

- [54] CONTAINER AND CONTAINER BLANK
- [75] Inventor: Richard R. Szatkowski, Western Springs, Ill.
- [73] Assignee: Continental Can Company, Inc., New York, N.Y.
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3,416,692	12/1968	Cline et al.	220/9 F
3,552,466	1/1971	Fairchilds	206/DIG. 30
3,684,123	8/1972	Bridges	220/9 F
3,688,384	9/1972	Mizushima et al.	220/9 F
3,705,222	12/1972	Rogers et al.	206/46 FC

Primary Examiner—William I. Price
Assistant Examiner—Stephen Marcus
Attorney, Agent, or Firm—Diller, Brown, Ramik & Wight

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- [51] Int. Cl. B65d 89/16, B65d 81/02
- [58] Field of Search 229/14 B, 14 BA, 14 BE, 229/14 C; 220/9 F, 9 M; 206/46 FC, DIG. 30

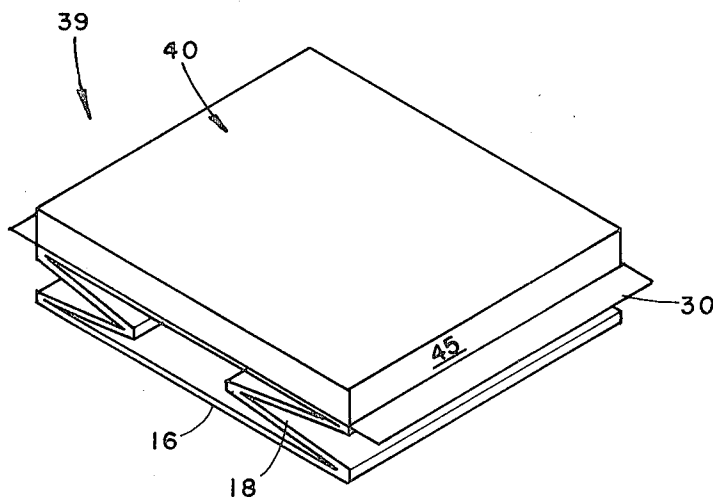
[56] **References Cited**
UNITED STATES PATENTS

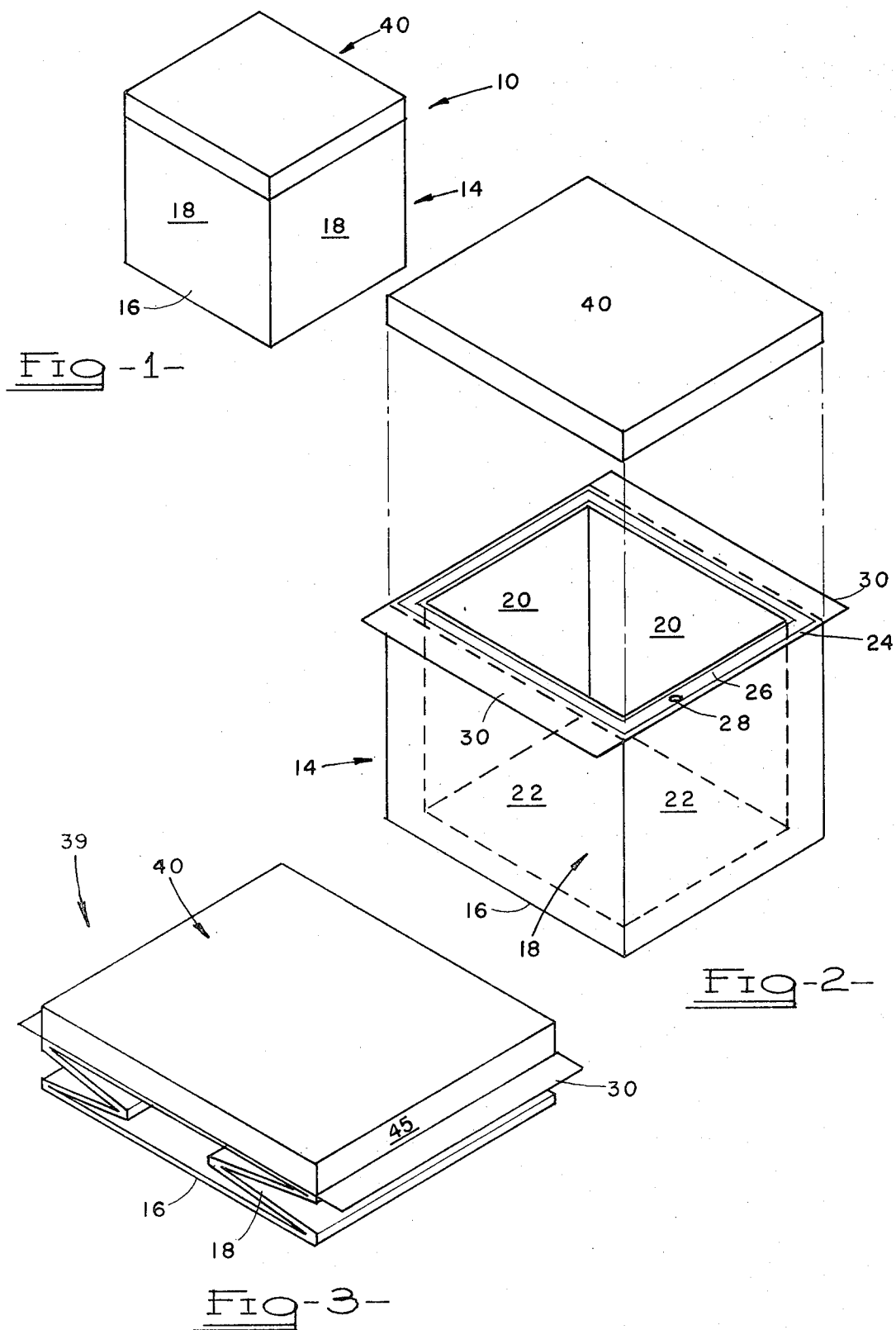
3,087,491	4/1963	Gewecke et al.	229/14 BE
3,093,259	6/1963	Morrison	220/9 F
3,298,554	1/1967	Piker	220/9 F
3,337,114	8/1967	Lockwood	229/3.1
3,383,004	5/1968	Closner	220/9 F
3,389,824	6/1968	Berchtold	220/9 F

