative rigid construction and an inner unit having said liquid sealed therein, said inner unit comprising a flexible bag having a heat seal along its lower edge and a separate narrow band of flexible plastic material overlapping the lower portion of said bag with its lower

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edge coinciding with and heat sealed to the lower edge of the said plastic bag, said band being otherwise free and unsecured to the bag, wherein said seal is thickened to prevent rupture of said seal caused by hydrostatic shock of the liquid sealed within said inner unit.

6. The invention of claim 5 wherein said flexible bag and said narrow band comprise polyethylene.

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