

July 13, 1965

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3,194,471

BULK CONTAINER DEVICE

Filed June 4, 1964

2 Sheets-Sheet 1

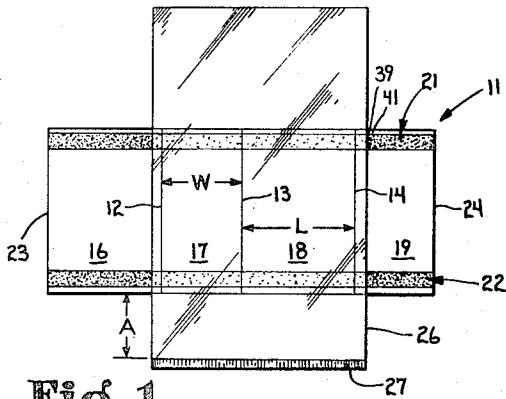


Fig. 1.

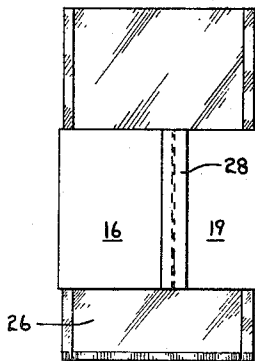


Fig. 2.

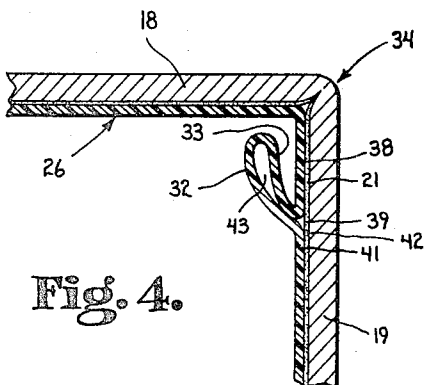


Fig. 4.

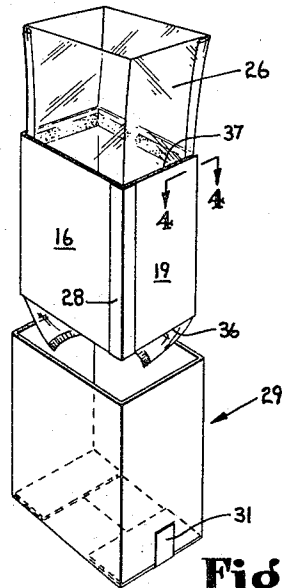


Fig. 3.

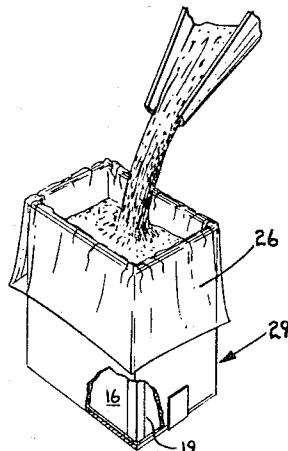


Fig. 5.

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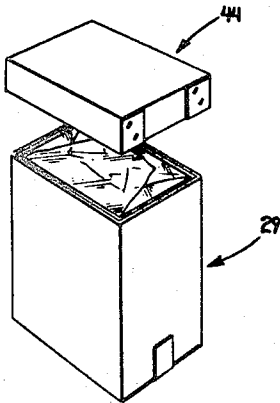


Fig. 6.

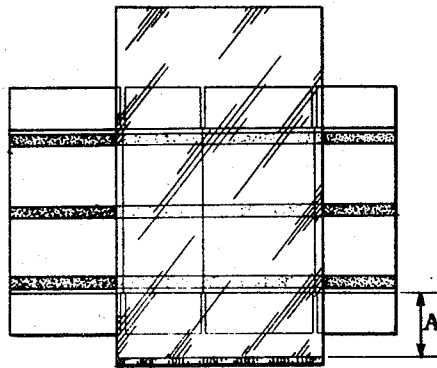


Fig. 7.

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3,194,471

BULK CONTAINER DEVICE

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5 Claims. (Cl. 229—14)

This invention relates generally to the packing of commodities, and more particularly to a container particularly well adapted to the packaging of flowable materials such as powders, granular or pelletized materials, semi-liquid or liquid materials, for example.