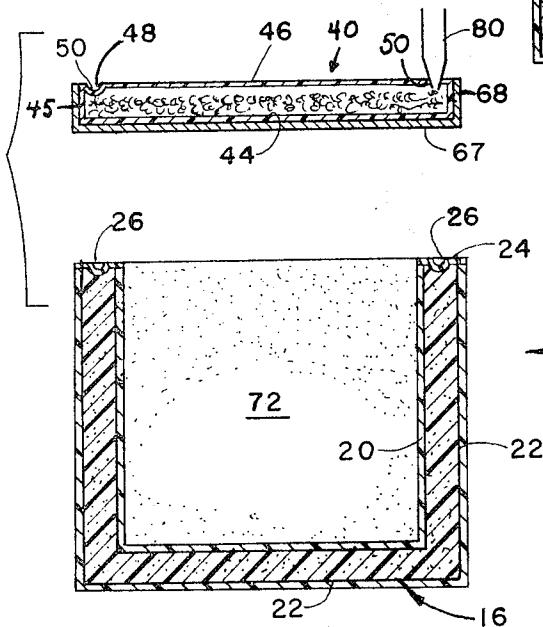
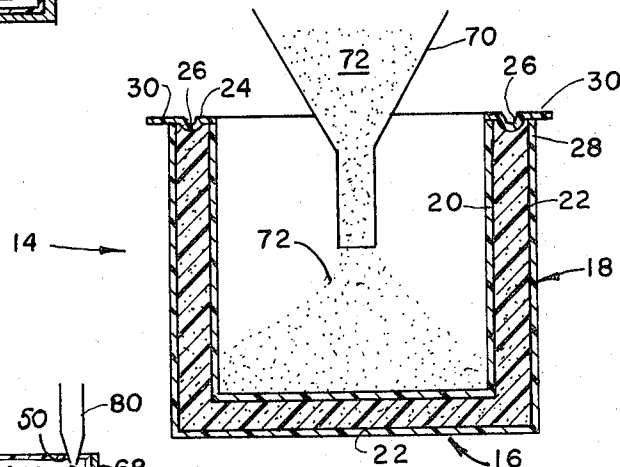
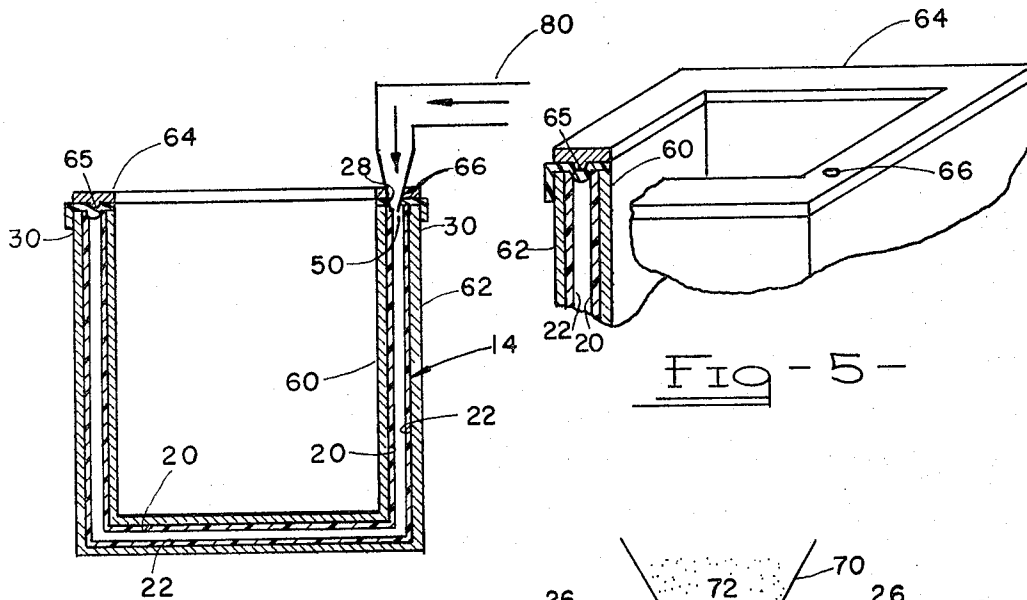
[57] **ABSTRACT**

