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CONTAINER

John Hohl and Olav Bjering, Toledo, Ohio, assignors to Owens-Illinois Glass Company, a corporation of Ohio

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This invention relates to bags or other containers formed of thin, flexible sheet material and for use in the packing, shipment, storage and dispensing of liquid, plastic, or other materials.

In such containers it is desirable that one or more of the walls, and preferably two opposite walls, be transparent so that the color and appearance of the contents may be readily noted without opening the container. Therefore, it is desirable to employ transparent sheet material in forming said walls. It is also desirable that one or more of the walls, and preferably two opposite walls, be somewhat stiffened or reinforced so that the container when filled may assume a form substantially rectangular in cross-section and readily fit into a rectangular carton or a plurality of the filled containers may be packed in a larger rectangular receptacle. This may be effected by layers or strips of paper or other analogous substantially opaque sheet material covering the last-mentioned walls and the top as well as the bottom of the filled container and somewhat thicker and stiffer than the transparent sheet material. Thus, a filled container may be more conveniently handled and is less liable to be punctured by rough or careless treatment.

When the container is empty and collapsed by infolding the two opposite transparent sides, all of the exposed surfaces of the container will be completely covered and protected by flat, stiffening, or reinforcing sheets on the other two sides.

In such a container the main liability of leaks developing is by abrasion at the corners, by weakening or cracking at the folds, and by strains at the seams.

The main object of the present invention is to provide a container of the general type above referred to, which is less liable to develop leaks; will resist more effectively internal strains exerted by the contents, for instance, that resulting from externally applied pressure; will better withstand rough usage, is less liable to be accidentally punctured, and may be conveniently and economically manufactured in quantity by automatic machines.

In carrying out the present invention there is provided, as an important feature, supplemental transparent sheet material which forms an additional or outer ply or layer on the transparent walls and a thickening or reinforcing on the edges of said walls. This outer layer or ply may be of the same general character as the thin, flexible, transparent sheet material employed in manufacturing the inner layer.

In the accompanying drawing there are illustrated certain embodiments of my invention but it will be understood that various changes and modifications may be made within the scope of my invention as defined in the appended claims. 5

In the drawing:

Fig. 1 is a perspective view of a filled container embodying my invention;

Fig. 2 is a face view of the container in flat or collapsed condition, a portion of one layer being broken away, and indicating how a plurality of containers may be made in end-to-end relationship, and then separated by transverse cuts;

Fig. 3 is a transverse section through the expanded container as, for instance, on the line 3—3 of Fig. 1;

Fig. 4 is an edge view of the upper end of the container showing the lips spaced apart for filling or dispensing;

Fig. 5 is a transverse section on the line 5—5 of Fig. 1 but showing the container partly expanded;

Fig. 6 is an edge view of the assembled sheets or layers of the transparent material prior to folding around a mandrel to form the body of the container; and

Fig. 7 is a section similar to Fig. 3 but showing an alternative construction.

It will be understood that in the drawing the several sheets or strips are shown of greatly increased thickness to facilitate the disclosure of the parts. In forming our improved container we may employ a sheet of thin, flexible, transparent sheet material of a width slightly greater than the circumference or peripheral distance around the container. "Pliofilm" is a suitable material which may be employed because of the ease with which the seams may be formed by heat and pressure without the necessity of separate adhesive, and because that material is slightly elastic so that it will give rather than break when subjected to reasonable strains. Other analogous thin, flexible, transparent sheet material might be employed, for instance, heat-sealable Cellophane, or even Cellophane which is not heat-sealable where it is satisfactory or convenient to employ adhesive in forming the seams.

Secured to one surface of the sheet 10 are a pair of strips 11 of substantially the same material as the sheet 10 but preferably of a grade of material which is somewhat tougher or harder. The strips 11 are each secured adjacent to its opposite edges to the sheet 10 by narrow sealing

lines or areas 12 preferably affected by the application of heat and pressure. The body portion of each strip 11 is preferably unattached to the body of the sheet 10. The strips 11 are slightly wider than the two opposed transparent walls of the container to be formed, and the portion of the sheet 10 between the two strips 11 is preferably slightly narrower than one of the other sides of the container. The edge portions of the sheet 10 beyond the strips 11 are of such width that when the sheet is bent to tubular form and the edges overlapped and sealed together, such portions will form the fourth wall of the container.