It has been found desirable to package commodities of the aforementioned character in corrugated fibreboard containers of various volumes. It has also been found desirable to remove powdered, granular or pelletized materials from such containers by the use of vacuum systems which include inlet nozzles insertable into the package to remove the contents therefrom.

To keep the contents of such packages in the desired condition, it is desirable to use a flexible bag of a material such as plastic which is as thin as feasible in order to minimize weight and space attributable thereto, and yet facilitate manufacture, setup, filling, sealing and emptying of the containers.

It is, therefore, a general object of the present invention to provide a container wherein commodities can be packaged, kept in desired condition and free of contaminants, and from which the commodities can readily be removed by vacuum apparatus or other means.

A further object is to provide a container employing a fluid-tight flexible bag supported so as to avoid any difficulty in filling or emptying the container, and in assembling and sealing the container.

A further object is to provide a container achieving the foregoing objects and well adapted to conservation of space, weight, and expense.

A further object is to provide a container readily adapted to variation in arrangement of parts as required by the characteristics of the commodity packaged and the amount packaged.

Described briefly, in a typical embodiment of the present invention, a plastic bag is provided in the form of a tube having a single sealed seam closing its lower end. This bag is received inside a generally rectangular tube of corrugated fibreboard, with the fibreboard tube being open at its upper and lower ends. A horizontal line of adhesive extends entirely around the inner surface of the fibreboard tube adjacent the upper end thereof and secures the bag thereto. A similar adhesive strip extends around the tube adjacent its lower end.

In order to insert this assembly into an outer shell or container, and permit the departure of air during assembly of the bag and tube with an outer container, without bubbles being formed in the bag, an overlapping portion of the bag material is provided extending from the lower end to the upper end of the fibreboard tube. This overlapped portion is disposed in the corner of the fibreboard tube. This overlapped portion also permits escape of any air trapped between the bag and the bottom of the container during the filling operation. This avoids possible rupture of the bag.

Securing the bag to the tube assures that the bag is in the proper position, will stay in such position during carton assembly and filling, and facilitate use of vacuum removal of contents—by preventing the bag from coming loose and clogging the vacuum system.

As will become apparent, variation from the typical embodiment can be made, still within the scope of the

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invention. For example, the tube can have configurations other than rectangular.

The full nature of the invention will be understood from the accompanying drawings and the following description and claims.

FIG. 1 is a view of the fibreboard blank with the plastic bag mounted thereto, the blank being shown as it appears before the ends thereof are joined.

FIG. 2 is a view of the combination of FIG. 1 with the ends of the fibreboard blank joined by a taped joint.

FIG. 3 is a perspective view of the assembly of FIG. 2 squared up and disposed above an outer container into which it may be assembled.

FIG. 4 is an enlarged fragmentary section taken along the lines 4—4 in FIG. 3 and viewed in the direction of the arrows, and illustrating details of the arrangement allowing the departure of air during assembly into an outer container.

FIG. 5 illustrates an assembly being filled.

FIG. 6 illustrates an assembly ready to be capped.

FIG. 7 illustrates an alternate construction wherein the fibreboard tube is provided with flaps whereby it is adapted to form a regular slotted container, upon closure.

Referring now to the drawings in detail, FIG. 1 shows a tube blank 11 typically made of double-faced corrugated fibreboard having score lines 12, 13 and 14 dividing the blank into four panels 16 through 19. The upper margins of these panels are colinear, and the lower margins thereof are colinear. Adhesive is provided in a strip 21 adjacent the upper margin of the blank and an adhesive strip 22 is provided adjacent the lower margin of the blank, both strips extending uniformly from the left-hand end 23 to the right-hand end 24 of the blank.

An envelope 26 of fluid-tight flexible plastic material such as polyethylene, for example, lies upon the panels 17 and 18. This envelope is actually formed of a tube of polyethylene sheeting and is shown lying flat with the lower edges of the tube heat sealed in a single seam 27 whereby the bottom of the envelope or tube is closed. A slight overlap of the envelope onto the panels 16 and 19 is apparent in FIG. 1. The material of the envelope which lies immediately in contact with the panels 17 and 18 and also 19 and 16, is secured thereto by the adhesive strips 21 and 22.