This application discloses a container blank having a bottom and upstanding sides formed of dual walls of a flexible polymeric material such that it may be folded into a reduced space to form a blank. Additionally the disclosure includes the injection of a foamed-in-place cellular structure between these dual walls so as to provide a more rigid container having a high strength to weight ratio. Finally, the disclosure includes a method of sealing a closure to the top of the container utilizing a foamed in placed method.

11 Claims, 7 Drawing Figures







CONTAINER AND CONTAINER BLANK

BACKGROUND OF THE INVENTION

This invention relates to containers primarily for the storage and shipment of bulk materials. More particularly, it relates to a container blank which is partially fabricated and folded so as to minimize storage problems prior to use. Subsequently, the container blank is adapted to be unfolded, set-up and filled with a cellular type expandable foam material so as to provide a rigid container for buk materials.

THE PRIOR ART

Currently containers for materials such as powdered chemicals as well as fluids take a form of large steel drums often having a capacity of 55 gallons. Alternatively, fibre drums or corrugated boxes carrying a liner compatible with the storage and transportation problems of the material are utilized. In the case of steel drums, such are relatively expensive, heavy and require substantial storage space prior to use. Alternatively, fibre drums may require complex sealing means to attach the bottom to the side walls and to provide a rigid closure therefor. Additionally the art utilizes corrugated containers having a liner therein, but they also present problems with respect to sealing and rigidity.

SUMMARY OF THE INVENTION

In an effort to overcome the disadvantages of these prior art bulk containers, the instant invention comprises a container blank having a bottom and upstanding sides formed of dual flexible walls of a polymeric material having a relatively high tensile strength. In this condition, the invention represents a container blank which may be folded into a small space and stored for subsequent use. Just prior to the use of a container blank, it is placed in an appropriate mold and an expandable foam such as polyurethane together with a blowing agent is injected into the hollow walls and permitted to expand into a rigid cellular structure which takes the shape of the mold to form a rigid container. Additionally, self-sealing means for closing the container are provided.

Accordingly, it is an object of the instant invention to provide a container for bulk materials or liquids which have a high strength to weight ratio and which provides additional vertical stacking strength. Additionally, it is an object of the instant invention to provide a container blank comprising merely a bottom and side walls of foldable material which may be folded so as to require little space for storage prior to the time of need for the container. An additional object of the instant invention is to provide a container which is very light, but carries an integral water-proof barrier. Finally, the instant invention results in a container which provides superior product protection from vibration and shock and has a capability to thermally insulate the packaged good to considerable degree.

DESCRIPTION OF THE DRAWINGS

The manner in which the objects of this invention is obtained will be made clear by consideration of the following specification and claims when taken in conjunction with the drawings in which:

FIG. 1 is a perspective view of a preferred embodiment of the instant invention in its closed condition;

FIG. 2 is an exploded perspective view of the container and the closure of this embodiment;

FIG. 3 is a perspective view of this embodiment in its folded condition;

FIG. 4 is a side elevational view depicting the manner of rigidifying the instant embodiment through the introduction of a liquid foam which expands into a rigid cellular structure;

FIG. 5 is a partial perspective view of FIG. 4;

FIG. 6 is a side elevational view depicting the filling of a container with a bulk material; and

FIG. 7 is a side elevational view disclosing the manner of applying the top closure to the container.