The laminated sheet as shown in Fig. 6 may be of indefinite length and progressively fed endwise over a mandrel associated with means for folding the sheet around the mandrel, overlapping the opposite edges and sealing them together to form a tube and by a heat-sealed seam 13 as shown in Fig. 3.

The portions of the laminated sheet covered by the strips 11 will form two opposite walls of the tube and of double thickness. By making these layers of Pliofilm, which is slightly elastic, all internal strains applied to the inner layer and all external strains applied to the outer layer will be transmitted to the other and the wall will therefore be reinforced and strengthened. This advantage is not secured if the material is nonstretchable. By reason of the elasticity, the layers are not permanently deformed by such strains, nor is the capacity of the container changed because upon the termination of the strain, the layers go back to the original position. The double thickness of the other two walls of the tube is formed by strips 14 and 14a of paper or analogous stiffer, tougher, and preferably opaque sheet material and these may be brought into proper assembly with the formed tube after the sealing of the seam 13, although one of the strips 14a which covers the area of the sheet 10 between the strips 11 may be applied to the sheet before the latter is folded around the mandrel.

The strips 14 and 14a are sealed in place preferably substantially throughout their area and preferably by an adhesive coating on the inner surfaces of said strips, although other sealing means may be employed. The strips 14 and 14a are preferably slightly wider than the rectangular tube formed on the mandrel so as to present edge portions 15 extending slightly beyond the other two side walls and serving to protect the corners as shown in Fig. 3. The strips 11 are of such width and the mandrel is of such shape that the edge portions of the strips 11 which are sealed to the strip or sheet 10 fold around the corners and thus, the seams 12 are covered by the sheets 14 and 14a and the latter are secured to such edge portions so that there is formed an outer casing made up of the strips 11, 14 and 14a and an independent inner casing formed solely by the sheet 10, but the two are permanently secured together.

In delivering the continuously produced tubular member from the mandrel, the double-ply transparent walls are provided with infolds 16 as shown in Fig. 5 so that the tube as delivered may be in flat, completely collapsed condition, and with substantially the entire outer area protected and concealed by the paper strips 14 and 14a.

In forming the container, transverse seams

are made at points spaced apart along the tube, the spacing being dependent upon the length of the desired container. Such transverse seams are preferably formed so as to completely seal the portion which will form the bottom of each container and seal only portions of the end which is to form the top of each container. As shown in Fig. 2 there may be a transverse heat-seal 16' which extends across the entire width and which will not only seal together the opposed surfaces of the inner sheet 10 but will also seal these portions to the infolds 16 and seal said infolds together on their outer surfaces. Each of the heat-sealed areas 16' may have laterally extending portions 17 spaced apart transversely and these likewise sealing together the infolded sections and sealing them to the outer sheet 10, but due to the spacing between the areas 17, the opposite layers of the sheet 10 will not be sealed together across a portion of the area between the infolds 16. Upon the completion of this heat-sealing, the endless tube may be cut transversely along lines A—A which will separate the heat-sealed areas 17 from the heat-sealed area 16' so that the area 16' may form a transverse flange or flap 16A across the bottom of the container and the heat-sealed areas 17 will form a transverse flange 17a across the top of the container.

A portion of this flap flange will have two lips so that it may be opened by spreading apart layers at the central unsealed area to form a filling or dispensing opening 18 as shown in Fig. 4. Any suitable form of nozzle may be inserted in the opening 18 for filling and simultaneously expanding the container from flat, collapsed condition to the form shown in Fig. 1 and thereafter the unsealed area of the top flap 17a and between the sealed areas 17 may be sealed by the application of heat and pressure to hermetically seal the container with the contents therein. The sealing of this filling opening may be by a comparatively narrow heat-seal, indicated at 18 in Fig. 1, and which may be readily broken by pulling the opposite lips apart. The opening may be effected by cutting off the upper edge portion of the flap 17a and below the line seal 18.