When the panels 19 and 16 are folded on the score lines 14 and 12, respectively, and their ends are placed together and secured by the tape 28 forming a joint, the assembly will have the appearance shown in FIG. 2. The narrow portions of the bag which are shown in FIG. 1 as overlapping portions of the panels 16 and 19 again appear in FIG. 2 and their significance will become apparent upon reference to FIGS. 3 and 4.

In FIG. 3, the combination of the bag and fibreboard tube has been squared up and is disposed above a half-slotted fibreboard container 29, the flaps of which are closed and secured by gluing or by tape 31, for example. When the assembly is squared up as shown in FIG. 3, the outer surface of all portions of the bag immediately adjacent a portion of the adhesive strip are secured to the adhesive strips 21 and 22 so that a horizontal attachment is obtained entirely around the inner surface of the fibreboard tube both adjacent its upper and lower ends.

As shown in FIG. 4, a portion 32, 33 of the material of the bag 26 is folded upon itself along the length of the bag and adjacent the corner 34 of the outer tube, and this lengthwise fold extends the length of the tube. The lengthwise fold is maintained throughout the height of the fibreboard tube because of adherence of bag portion 38 to the adhesive strips 21 and 22 and the bag portion

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41 is also adhered to the adhesive strips, the reference numeral 39 identifying the area adjacent the base of the lengthwise fold 32-33.

By reason of this construction, the lengthwise fold or overlap of the portions 32 and 33 provides a passageway 43 through the fibreboard tube but external to the bag. There is a tendency of this folded portion to continue to some extent below and above the fibreboard tube and this is indicated in the drawings. In any event, by reason of this construction, the fibreboard tube can closely fit inside the outer container 29 as the tube is inserted into the container and allow escape of air from between the bottom of the bag and the bottom of the container 29, the air passing upwardly through the passageway 43. Normally, one such passageway or chimney is provided in each of two diagonally opposed corners of the tube.

By thus allowing the escape of air, and by providing the adhesive attachment all around the inner surface of the tube at its lower end as well as its upper end, there is no tendency for trapped air to create bubbles between the inner surface of the fibreboard tube and the outer surface of the bag. Such bubbles, if formed, could be broken during filling of the bag and destroy the fluid-tight sealing effect desired. One advantage of having the air passageway forming folds in the corners is that it allows the fold to remain out of the way during loading and unloading of the container. Another advantage of providing the overlaps at the corners is the fact that it is not necessary to prefold the bag before attachment thereof to the tube forming blank 11. The overlap at the corners can be accomplished by merely providing the slight overlap of the bag onto the panels 16 and 19 such as shown in FIG. 1, prior to squaring up of the assembly. With the main portion of the bag adhered to panels 17 and 18, and with the overlapping portions of the bag which contact panels 19 and 16 being adhered thereto when the blank is in the condition shown in FIG. 1, the folds become formed automatically when the panels 16 and 19 are folded to the position shown in FIG. 2 and sealing of the bag to the rest of the adhesive strips on panels 16 and 19 is completed.

Referring now to FIG. 5 which illustrates one possible way of filling the container, it is usually desirable to fold the upper portion of the bag down around the outside of the outer container. This is not necessary, however, because the upper adhesive strip securely retains the bag in the proper position in the tube and prevents it from being pulled down inside during filling. Therefore, there will always be the right amount of bag at the top for proper closure. Moreover, if the container is a deep container, additional adhesive strips may be provided as shown at an intermediate point in FIGURE 7. This assures that once the tube is squared up, there will not be bulges of the bag extending inwardly into the volume thereof and which might not be flattened out during filling if the material packaged would not be of sufficient weight to open the bag and conform it to the inner surface of the tube during the filling operation. The use of adhesive in the manner disclosed herein makes certain that the bag conforms with the inner surfaces of the tube when the tube is squared up, and the use of the fold or folds to form the air passageway assures that this conformity will remain during and after the insertion of the tube and bag assembly into an outer container.

