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CONTAINERS MADE OF CORRUGATED FIBROUS SHEET MATERIAL

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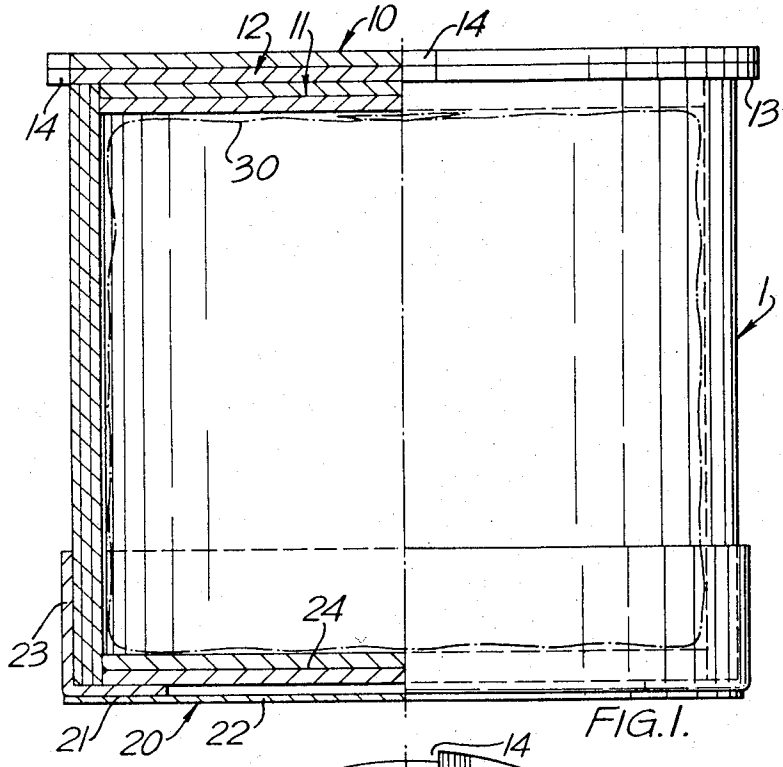

FIG. 1.

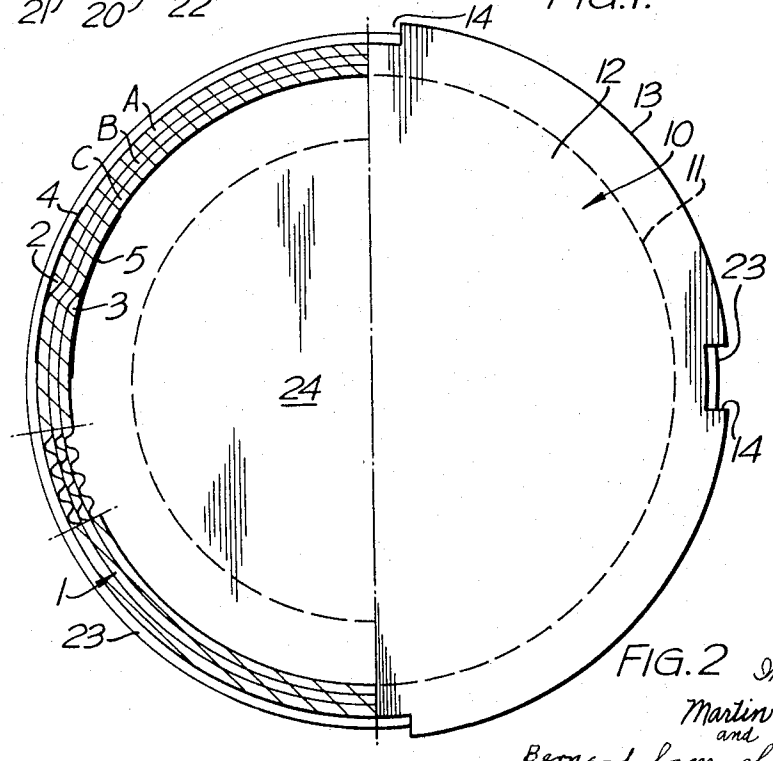

FIG. 2

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9 Claims. (Cl. 229—4.5)

ABSTRACT OF THE DISCLOSURE

A container suitable for use in the packaging of liquids, fats, powders and other flowable materials, and including a hollow tubular body comprised of two or more turns of convolutely wound, single faced corrugated fibre-board, the ends of the corrugated fibre-board, which extend longitudinally of the body, being secured to the respective adjacent turns but otherwise the adjacent turns of the corrugated fibre-board being unattached, and end closure members in each end of the body to reinforce the body against inward deformation.

This invention relates to containers made of corrugated fibrous sheet material particularly, but not essentially, suitable for use in the packaging of liquids, fats, powders and other flowable materials.

According to the present invention a container includes a hollow tubular body of two or more turns of convolutely wound, single faced corrugated fibre-board, the ends of the corrugated fibre-board, which extends longitudinally of the body, being secured to the respective adjacent turns but otherwise the adjacent turns of the corrugated fibre-board being unattached, and end closure members at each end of the body.

