May 19, 1964 J. G. RABBY ETAL 3,133,686

CONTAINER

Filed March 24, 1961

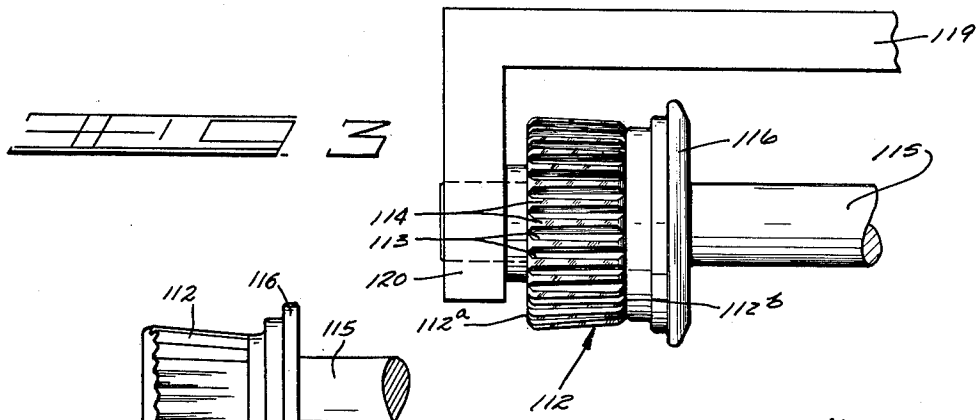



FIG 3

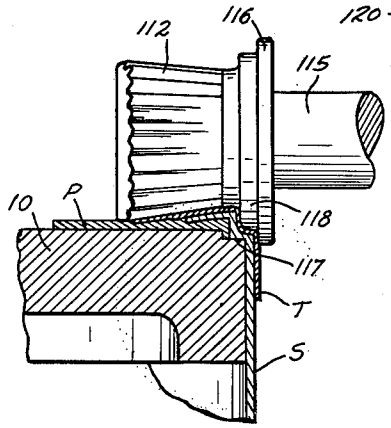



FIG 4

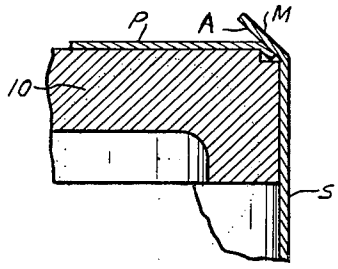
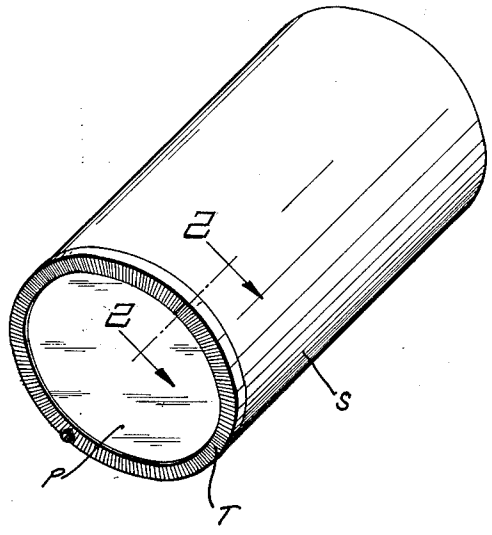



FIG 5

FIG 1



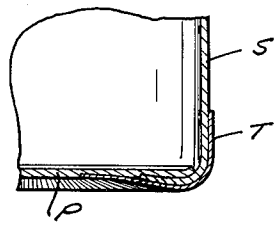




FIG 2

INVENTORS

JOSEPH G. RABBY
EDOUARD E. GSCHWIND
BY J. F. TEIGLAND &
W. A. SCHAICH
ATTORNEYS

United States Patent Office 3,133,686 Patented May 19, 1964



3,133,686

# CONTAINER

Joseph G. Rabby and Edouard E. Gschwind, Jacksonville, Fla., assignors to Owens-Illinois Glass Company, a corporation of Ohio

Filed Mar. 24, 1961, Ser. No. 98,157
7 Claims. (Cl. 229—5.6)

This invention relates generally to a container having a novel end structure, and more particularly to a drum-like container having a liquid-tight end structure.

The present invention is primarily concerned with a drum-like container assembled from a tubular sleeve, an end panel, and a length of tape. The preferred container of this invention comprises a sleeve having a marginal portion inwardly folded to form a ledge, an end panel in abutting relationship with the ledge, and the juncture of the sleeve and end panel sealed with a length of tape. The difficulty in providing a liquid-tight seal occurs when the area of the seal follows a curved path, such as is the case when the sleeve is circular in cross-section. When the area of sealing follows a curved path, the inner peripheral edges of the infolded portions of the sleeve and tape follow shorter paths than their respective outer peripheral edges. This results in the infolded portions buckling and overlapping themselves, thereby forming a series of channels and voids which prevent the formation of a liquid-tight seal. The container of the present invention is characterized by having the infolded portions and the end panel of the container compressed together into an annular series of radial undulations to place the infolded portions and end panel into continuous face-to-face contact, thereby creating a liquid-tight seal.

