Oct. 8, 1963 F. E. BAKER 3,106,140

METHOD FOR FORMING MULTIWALL BAGS

Original Filed July 24, 1958 3 Sheets-Sheet 1

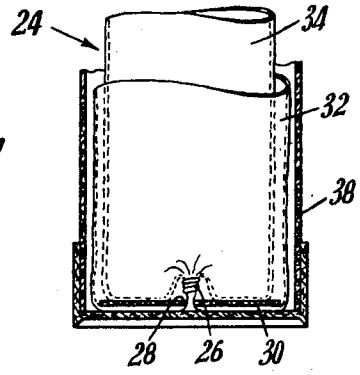


Fig. 1.

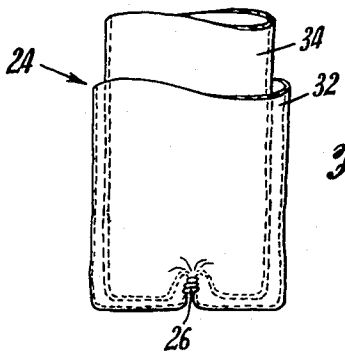


Fig. 2.

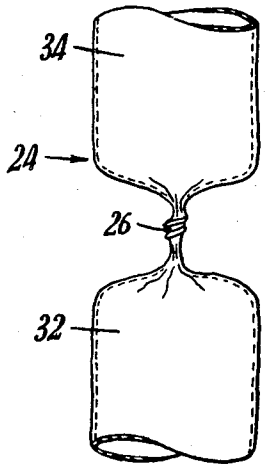


Fig. 3.

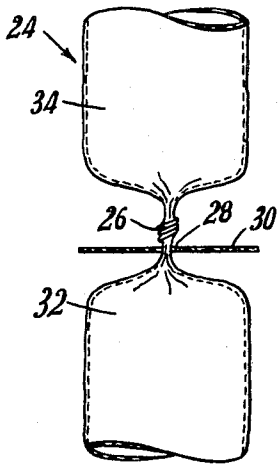


Fig. 4.

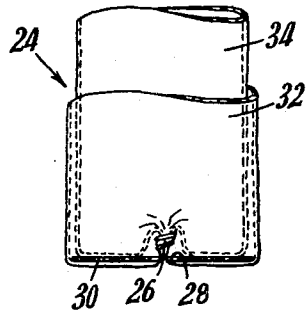


Fig. 5.

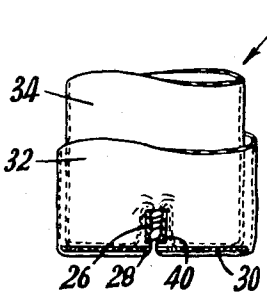


Fig. 6.

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Fig. 7.

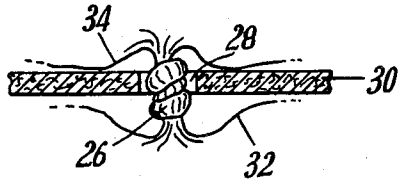


Fig. 8.

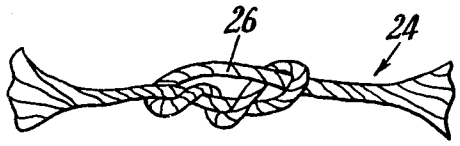


Fig. 9.

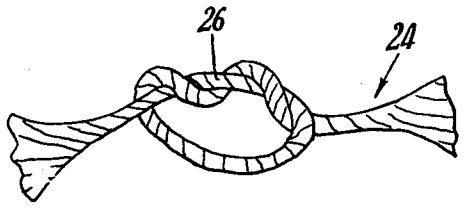
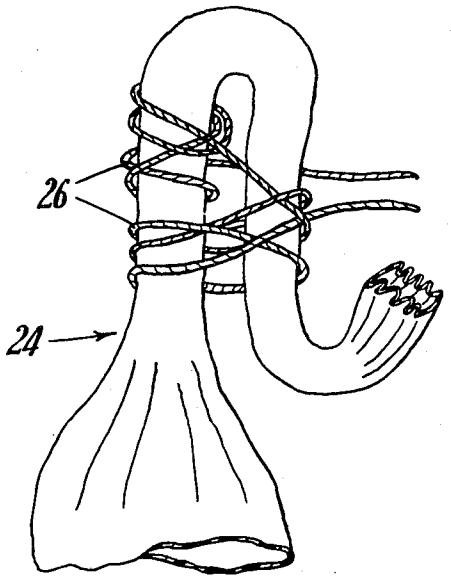


Fig. 10.