As an alternative arrangement of the layers to produce substantially the same results, only two strips or sheets of the thin, flexible, transparent sheet material need be employed and of equal width. In Fig. 7 I have indicated an inner sheet 20 bent to form three sides of the container, and an outer sheet 21 also bent to form three sides. By turning inwardly the edges of each sheet and assembling the sheets with the channels facing in opposite directions and heat-sealing each of the inturned edges of one sheet to the adjacent sheet, a tubular casing is formed having two opposite sides each formed of two layers of the thin, flexible, transparent sheet material. Strips or sheets 14 and 14a of the stiffer opaque material may be applied and glued in place to cover the single layer sides and to cover, conceal, and reinforce the seams 12. Other arrangements may be employed for accomplishing the same general result.

Having thus described our invention, what we claim as new and desire to secure by Letters Patent is:

1. A container having the peripheral wall formed of two concentric casings, the inner casing being formed of thin, flexible, transparent

sheet material, and the outer casing including layers of thin, flexible, transparent sheet material covering two opposite sides of the inner casing and stiffer but flexible sheet material covering the other two sides.

2. A container having an inner wall formed of a single sheet of thin, flexible, transparent sheet material with its edges overlapped and sealed together, and an outer wall formed of strips of thin, flexible sheet material covering two sides of the inner wall and strips of stiffer sheet material covering the other two sides of the inner wall.

3. A container substantially rectangular in cross-section and having two opposite walls formed of a plurality of layers of thin, flexible, transparent sheet material, and having the other two walls each formed of an inner flexible waterproof layer and outer stiffening layer.

4. A container approximately rectangular in cross-section and comprising an inner casing formed of a single sheet of transparent material with the edges overlapped and sealed together, and having a pair of opposite walls each provided with an outer layer of similar material and the other pair of walls each being provided with a layer of opaque material.

5. A container approximately rectangular in cross section and having a pair of opposite walls each formed of two superposed layers of transparent slightly elastic material, said layers being sealed together along lines lengthwise of the container and along the other two opposed walls adjacent to the longitudinal corners whereby each of said corners is also formed of a double thickness of said material, and whereby the contents of the container may be viewed through either of said double layer walls.

6. A container substantially rectangular in cross section and having two opposite walls and the longitudinal marginal portions of the other two opposed walls formed of two superposed layers of thin flexible transparent sheet material, said layers being sealed together along said marginal portions and stiffer opaque sheet material covering the sealed areas in said marginal portions.

7. A container including a pair of channel-shaped strips of transparent sheet material, and a pair of strips secured to the edge portions of said first-mentioned strips to form an outer casing, and an inner casing formed of a single sheet of thin, flexible, transparent material, said casings being secured together along a plurality of seams lengthwise of the container.

8. A container including an inner casing of thin, flexible, transparent material, strips of similar material covering two opposite walls thereof and each of a width slightly greater than the width of said walls, and strips of stiffening material covering the other two walls and having their edge portions secured to the edge portions of the first-mentioned strips.

9. A container including an inner casing of thin, flexible, transparent material, strips of similar material covering two opposite walls thereof and each of a width slightly greater than the width of said walls, and strips of stiffening material covering the other two walls and having their edge portions secured to the edge portions of the first-mentioned strips to form an outer casing, said inner and outer casings being permanently secured together.

10. A container having an inner casing formed of "Pliofilm" and an outer casing formed partly of "Pliofilm" and partly of stiffening opaque sheet material.

11. A container having an inner casing formed of "Pliofilm" and an outer casing formed partly of "Pliofilm" and partly of stiffening opaque sheet material, said casings being permanently secured together.

12. A container including an inner casing formed of a single sheet of "Pliofilm" and an outer casing comprising strips of "Pliofilm" covering two opposed sides of the inner casing, and having the edge portions heat-sealed to the inner casing, and strips of opaque sheet material covering the other two sides of the casing and overlapping and secured to the edges of the first-mentioned strips.

JOHN HOHL,
OLAV BJERING.