While the preferred container of this invention utilizes a tape as a sealing member, the container of this invention can be formed without a tape. The end structure of this container is characterized by having the infolded portion of the sleeve and the end panel bonded together and compressed together to form an annular series of radial undulations.

Containers of this invention are especially useful for packaging liquid type products, such as molten asphalt, and also finely divided, siftable products.

Accordingly, it is an object of this invention to provide a drum-type container having a liquid-tight end structure.

Another object of this invention is to provide a drum-like container assembled from a tubular sleeve, an end panel, and a length of tape, with infolded portions of the sleeve, and tape, and the end panel being compressed together into an annular series of radial undulations.

A further object of this invention is to provide a drum-like container assembled from a tubular sleeve, and an end panel, with infolded portions of the sleeve, and end panel being bonded together and compressed into an annular series of radial undulations.

The specific nature of this invention, as well as other objects and advantages thereof, will become apparent to those skilled in the art from the following detailed description, taken in conjunction with the annexed sheets of drawings on which, by way of example only, the preferred embodiment of this invention is illustrated.

On the drawings:

FIG. 1 is a perspective view of the completed container of the present invention;

FIG. 2 is a sectional view taken along the line 2—2 of FIG. 1;

FIG. 3 is a partial side elevational view of the serrated wheel employed to form the radial undulations of the container;

FIG. 4 is a side elevational view taken along the axis



of the serrated wheel with the mandrel and container of the present invention shown in section; and

FIG. 5 is a modified construction with the mandrel and container of the present invention shown in section.

The three elements which are combined to form the preferred container are a sleeve S, an end panel P, and a length of tape T (FIGS. 1 and 2). The sleeve S is preferably an open-ended tube which is circular in cross-section. The sleeve is deformable and is preferably formed of paperboard or the like. The sleeve may be coated on its interior surface with a conventional coating which is compatible with or required by the contents of the container, such as a water-resistant coating. The end panel P is formed to fit snugly within the end of the sleeve. The end panel is also deformable and may be formed of paperboard or the like. The panel may be coated on its interior surface with a conventional coating similar to that used on the sleeve. The tape T used in our invention is preferably a paper tape which has an adhesive deposited on one side thereof. The adhesive is preferably a quick-setting tape which is chemically reacted by a wetting agent, such as water. It is to be understood, of course, that any conventional, deformable or flexible type of tape, such as a fabric tape, can be used, and a pressure sensitive adhesive or any other suitable conventional type of adhesive can be substituted for the preferred form.

Briefly, the main elements of the forming means comprise a plurality of rotatable rollers which are arranged to radially press the tape against the sleeve to adhere it thereto, and inwardly fold the adhered tape and sleeve on rotation of the sleeve; and a rotary serrated forming wheel which is lowered downwardly to axially compress the inwardly folded portions and end panel together into an annular series of radial undulations conforming to the serrations of the wheel.

Referring particularly to FIG. 3, the serrated forming wheel 112, which is mounted on a drive shaft 115, comprises a slightly conical cylinder having a major diameter end 112*a* and a minor diameter end 112*b*. The forming wheel has an annular series of serrations cut therein which form a plurality of teeth 113. The teeth, which are of greater depth at the minor diameter end of the wheel, are provided with flats 114 on their outer peripheral surfaces. The purpose of the flats is to prevent breaking or rupturing the tape as it is pressed into place. The forming wheel is placed on the drive shaft so that its major diameter end 112*a* will contact the inner peripheral edges of the infolded portions of the sleeve and tape. See FIG. 4. With the forming wheel thus positioned and with the axis of the forming wheel and the axis of the mandrel substantially normal, the aforementioned inner peripheral edges will be compressed into undulations of greater extent than the remainder of the infolded portions. Undulations of greater extent, that is, of greater depth or frequency are preferably at the inner peripheral edges because there is more excess material to be compressed into place than at the perimeter of the container. It may be mentioned at this point that since the end panel is positively engaged by the teeth of forming wheel and since the mandrel is freely rotatable, the mandrel and hence the sleeve and end panel will rotate on rotation of the forming wheel.

Referring to FIG. 3, a stepped forming wheel 116 is disposed in abutting relationship with the rear surface of the forming wheel 112 and is affixed to the drive shaft 115. Referring to FIG. 12, when the drive shaft 115 is lowered into the forming position the stepped wheel provides axial pressure along the perimeter of the mandrel plate 10, thereby downwardly pressing the sleeve and tape. The mandrel plate 10 is provided with an annular,

peripheral notch 117 into which the intermediate step 118 of the stepped wheel presses the tape and sleeve.