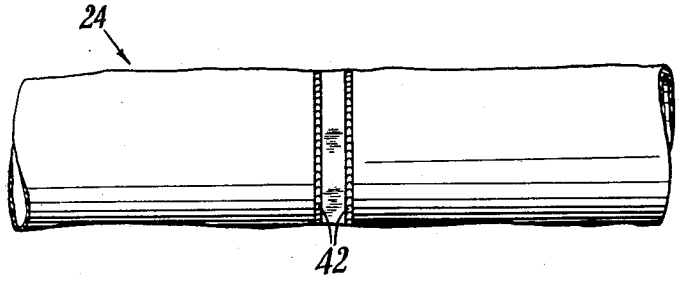
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Fig. 11.



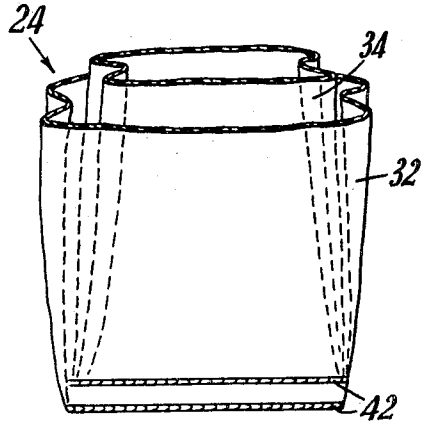


Fig. 12.

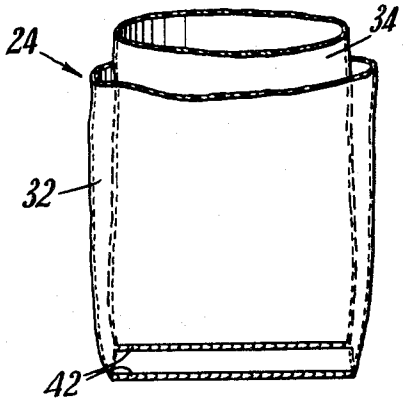


Fig. 13.

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METHOD FOR FORMING MULTIWALL BAGS

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Original application July 24, 1958, Ser. No. 750,769, now Patent No. 3,061,170, dated Oct. 30, 1962. Divided and this application Apr. 28, 1961, Ser. No. 110,293

5 Claims. (Cl. 93—35)

This application is a division of copending application Serial No. 750,769, filed July 24, 1958, which issued as Patent No. 3,061,170, dated Oct. 30, 1962.

This invention relates to a method of making a multiwall bag and the bag produced by this method. More particularly, it relates to a multiwall plastic bag having a leakproof pouch.

Containers used for packaging and shipping liquid or solid items are relatively expensive. This is also true of containers used to ship frozen foods which must be made more durable than usual in order to withstand the thermal strains of freezing and thawing.

As economical leakproof containers, there have been proposed containers of paperboard and fiber drums lined with single wall seamed pouch liners. The use of such containers has not been entirely satisfactory. When such containers were used to ship frozen eggs, fruits, etc., shocks of handling and vibrations encountered in shipping have caused pouch liner seam leaks or leaks through small pin holes in the single wall liner. These leaks cause deterioration of the container interior and a loss of goods being shipped.

Thus, the bulk frozen food industry has need of a leakproof shipping unit as well as one which is more economical than the tin plate cans customarily used for the purpose. Other industries also have need for an economical leakproof shipping unit.

An object of this invention is to provide a simple and more economical method of making a multiwall leakproof flexible bag.

Another object of this invention is to provide a simple method of making a multiwall leakproof flexible liner for shipping containers.

Another object is to provide a method for the fabrication of a multiwall package from a length of tubular plastic film of a single wall thickness.

