Dec. 23, 1958 M. M. CUNNINGHAM 2,865,419

COLLAPSIBLE CONTAINER

Filed Oct. 4, 1957

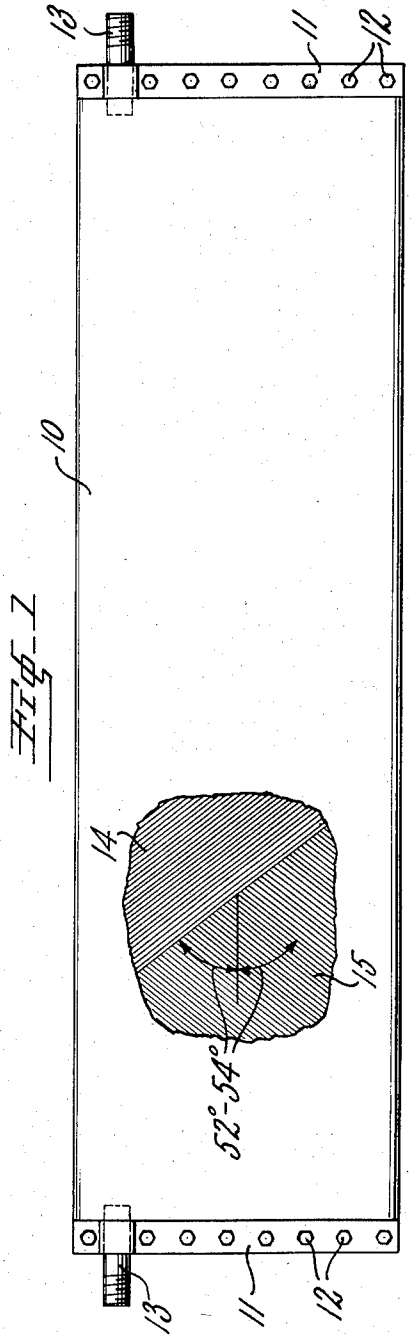


Fig. 1

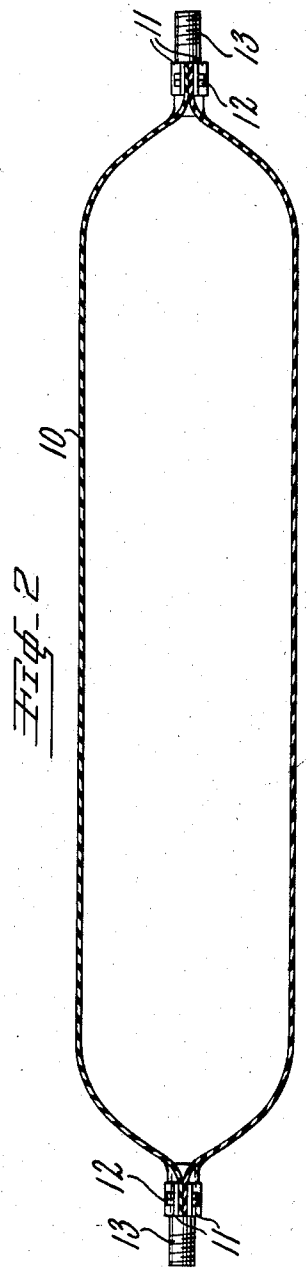


Fig. 2

INVENTOR.
MARION M. CUNNINGHAM
BY
Irwin M. Lewis
ATTORNEY

United States Patent Office 2,865,419 Patented Dec. 23, 1958

2,865,419

COLLAPSIBLE CONTAINER

Marion M. Cunningham, Providence, R. I., assignor to United States Rubber Company, New York, N. Y., a corporation of New Jersey

Application October 4, 1957, Serial No. 688,268

1 Claim. (Cl. 150—1)

This invention relates to collapsible containers and in particular to collapsible containers formed of rubberized cord fabric of a type commonly used for forming pneumatic tires.

In my United States Patent No. 2,612,924 I disclose a generally cylindrical collapsible container formed of plies of rubberized cord fabric angularly disposed relative to the axis of the container. The container was closed at each end by separate convex-concave heads, also of rubberized cord fabric.

Shortly after the issuance of this patent, containers of this type were introduced on the market. Users of containers while at first skeptical of these containers were soon sold on the advantages thereof, particularly the ruggedness of the containers which permitted rough handling thereof without failure; the water-tightness of the containers which permitted outside storage of various materials with consequent saving in expensive warehouse space; and the collapsible feature of the container which permitted a substantial saving of space on return shipment of the empty containers. Since their introduction, many thousands of such containers have been sold representing on the part of the users an investment of many millions of dollars.

The introduction of these containers formed of rubberized cord fabric created considerable interest in containers formed of such material and as a result thereof various rubber manufacturers soon introduced such containers in various shapes and sizes. The trade, however, has completely failed to recognize and appreciate the advantages of the application of the angularly disposed rubberized cord ply construction to probably one of the simplest forms of containers. This form consists of a flexible tube closed at each end merely by securing together the marginal halves of the edge of each end of a tube.