Referring to FIGS. 1 and 2, in the preferred form of the completed container the infolded portions of the sleeve and tape, and the end panel are compressed together into an annular series of undulations by means of serrated wheel 112 as discussed above, thereby placing the members into substantially continuous face-to-face contact. As will be noted from the sectional view, FIG. 2, the inner peripheral portion of the tape is preferably depressed into the end panel to provide a positive liquid-tight seal. In the preferred container, a marginal portion of the tape is also allowed to extend beyond the infolded portion of the sleeve onto the side wall of the sleeve, thereby providing a positive liquid-tight seal along this marginal portion of the tape.

Where desired, the tape T can be omitted and the end panel and the marginal portion of the sleeve can be secured or bonded together by means of an adhesive deposited therebetween (FIG. 5). The container of this type is formed on the apparatus previously described with the exception that no tape is supplied to the forming area. After a sleeve S and end panel P have been placed on the mandrel 10, a conventional, quick-setting liquid adhesive A can be manually brushed onto the inner surface of the axially extending marginal portion M of the sleeve. The apparatus is then operated in the manner previously described. The container thus formed will have the infolded portion of the sleeve and the end panel compressed and bonded together into an anular series of radial undulations which place them into substantially continuous face-to-face contact to provide a liquid-tight seal.

A more detailed description of the method and apparatus whereby the container of the present invention is made will be found in application Serial No. 98,156 filed March 24, 1961, which is assigned to the same assignee and which application is incorporated by reference in the present application.

It will, of course, be understood that various details of construction may be modified through a wide range without departing from the principles of this invention, and it is not, therefore, the purpose to limit the patent granted hereon otherwise than necessitated by the scope of the appended claims.

We claim:

1. A container comprising a sleeve-like body, an end panel within one end of said body, said body having a continuous end portion folded radially inwardly over an adjacent peripheral portion of the end panel and means including an annular series of radial undulations in the folded end portion and corresponding undulations in the subjacent area of the panel for securing the panel and body together in continuous face-to-face contact to provide a liquid-tight seal.

2. A container comprising a sleeve-like body, an end panel within one end of said body, said body having a continuous end portion folded radially inwardly over an adjacent peripheral portion of the end panel, a length of tape overlapping the juncture of said panel and the outer free edge of said end portion, and means including an annular series of radial undulations in the folded end portions, tape and subjacent areas of the panel for securing said panel, tape and body together.



3. A drum-type container comprising a deformable sleeve having a generally circular cross-section, a paperboard end panel within and near one end of said sleeve, said sleeve having a portion folded radially inwardly over a peripheral portion of the panel, a length of tape along the line of juncture of said sleeve and end panel and along a zone extending laterally beyond both sides of said line of juncture, and said tape, sleeve, and panel compressed together in the area of said zone into a series of undulations.

4. The container as defined in claim 3, wherein said tape extends laterally beyond said zone and into face-to-face contact with adjacent exterior surfaces of said sleeve.

5. A drum-type container comprising a paperboard sleeve having a generally circular cross-section, a paperboard end panel within and near one end of said sleeve, said sleeve having a marginal portion folded radially inwardly over the peripheral portion of the panel, a length of tape along the line of juncture of said sleeve and panel and along a zone extending laterally beyond both sides of said line of juncture, and said tape, sleeve, and end panel compressed together in the area of said zone into an annular series of radial undulations with the inner peripheral portion of said tape in firm engagement with the end panel.

6. The container as defined in claim 5, wherein the undulations are of greater extent at the inner peripheral edge of the tape and infolded sleeve portion.

7. A drum-like container comprising a paperboard sleeve having a generally circular cross-section, a paperboard end panel within and adjacent but spaced from one end of said sleeve, said sleeve having a marginal portion folded radially inwardly to overlap the peripheral portion of the end panel, an adhesive deposited between the infolded portion of the sleeve and end panel, said adhesive bonding the sleeve and end panel together, and said infolded portion and end panel pressed together in the area of overlap and formed with an annular series of corresponding radial undulations in said infolded portion and end panel, thereby placing said infolded portion and end panel in continuous face-to-face contact to provide a liquid-tight seal.

**References Cited** in the file of this patent

UNITED STATES PATENTS

| | | |
|---|---|---|
| 2,053,680 | Page | Sept. 8, 1936 |
| 2,305,506 | Wilcox | Dec. 15, 1942 |
| 2,311,291 | Carlson | Feb. 16, 1943 |

FOREIGN PATENTS

| | | |
|---|---|---|
| 22,259 | Denmark | July 2, 1917 |