Still another object is to provide a method for the fabrication of a seamless double leakproof container from a length of seamless tubular plastic film of a single wall thickness, said container having a stiffening member positioned between the inner and outer walls.

Other objects of this invention will become apparent hereinafter.

According to the present invention multiwall bags of material such as flexible plastic film are formed from a tubular length of the film by first placing a substantially leakproof construction at a suitable intermediate position in the length of the tubing, as for example by tying a knot in the tubular film or by encircling it with a suitable clamp or by heat sealing the tubing wall, thereby producing two connected sections of tubing but with a leakproof barrier therebetween, and then by suitable manipulation of one or both sections of tubing forming a double wall container wherein one tubular section is superimposed over the other section and with the leakproof barrier being positioned at the bottom of the container and between the inner tubular section and the outer section which has been superimposed over the inner section.

The superimposing of one tubular section upon the other section can be effected by folding back the end of one section to form a cuff and continuing to turn inside out said section until all of said section has been cuffed over the leakproof construction and is superimposed as an outer ply or wall over the other tubular section.

Alternatively, instead of starting the cuff at the end of a tubular section, the cuff forming can begin at the constriction section by grasping it and pushing or pulling it interiorly through one of the tubular sections whereby the other tubular section forms the interior or inner ply of the resultant container.

The nature of the invention will be more clearly understood by reference to the following detailed description and in connection with the accompanying drawings, wherein;

FIG. 1 is a vertical section of a multiwall bag positioned as a liner in a shipping container.

FIG. 2 is an elevational view of a multiwall bag without stiffening members.

FIGS. 3, 4 and 5 are elevational views progressively illustrating the construction of a double-wall bag having a stiffening member at the bottom of the bag and between the inner and outer walls.

FIG. 6 is an elevational view of a multiwall bag having a leakproof constriction secured with a clip and having a bottom stiffening member inserted between the inner and outer walls.

FIG. 7 is an elevational view of the bottom portion of a multiwall bag having a bottom stiffener between the inner and outer walls and a leakproof constriction made by tying a double overhand knot in a flexible tubular plastic film twisted and pleated at the annulus.

FIG. 8 is an elevational view of a flexible tubular plastic film tied into a stevedore's knot which will yield a leakproof constriction.

FIG. 9 is an elevational view of a flexible tubular plastic film tied into a double overhand knot which will yield a leakproof constriction.

FIG. 10 is an elevational view of a flexible tubular plastic film tied into an anchored double clove hitch knot which will yield a leakproof constriction.

FIG. 11 is an elevational view of a tubular plastic film with heat sealed wall which will yield a leakproof constriction.

FIG. 12 is an elevational view of a multiwall bag made of gussetted tubing having a heat sealed leakproof constriction.

FIG. 13 is an elevational view of a multiwall bag made of fattened tubing having a heat sealed leakproof constriction.

The spaces between the plys of the multiwall bag, in the drawings, have been exaggerated for purposes of clarity.

When the leakproof constriction comprises a knot, it can be made mechanically or by hand. When a metal or plastic clip 40 is used, such as a "Vac-tie" clip, a "Fastie" clip or a "Global U-clip," it is generally applied mechanically. One or more heat seals 42 can be applied transversely across a section of the tubing by means well known to those skilled in the art to form a leak-proof construction. Any of such constrictions may be applied to lay-flat tubular plastic film or gussetted tubing such as is described in U.S. Patent 2,542,652 to G. Freund II.

Any suitable tubular plastic film such as those made from polyethylene, plasticized copolymers of vinyl chloride and vinylidene chloride, plasticized polyvinyl chloride, plasticized copolymers of vinyl chloride and vinyl acetate, nylon, polystyrene, ethyl cellulose, cellulose acetate butyrate and cellulose acetate can be used in the practice of this invention. Tubular polyethylene film is preferably used for the bag construction because, among other reasons, it is flexible at a wider range of temperatures at which the pouch constriction is made.