DETAIL DESCRIPTION

The instant invention preferably takes the form of a box shape container illustrated in FIG. 1 by the number 10. Preferably this box shape structure is formed of a bottom portion 14 and a closure 40. The bottom or container portion 14 has upstanding sides 18 and a bottom support 16 formed of dual flexible walls. This flexibility will permit the folding of the upstanding sides 18 against the bottom 16 into a container blank 39 (FIG. 3) which requires a minimum amount of storage space for the user until it is ready to be filled. Then this box blank of FIG. 3 is placed into a mold with an expandable foam material being injected into the interior space between the dual walls. Upon expansion into a cellular structure, the foam and flexible walls result in a rigid open container as illustrated in FIG. 6 ready for the filling of material therein and subsequent closing by a top 40. This top closure member 40 is also hollow and receives an expandable foam product which may be utilized to form an integral seal and lock as hereinafter explained.

FIG. 2 of the instant invention illustrates the hollow bottom member 16 and upstanding side walls 18. Both the bottom 16 and side walls 18 are formed of dual inner and outer flexible walls 20 and 22 formed of a polymeric material. The upper side walls 18 terminate at the upper edge with a peripheral cross sectional sealing surface 24 having a semi-circular sealing channel 26 thereon. Additionally, at least one aperture 28 is provided within the sealing channel for purposes hereinafter explained. Extending from two of the sides at the top are flaps 30 which may be utilized for handling the container.

Preferably, the thin flexible walls are formed of a polymeric material which has a high tensile and impact strength, is relatively rigid and resistant to punctures. Suitable materials include such polymers as polybutylene terephthalate which is marketed under the trademark VALOX by General Electric Company, Inc. having a sales office at One Plastics Avenue, Pittsfield, Massachusetts, or other fluorohalocarbon materials such as teflon. These compositions are most appropriate when a fire resistant container is desired. Alternatively, other materials which provide the desired exterior packaging characteristics are acceptable and would include polyethylene, polyurethane or polycarbonate polymers. In addition to choosing a polymer for forming the desired external surface, consideration should be given to those which are best suited to the specific forming process which is to be used.

A preferred method of forming such a flexible shell having the inner and outer walls 20 and 22 is the conventional rotational molding process. Reference may

be had to by copending application, Ser. No. 237,194, filed Mar. 22, 1972 for additional disclosure relating to this process. Alternatively, the inner and outer shells may be formed through a sinter molding process and then joined together by heat sealing or other methods. In the latter instance, the walls may be formed by the electrical deposition of a powder onto two molds of different dimensions followed by the sintering or fusing of the powder to form a thin film. Upon removal of the films from the molds, they may be heat sealed together to form the hollow shell similar to that of the instant embodiment. Additionally, the top closure member 40 may be formed through the same processes and generally with the same choices of material being available. It may take the form of upper and lower surface films 44 and 46 (see FIG. 7), side walls 45 with a peripheral sealing channel 48 in the lower surface. Finally, an aperture 50 is provided within the channel 48 for purposes hereinafter explained.

After the manufacture of the blank container illustrated by the number 39 in FIG. 3, the flexible walls 18 may be folded down on the bottom portion 16 with the top 40 being placed thereon. Such is hereinafter referred to as a container blank since it requires a very small storage space with respect to the finished container illustrated in FIG. 1. This blank 39 may then be transported to the ultimate user and stored in his facilities with a minimum requirement of space until it is used.

At the user's plant and at the time of use, the container blank 39 is fabricated into a rigid cellular structure having a high strength to weight ratio to the manner illustrated in FIGS. 4 and 7. In these drawings, the flexible container portion 14 is placed within an outer rigid mold 62, while an inner rigid mold 60 is then inserted into the interior. Subsequently, a rigid top 64 is placed on the other molds, with the flaps 30 attached to the upper portion of the outer walls 22 being utilized to hold the container in place. Preferably, the mold top 64 is provided with a semi-circular land 65 which fits the peripheral groove 26 of the sealing surface 24 so as to preclude the foam from filling it. Subsequently, through an injection nozzle 80, an expandable foam material is injected into the container portion 14 through an aperture 66 in top mold 64 and aperture 28 into the space between the inner and outer walls 20 and 22 by conventional in-situ foaming methods.

