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[54] **END WALL FOR DRUMS AND OTHER CONTAINERS FOR LIQUID OR SOLID STATE PRODUCTS**


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[52] **U.S. Cl.** ..... **220/66,** 229/5.5

[51] **Int. Cl.** ..... **B65d 7/42**

[58] **Field of Search** ..... 220/66, 60 A, DIG. 19, 42 C, 220/60 R; 229/5.5, 5.6, 5.7; 5.8; 206/46 FR; 150/.5



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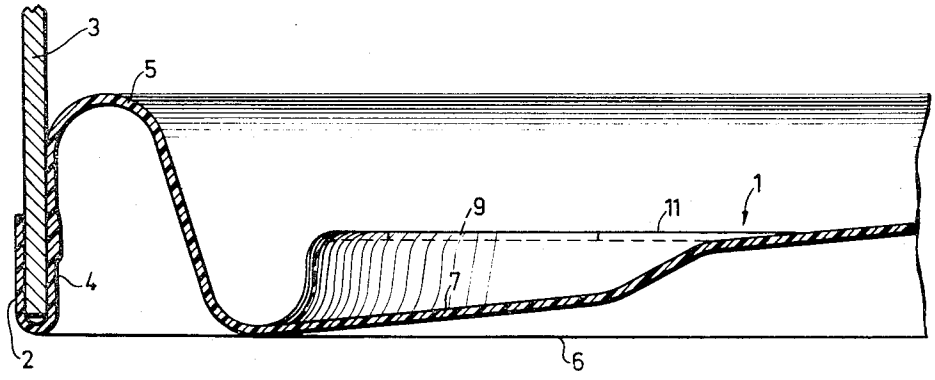
[57] **ABSTRACT**

An end wall structure for drums and other containers adapted to hold products in liquid or solid state in which the end wall is an integrally-formed, elastic, plastic structure having a central portion which is curved inwardly with respect to a plane through the end edge surface of the drum and which is deformable from such inwardly curved configuration to an outwardly curved configuration when substantial force is applied from the interior of the drum as a result of a shock resulting from dropping the drum, etc., and which then extends toward the periphery of the end wall and toward the plane through the end edge of the drum as an outwardly curved configuration, a curved outer portion extending from the outwardly curved configuration to the inner surface of the shell of the drum and thence in a substantially straight part parallel to the inner surface of the drum and having a sufficient curvature to resiliently take up and dampen the forces resulting from the outward deformation of the central portion and return the central portion to its original inwardly curved position and a peripheral flange portion extending from the outer portion and adapted to secure the end wall on the shell of the drum cover the edge surface of the drum.