Preferably each end closure member engages internally at the end of the body, thereby affording reinforcement against inward deformation. This reinforcement may be obtained by providing the end closure member with or forming it as a disc plug dimensioned to fit snugly into the end of the body. Reinforcement may also be provided against outward deformation. This may comprise an annular skirt of an end closure member or may be in the form of one or more straps externally applied, longitudinally around the body and end closures.

The present invention is now described with reference to the accompanying drawing in which

FIGURE 1 shows a half sectional elevation of a container and closure member therefor, and

FIGURE 2 shows a half plan view and half section in a radial plane, of the container.

Referring to the drawing, the container has a cylindrical body **1** of hollow cylindrical form. The body need not essentially be of circular section. It could be of eliptical or other cross-section. The body may vary infinitely in size between diameters of 12" and 74" and heights of 12" and 76". In terms of cubic capacity, this is in the range of 0.8 to 188 cubic feet. There are, of course, no absolute limits to the dimensions of the container body and we have found that container bodies in these ranges, satisfy user requirements. The body is formed by convolutely winding an elongated length of single faced corrugated fibre-board. By single faced corrugated fibre-board we mean a corrugated layer of paper which is faced on only one side with a sheet of paper. In the manufacture of a container having dimensions as mentioned above a heavy weight, single faced corrugated board is used and this enables the container to be employed for contents weighing up to 5,000 lbs. The number of plies in the body, i.e. turns of wound, corrugated board, can vary according to the weight of contents to be carried and the potential external hazards during usage and transit will also have an effect on the number of plies, but generally it is unlikely that more than six plies will be necessary.

In the particular embodiment illustrated in the accompanying drawing, the elongated strip of corrugated board is convolutely wound three times to give three turns A, B and C. The ends **2** and **3** of the strip lie longitudinally of the body and are adhesively secured to the adjacent turns by lengths of tape **4**, **5** respectively. This taping is the only securing between the adjacent turns A, B and C. The unattachment of the turns A, B and C to each other is an essential feature of the present invention. It is important to leave the turns unsecured so that there can be relative movement between them with the consequential result that the forces, acting radially outwardly, generated by the weight of the contents are substantially evenly distributed between the several turns.

The body **1** is closed at each end by an end closure member and different constructions of end closure members are shown at the top and bottom ends of the body **1**, in the accompanying drawing. Generally speaking both end closure members of a body will have the same construction but this is not always so and in some instances of use different constructions may be used for the top and bottom end closure members, to suit particular requirements.

Referring to FIGURE 1, the top end enclosure member **10** comprises a plug **11** and a cover disc **12**. The plug **11** is made of two layers of double faced corrugated fibre-board adhesively secured together, the plug being of circular shape having a diameter corresponding to the internal diameter of the body **1**. Thus the plug is a snug fit in the end of the body. The cover disc **12** also is made of two layers of double faced corrugated fibre-board adhesively secured together. The cover disc **12** is adhesively secured to the end closure **10** and it is of circular shape also but of a diameter slightly greater than the external diameter of the body **1**. Thus the cover disc **12** presents a radially projecting flange **13**. Circumferentially spaced notches **14** are cut in the flange **13**. These notches are provided to receive bands or straps (not shown) applied externally to the container, longitudinally around the body **1** and diametrically across the end closures **10**.

To suit requirements, particularly with the larger diameter drums, the plug and cover disc may be made from more than two layers of corrugated fibre-board and it has been found that up to six layers may be necessary.

The purpose of the cover disc **12** having a diameter greater than the external diameter of the body **1** is to provide rolling edges so that in handling of the container it may be rolled, about its axis, on the flanges **13**, without the body **1** coming into contact with the ground.

The bottom end closure member **20** has an alternative

form including a lid 21 having an end disc 22 and a peripheral skirt 23. Associated with the lid 21 is a plug 24.

The components of the lid 21 are made of corrugated fibre-board and the skirt 23 preferably is single faced fibre-board to facilitate easy formation. The plug 24 has the same construction as the plug 11 hereinbefore described but initially the plug 24 and the lid 21 are not adhesively secured together. Bearing in mind that the body may be up to 76" high and 74" in diameter, it will be appreciated that if the plug 24 and lid 21 were initially secured together, some difficulty might be experienced in fitting the end closure 20 on to the end of the body.

The procedure to apply the end closure 20 to the body 1 is first of all to manipulate the lid into position. This conveniently may be done by folding the body radially inwardly upon itself, the turns A, B and C of the body, during this deformation, slipping relative to each other, and fitting the lid over the end of the body. The body is then pressed back into its cylindrical form so that, at its end, it lies snugly within the skirt 23. The plug 24 is pushed into position from the other and open end of the body. The first end closure member put into position becomes the bottom end closure member. After the body has been filled with the desired contents the top end closure member is fitted by first of all putting the plug in place and then manipulating the lid down on to the top end of the body. In some instances the plug 24 may be dispensed with at the top end, and the lid 21 used on its own.