With respect to the foam composition, polyethylene or polyurethane foams are preferable. However, any foam composition which can be foamed in place with the use of blowing agents or through existing or acceptable processes and which form a relatively rigid cellular structure upon expansion is acceptable. Too, closed cell structure may be utilized if a highly water-proof package is desired. Thus, any material which is capable of being inserted into the walls and thereafter expanded into a rigid cellular structure is acceptable. When different compositions are utilized to form the film and the cellular structure, the finished article will exhibit a relatively abrupt change of composition at the interface or juncture between the film and the composition. Where the film and the cellular structure are formed of the same composition, such as polyurethane, the film and the cellular structure may exhibit a rather abrupt change in density at the interface or juncture.

After the expandable foam has been injected into the interior of the bottom and side walls 16 and 18, it is

permitted to rigidify and then is removed from the molds 60 and 62. Thereafter, it may be filled with a bulk material illustrated by the number 72 through a dispensing spout 70. At this point it should be noted that the annular sealing channel 26 formed in the upper sealing surface 28 remains uncontaminated with any material. Subsequently, the top section 40 is placed into its own mold 67 having upstanding side walls 68 with a liquid foam being injected through the nozzle 80. This liquid foam immediately begins to expand and to rigidify upwardly to act as a self-sealing means for the liquid foam which is below it. At this time, the top member 40 may be inverted and placed upon the container 14 so as to align the sealing channel 48 of the top 40 and the sealing surface 24 on the container with the foam expansion process continuing. Subsequently, such foam is permitted to flow out the apertures 50 into the annular grooves 48 and 28 so as to completely seal the circumferential annular channel now formed between the closure member 40 and the upper side sealing surface 24 on the container. Thereafter the container is ready for shipping or further storage.

It should be noted from this disclosure that the container may take several forms. For example, the bottom member 16 may be formed of a rigid plate-like structure to which is attached two separated upstanding walls which are adapted to receive the expandable foam material. This alternative will permit the folding of a container blank to very small space as well as the use of a more rigid bottom. Additionally, the top member 40 may also take many forms, and may be of a solid material having an annular groove therein. Too, the container, shown in a rectangular or square structure, may take various shapes. Finally, it should be evident that in the rotational molding process the sealing channel 26 adjacent the upper surface 24 may be provided with a rough textured surface so as to improve the adhesive relation between the upper closure 40 and container 14. As an alternative process of making the instant invention, the in-situ foam process may be accomplished when the thin walls are within the rotational molds.

I claim:

1. A new article of manufacture comprising a container blank including a bottom portion and side portions integrally connected to one another and to said bottom portion to define a container shape, said side portions each being defined by dual walls of a thin flexible polymer material separated from one another and defining a space therebetween, and said side portions including means for folding said side portions against said bottom portion for storage and shipment.

2. The container blank of claim 1 wherein interiors of said side portions are in communication with one another.

3. The container blank of claim 1 wherein said bottom portion is also of a dual wall construction, and the interiors of said side portions are in communication with one another and said bottom portion.

4. The container blank of claim 1 wherein upper edges of the dual walls of said side portions are interconnected by a sealing surface defining member and maintained in spaced relation thereby.

5. The container blank of claim 1 wherein upper edges of the dual walls of said side portions are interconnected by a sealing surface defining member and maintained in spaced relation thereby, said sealing sur-

face defining member having at least one aperture therein for introducing a filler into the space between said dual walls.

6. The container blank of claim 1 wherein upper edges of the dual walls of said side portions are interconnected by a sealing surface defining member and maintained in spaced relation thereby, said sealing surface defining member having extension forming flap means for handling of the container.

7. The container blank of claim 1 wherein said dual walls include inner and outer walls, said inner walls being continuous and said outer walls being separately continuous.

8. The container blank of claim 7 wherein said space between said dual walls is continuous.

9. A new article of manufacture comprising a container having a bottom portion and side walls, said bottom portion and said side walls each being of a dual

wall construction, said dual walls including a continuous inner wall defining inner surfaces of said bottom portion and said side walls and a separate continuous outer wall defining outer surfaces of said bottom portion and said side walls, said inner and outer walls being formed of a thin flexible polymer material and being connected together at upper edges of said side walls by a seal forming member, and a formed in situ foamed cellular material filling the space between said inner and outer walls.

10. The container of claim 9 wherein said seal forming member has at least one foamed cellular material passage therein.

11. The container of claim 9 wherein said seal forming member has extensions projecting outwardly of at least two opposite ones of said side walls and defining flap means for handling of the container.

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