Once the bag has been filled, the extra bag material can be folded over in place and heat sealed or otherwise sealed in a condition such as shown, for example, in FIG. 6, whereupon the contents of the bag are isolated from the environment exterior to the bag. A telescoping cover 44 can then be mounted on the outer container 29 (FIG. 6).

To permit the use of a plastic bag with a single heat sealed seam closing the bottom, and provide just the proper amount of material so that when the fibreboard tube is squared up, the bottom of the bag will be formed

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properly without pulling the bag away from the walls of the tube, it is desirable that the seam 27 of the bag (FIG. 1) be located at a proper distance below the lower margin of the tube forming blank 11. This distance designated A in FIG. 1 can be found according to the formula:

$$A = \frac{L\sqrt{L^2 + W^2}}{W\left(1 + \frac{L^2}{W^2}\right)}$$

where L is the inside length of the panel 18, and where W is the inside length of the panel 17, the inside length meaning the length of these respective panels when the unit is squared up. These dimensions are designated generally in FIG. 1.

FIG. 7 shows an embodiment of the invention wherein the blank which forms the fibreboard tube has appropriate flaps thereon whereby it is adapted to become a regular slotted carton when the packaging is complete. The same principles as to the location and spacing of the bag with respect to the blank are applicable to this embodiment, and, as mentioned previously, an additional horizontal strip of adhesive is employed to assure conformity of the bag with the box upon squaring up even though the box is of considerable depth.

It will be recognized that the container of the present invention is well suited to various other assembly constructions. Therefore, while the invention has been disclosed and described in some detail in the drawings and foregoing description, they are to be considered as illustrative and not restrictive in character, as other modifications may readily suggest themselves to persons skilled in this art and within the broad scope of the invention, reference being had to the appended claims.

The invention claimed is:

1. A container comprising: a flexible liner adapted to be filled with a flowable material, a rigid polygonal tube surrounding said liner, the upper marginal edges of said tube defining the upper opening thereof and the lower marginal edges of said tube defining the lower opening thereof, first adhesive means extending around the interior of said tube adjacent said upper edges and securing said liner to said tube adjacent the upper marginal edges of said tube, second adhesive means extending around the interior of said tube adjacent said lower edges and securing said liner to said tube adjacent said lower marginal edges of said tube, said liner being folded upon itself to provide lengthwise folds extending vertically along diagonally opposite corners of said tube from the lower marginal edges of said tube to the upper marginal edges, the interior of said lengthwise folds providing passageways for passing air from the bottom to the top of said liner, and a rigid receiver receiving said lower edges of said tube with the liner therein, the said passageways venting air from between said liner and said receiver as the liner is filled.

2. A container comprising: a bag formed of a tube of flexible material having a single sealed seam closing its lower end; a tube of rigid material having a polygonal cross-section and open at its upper and lower ends; adhesive means extending around the inner surface of said rigid tube at locations adjacent its upper and lower ends and adhering said bag to the inner surface of said rigid tube at said locations; said bag being folded upon itself to provide a lengthwise fold therein extending from a point adjacent the lower end of said rigid tube to a point adjacent the upper end of said rigid tube, the interior of said lengthwise fold accommodating passage of air between the ends of said rigid tube and exterior to said bag.

3. The container of claim 2 wherein said lengthwise fold is at a corner of said rigid tube.

4. A container comprising: a rigid tube open at its upper and lower ends; a bag formed of flexible material closed at its lower end; adhesive means extending around the inner surface of said rigid tube at locations adjacent

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its upper and lower ends and adhering said bag to the inner surface of said tube at said locations; said bag being folded upon itself to provide a lengthwise fold from a point adjacent the lower end of said rigid tube to a point adjacent its upper end, the interior of said lengthwise fold accommodating passage of air between the ends of said rigid tube and exterior to said bag.

5. The container of claim 4 wherein said rigid tube includes flaps at one end thereof closed upon themselves to close one end of said rigid tube with said bag providing a fluid-tight inner liner therefor.

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