**2 Claims, 2 Drawing Figures**



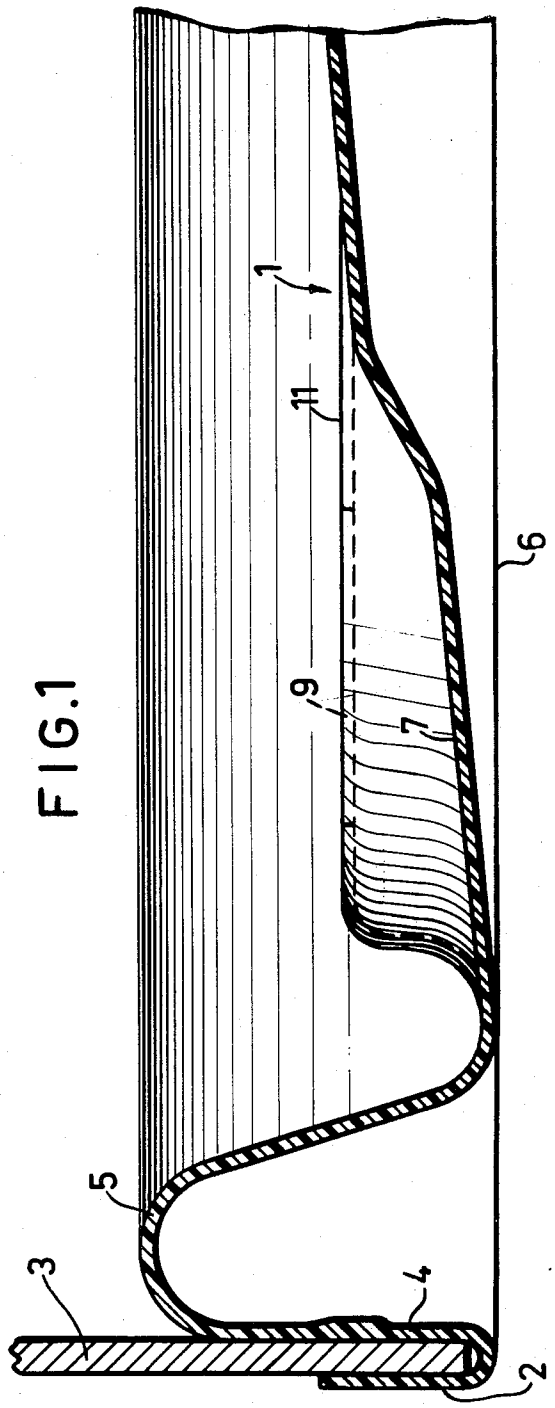
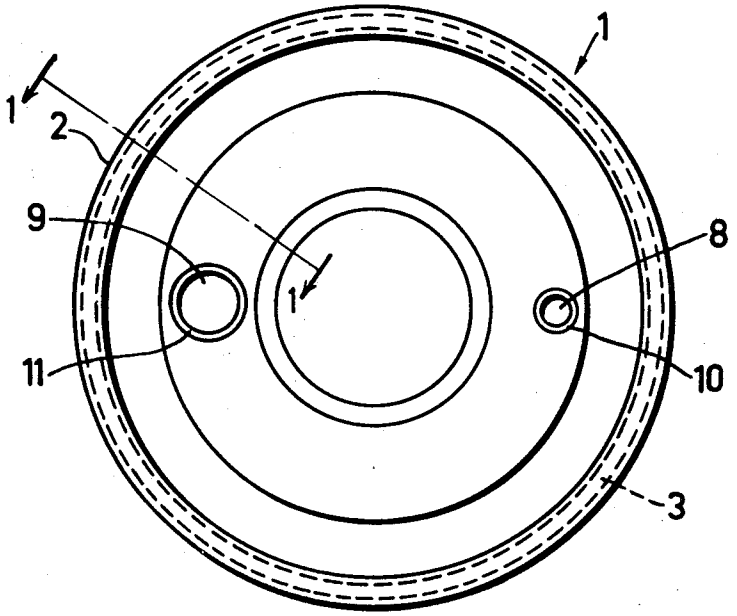



FIG.1

FIG. 2



# END WALL FOR DRUMS AND OTHER CONTAINERS FOR LIQUID OR SOLID STATE PRODUCTS

This invention relates to an end wall for drums or other containers for products in liquid or solid state and having a shell with round, polygonal or other suitable cross-sectional shape, which end wall is formed integrally of an elastic plastic material and comprises a peripheral flange extending all around the wall for securing the end wall on the drum and for covering the edge surface of the drum. End walls for drums and similar containers are known which are of different constructions and materials. These known end wall constructions, however, are rigid, which involves, among other things, that the containers have to be given a relatively strong construction to be able to resist the extra stresses to which they are subjected, for example when being loaded or unloaded or when they fall from a hauling vehicle.

Heretofore, moreover, no applicable throw-away drums have been available which are adapted to hold large quantities, of the order of 200 liters or more. One essential reason therefor has been, that in the existing throw-away containers holding a small volume and comprising an outer casing with a plastic bag arranged therein, the end walls are made of materials which are suitable for such throw-away containers and relatively cheap in view of the nature of the throw-away containers. These materials, however, cannot be utilized in large throw-away drums.

The present invention has as its object to produce an end wall, in which the aforesaid disadvantages are eliminated and which renders it possible to manufacture throw-away drums also in large quantities. A further object of the invention is to provide by the end wall a protection for the drum against moisture, thereby rendering it possible to utilize cheap material in the drum, for example wound paper.

These objects are achieved according to the invention, which is characterized in that the end wall includes in addition to the flange portion secured on the drum, a portion folded in a bow-shape with a relatively large curvature, which portion transforms into a substantially straight portion, extending obliquely to the end plane of the end wall, and inside of said end plane curvingly transforms into an inwardly curved central portion of the end wall.

An embodiment of the end wall according to the invention is described in greater detail by way of example in the following, reference being made to the accompanying drawing, in which

FIG. 1 shows a section through a part of the end wall embodiment secured on a shell, and

FIG. 2 shows on a reduced scale the embodiment seen from below.