When handling and filling the larger drums it may be found that the top and open end of the drum body requires supporting. This can be achieved by fitting into the top end of the body, before filling, a plug in which is cut an aperture of up to twelve inches diameter. Thus the disc supports the drum body and the contents can be charged through the aperture. After filling the drum, the aperture is closed by a secondary plug having peripheral dimensions and contours corresponding to those of the aperture. To facilitate correct location of the secondary plug in the aperture, a cover disc is secured to the upper surface of the plug and projects radially as a flange which seats on the upper surface of the apertured plug.

An apertured plug as just described can be readily manipulated into the drum end as the operator can pass his hand and arm through the aperture and thereby work, if necessary, on the plug's under surface. Further to assist in this regard, hand grip recesses may be cut in the plug's periphery.

The end closure member 20 is secured in position by adhesive at the interface between the skirt 23 and body 1. Alternatively or additionally, taping or stitching may be employed.

The particular construction of end closure member, and the thickness of corrugated board from which it is made, are shown to suit particular requirements and this selection will present no problems to those skilled in the art. Furthermore, the end closure members need not necessarily be made of fibrous, sheet material. They could be shaped from sheets of synthetic resin by a suitable moulding technique.

If it is desired to make the container water resistant, then the corrugated fibre-board, before or after being made up into the different component parts, may be treated in known manner, for example wax impregnated.

A container according to the present invention is primarily intended for the packaging of liquids, fats, powders and other flowable material and thermoplastic material such as waxes which are charged to a container whilst in a liquid state and then allowed to set or solidify. With the use of such materials it is of course necessary to provide an inner bag liner 30 to provide an appropriate barrier according to the characteristics and properties of the material to constitute the proposed contents. The bag 30 is so dimensioned as to have a slight oversize fit within the interior of the container. Thus the bag itself does not serve as a load bearing member. The bag may be of plastics material, for example polyvinyl chloride or polythene.

In the packaging of liquids, powders and other flowable materials it may be convenient to provide the bag with some form of discharge neck or spout, in which case, lines of weakness may be provided in one of the end closure members or the body 1 to facilitate removal of a portion thereof thus forming an aperture through which the discharge spout or neck can be drawn. The contents may thereby be discharged in controlled manner and it is not necessary to open completely the container. It will be appreciated that this practice is commonly adopted with the "bag in box" type of container.

In use, bearing in mind that the contents may be liquid or powder, the larger containers would be assembled and filled standing on a pallet and would remain on the pallet until emptied. It is recognized that containers according to the present invention cannot withstand high loads applied externally and that is why a pallet would be employed. However, the containers have great strength against outwards bursting and thus are suitable for holding liquids and powders, whilst being of simple and economic construction. An important practical advantage of drums according to the present invention is that they are easy and simple to assemble and, therefore, the end closure members and bodies can be transported and stored in a disassembled state, affording a substantial saving of space.

What is claimed is:

1. A container comprising a hollow tubular body defined by at least two plies of a convolutely wound sheet material blank, said sheet material blank having inner and outer edge portions disposed generally longitudinally of the body, means securing said edge portions to immediately adjacent plies, and said plies being otherwise unsecured to each other whereby relative movement between the plies is effective to evenly distribute radially outwardly directed forces acting against the interior of the body by a product adapted to be packaged therein.

2. The container as defined in claim 1 wherein said sheet material blank is single faced corrugated fibreboard.

3. The container as defined in claim 1 including a closure at one end of said body, said closure includes a plug portion internally engaging an inner ply of said body and a peripheral flange-like portion projecting radially beyond an outer ply of said body, and outwardly opening notches formed in said peripheral portion adapted to receive securing bands therein.

4. The container as defined in claim 1 including a closure at each of axially opposite ends of said body, and each of said closures includes a plug portion internally engaging an inner ply of said body.

5. The container as defined in claim 1 including a closure at one end of said body, said closure being defined by a plug portion internally engaging an inner ply of said body, an annular band having a radially inwardly directed portion overlying a periphery of said plug portion and an axially directed peripheral portion overlyingly engaging an outer ply of said body, and a closure disc overlyingly secured to said radially inwardly directed portion.

6. The container as defined in claim 2 including a closure at one end of said body, said closure includes a plug portion internally engaging an inner ply of said body and a peripheral flange-like portion projecting radially beyond an outer ply of said body, and outwardly opening notches formed in said peripheral portion adapted to receive securing bands therein.

7. The container as defined in claim 2 including a closure at each of axially opposite ends of said body, and each of said closures includes a plug portion internally engaging an inner ply of said body.

8. A method of assembling a closure having a periph-

eral skirt and a convolutely wound multi-ply container body having inner and outer edge portions secured to immediately adjacent plies but the plies being otherwise unattached to each other comprising the steps of folding the body radially inwardly upon itself from a first configuration in which the outer contour of the body corresponds to the inner contour of the peripheral skirt whereupon slippage between the plies prevents permanent distortion of the body, relatively positioning the peripheral skirt telescopically externally of an end of the body, and unfolding the body to its original contour.

9. The method of assembling the closure and body as defined in claim 8 including the step of inserting a plug into the body from an end opposite said one end, and positioning said plug with a periphery thereof in snug

engagement with an inner ply of said body at said one end.

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