My invention consists of the application of angularly disposed rubberized cord ply construction of such a form of container. In accordance with my invention the container consists of a flexible tube formed of plies of rubberized cord fabric angularly disposed so as to form an angle with the longitudinal axis of the tube of from approximately 52° to 54° and closed at each end by securing together the marginal halves of the edge of each end.

Such a container has advantages both from the viewpoint of fabrication and use. Such a container may be easily fabricated without special forms by laminating the bias cut plies of the cord fabric to form a generally rectangular sheet, folding the sheet over on itself, and securing together the marginal edges thereof to form the tube. The container can also be fabricated by winding the cord on a mandrel at the correct helix angle, applying a layer of rubber to the cord so wound, and repeating this process until the desired number of plies have been built up. The tube so fabricated may be cured or vulcanized while in a flattened condition in a relatively inexpensive flat press by introducing an adhesive-preventing substance, such as powdered soap stone, into the tube before curing.

To facilitate the filling of orders for such containers, lengths of the tube, in various diameters, fabricated as above described, may be kept in stock. The tube may then be cut to the desired length when the order is received, clamps applied to close each end, and other necessary hardware, such as filling and emptying fittings applied.

The container may be used for shipment and storage of a variety of products of either a gaseous, liquid or granulated or powdered solid form. When inflated with air or other gas, the container may be used as a float, buoy, cushion, dunnage, or as a filler to take up space between cargo in shipping compartments. The container is particularly useful for the shipment of liquids as the container can be filled from a flat position so that the container is completely filled with the liquid and pressurized thereby to create the desired rigidity. The container being completely filled, there is no surge of the liquid during shipment.

The container has the advantage that when unexpanded it will flatten out so that it can be easily stored, either in the flattened condition or can be easily rolled up for storage so as to take up a minimum of space when not in use. This feature of the container permits easy conversion of a general cargo truck, flat car or gondola car to a truck car or a tank car so that general cargo can be carried in one direction with the unexpanded container occupying only a small space and the container filled and expanded for a return trip when the nature of the cargo requires such a container.

Because of the cord angle the container of the present invention when fully expanded is substantially cylindrical in its central portion and forms a relatively rigid, stable container.

My invention having been broadly described, a more detailed description of one embodiment of the invention is given hereafter by reference to the accompanying drawings wherein:

Fig. 1 is a plan view of a container constructed in accordance with the present invention showing the container in the flattened, unexpanded condition and showing parts broken away to show the cord angle of the cords of the rubberized cord fabric; and

Fig. 2 is a sectional view of the container of Fig. 1 showing the container in its fully expanded condition.

Referring to the drawings, the container of the invention is in the form of a tube **10** closed at each end by securing together opposite halves of the marginal edges of the ends thereof. In the particular embodiment shown, the opposed halves of the marginal edges of the ends of the tube are secured together by plates **11** and bolts **12** between which the marginal edges are clamped and tightly sealed.

One or more suitable filling and emptying openings **13** are provided through which the container may be filled or emptied. Suitable closures (not shown) may be provided for closing the openings **13**. While the openings **13** as shown in the drawings in the form of pipes clamped between plates **11**, it will be appreciated that other forms of openings may be provided at other places on the container.

The tube **10** is formed of a plurality of plies of rubberized (rubber coated and impregnated) cord fabric of the type commonly used in the manufacture of pneumatic tires. The individual cords of the cord fabric may be either a natural or synthetic textile or a metallic wire. In accordance with the invention the rubberized plies are oriented, as shown in the broken away portion of

Fig. 1, so that the cords 14 and 15 of adjacent plies extend in opposite directions at an angle of approximately 52° to 54° to the longitudinal axis of the tube. This insures that the central portion will assume a substantially cylindrical shape and the container will be a relatively rigid and stable structure when fully expanded. When the container is only partially filled with the product be shipped, the container may be pressurized with air or some inert gas to render the container rigid.

The inner surface of the container may be lined with a suitable material which is inert or unaffected by the contents of the container. For example when the container is to be used for petroleum products a neoprene liner may be desirable.

From the above description it can be seen that there is provided a relatively simple, inexpensive, but very useful container. While a particular embodiment of the invention has been shown and described, it is to be understood that this is for the purpose of illustration only and that modifications and changes can be made therein without departing from the spirit and scope of the invention.

The terms "rubber" or "rubberized" is used herein in their generic sense to include natural or synthetic rubber and blends thereof.

Having thus described my invention, what I claim and desire to protect by Letters Patent is:

A collapsible container comprising a flexible tube formed of a plurality of plies of rubberized cord fabric, the cords of adjacent plies being angularly disposed relative to each other and extending at an angle of between approximately 52° and 54° to the longitudinal axis of the tube, the marginal halves of the edges of each end of the tube being secured together to close each end of the tube, and a closable opening in said container for filling and emptying the container.

References Cited in the file of this patent

UNITED STATES PATENTS

2,615,487	Cunningham	Oct. 28, 1952

FOREIGN PATENTS

119,303	Great Britain	Oct. 3, 1918
120,088	Great Britain	Oct. 25, 1918