The end wall according to the invention, designated in the Figures by 1, is manufactured integrally of an elastic material, for example rubber or different types of plastics, of which high-molecular polythene has proved to be highly advantageous. Also, other elastic materials may be used though not mentioned here. In the embodiment shown, the end wall 1 is formed at its circumference with a U-shaped flange 2 by which the end wall 1 can be secured on the shell 3 of a container (not shown in detail) by riveting, wire-stitching, sewing or glueing. The flange for securing the end wall, of course, may be given other suitable shapes.



From the leg 4 of the flange 2 located inside of the shell 3 the end wall (seen in FIG. 1, i.e., in a section) extends somewhat upwardly and, at a suitable distance from the connection between shell and end wall, transforms smoothly into a bow-shaped portion or groove 5, the radius of which preferably is chosen with respect to the size of the end wall. From said bow-shaped portion 5 the end wall 1. continues downwardly, preferably obliquely inwardly as shown in FIG. 1, to the end plane designated by 6. Inside of said plane the end wall is bent so as thereafter to extend inwardly towards the center of the container, preferably with a suitable degree of ascension which may vary as shown in FIG. 1.

By designing the end wall in the aforedescribed manner, a bellow means is formed which may include more than one bow-shaped portion or groove 5 shown in the Figure, and which renders the end wall so resilient and elastic that it can take up considerable blows and impacts or other loads from the outside without being damaged or to damaging the shell 3. The end wall according to the invention has the further essential advantage that its more or less frusto-conical portion 7 acts as a diaphragm which, to a substantial degree, increases the resilience of the end wall and its capacity of absorbing loads.

The U-shaped flange 2 and the adjacent bow-shaped portion 5, thus, have the functions as follows:

a. they constitute the fastening means for the shell;
b. they act as a protection against moisture when the drum is placed on wet ground, by enclosing the shell entirely up to a certain height;
c. they act by their design as shock-absorbers if the drum happens to fall from a height, in which case the end wall, by its design and due to the elastic material it is made of, can be deformed when falling from great heights, but thereafter reassumes its original shape.

The end wall, thus, in the case of high inner pressure, which may arise, for example, when the drum falls from a great height, is pressed outwards a substantial distance, because the bow-shaped portion or groove 5 is straightened. To prevent this straightening from taking place too rapidly, which may damage the fastening on the drum, the bottom of the groove 5 may be made of a material thinner than that in the substantially straight portion of the groove which extends inwardly and obliquely downwardly to the end plane 6 of the end wall. The groove portion adjacent to the drum shell may be made of a material thicker than that in said straight groove portion. By applying in this way different material thicknesses, a certain braking effect is obtained when the end wall bulges outwardly.

The end wall, as shown in FIG. 2 and by the broken line portion of FIG. 1, is provided with two recesses 8 and 9, which are disposed at two diametrical planed surfaces 10 and 11 for mounting an air connection and a filling connection, respectively.

What I claim is:

1. A container which is particularly adapted for the storing of heavy liquid or solid loads and comprising,

a cylindrical wall member, and

an end wall comprising an integrally-formed elastic, resilient member,

said end wall having a first central portion thereof which is disposed inwardly of the container and spaced axially of the container from the plane

defined by the associated peripheral edge of the wall member,

said end wall member over a second and generally frusto-conical portion thereof, radially outwardly of said central portion, extending toward and substantially to said plane and then sweeping in a smoothly-curved manner over a third and generally frusto-conical portion toward the cylindrical wall member and away from said plane to a location which is substantially more remote from said plane than any part of said first portion,

said end wall member over a fourth portion thereof finally curving smoothly outwardly to the inner surface of said cylindrical wall member and then extending along a fifth portion thereof toward and around said peripheral edge terminating in a rim portion paralleling said fifth portion and overlying



the outer surface of said cylindrical wall member,

said end wall member thereby being partially diaphragm-like so that the imposition of transient shock forces upon said end wall results in momentary axial displacement of said first, second and third portions outwardly toward said plane as said end wall flexes about said fourth curved portion while concurrently said flexure always establishes internal forces in said end wall tending to restore said end wall to its original configuration when said shock forces are relieved.

2. The container of claim 1 wherein said fourth portion of said end wall member is thinner than said third portion and said fifth portion is thicker than said third portion.

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