Preferably lengths of plastic tubing in flat widths up

to about 48 inches and having a thickness of from about .0015 inch to about .004 inch are used. The length and flat width or diameter, of the tubing to be used, is determined by the size of the bag to be made. Thus, bags of various lengths may be readily obtained by using an appropriate length of tubing.

Multiple walled bags containing a stiffening member at the bottom of the bag as shown in FIGS. 1, 5 and 6 are constructed by inserting tubular film 24, containing a leakproof constriction 26 through a hole 28 in a stiffening member 30 such as corrugated cardboard, so that the stiffening member 30 lies adjacent to the shoulder of the leakproof knot 26, as shown in FIG. 4. The inserted end 32 is turned back, as a cuff, over the other end of the tubing, as by telescoping and is pulled to the knot 26. In the completed bag as shown in FIG. 5, the stiffening member 30 is positioned between the inner ply 34 and outer ply 36. When the bag is to be used as a liner, it is inserted into a suitable container 38, which may be made of fiber board, metal or other suitable container material.

The stiffening member 30 helps protect the bottom of the bag by cushioning it against shipping and handling shocks, as well as reinforcing and imparting a shape to the multiwall bag. The stiffening member may be made of any suitable shape-retaining material such as corrugated cardboard, foam rubber, sponge, cork, plastic sheet stock, plywood and others. when the multiwall bag is used as a liner, the stiffening member is preferably made into the shape of a rectangle or circle and of a size which will loosely fit into and conform to the shipping container. If the multiwall leakproof bag is not to be used as a liner but as a shipping container by itself, the stiffening member may be made any size and shape which will fit between the inner and outer walls of the bag and impart the desired shape to the bag. The hole in the stiffening member 30 should preferably be of a size to loosely accommodate the leakproof constriction made in the tubing. The stiffening member may be constructed so as to form any shape desired such as for example round, square, polygon, etc.

Since a multiwall bag minimizes leaks caused by pin holes in the tubular plastic film and the method of this invention permits the use of thinner and less expensive plastic material, such as .0015 inch thick polyethylene tubing, in place of the .003 inch thick material ordinarily required for single walled seamed bags, it has a considerable advantage over a single walled seamed bag. Thus, this leakproof multiwall bag is more economical to various industries, such as frozen food, agricultural and meat packing, by decreasing the spoilage of goods and shipping containers caused by leaks, as well as loss of material being shipped.

The polyethylene film, preferably used for the bag construction, is flexible over a considerable temperature range, and hence can be readily pleated, twisted or constricted to form a leakproof knot or closure. By pleating, twisting or otherwise forming convolutions in the tubular film before knotting it, the resultant knot is less likely to leak.

Since it is apparent that various changes and modifications may be made in the above illustrated embodiments without departing from the nature and spirit thereof, this invention is not limited thereto, except as set forth in the appended claims.

What is claimed is:

1. A method of making a multiwall leakproof bag which comprises making a leakproof constriction at an intermediate section in a length of flexible tubular plastic film to form two connected tubular sections with a leakproof barrier therebetween, inserting and end of one of said sections through a hole in a stiffening member and positioning the stiffening member adjacent to the constriction, turning back the end of one of said sections inside out beyond the constriction and over the exterior surface of the other section of said tubing, thereby forming a bag with an inner and outer ball and with the stiffener positioned at the bottom of the bag between the inner and outer walls of the bag.

2. A method of making a multiwall leakproof bag, as set forth in claim 1, wherein the leakproof constriction is formed by encircling a section of the tubular material with a clip.

3. A method of making a multiwall leakproof bag, as set forth in claim 1, wherein the leakproof constriction is formed by heat-sealing.

4. A method of making a multiwall leakproof bag, as set forth in claim 1, wherein the plastic film comprises polyethylene.

5. A method of making a multiwall leakproof bag as set forth in claim 1, wherein the leakproof constriction is made by tying the tubular film into a knot.

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UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,106,140 October 8, 1963

Francis E. Baker

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 4, line 18, for "and" read -- an --; line 24, for "ball" read -- wall --.

Signed and sealed this 28th day of April 1964.

(SEAL)
Attest:

ERNEST W. SWIDER
Attesting Officer

EDWARD J. BRENNER
Commissioner of Patents