Aug. 7, 1962 W. J. HERTER 3,048,305

METHOD OF PACKING PRODUCTS AND CONTAINER THEREFOR

Filed May 22, 1959

Fig.1

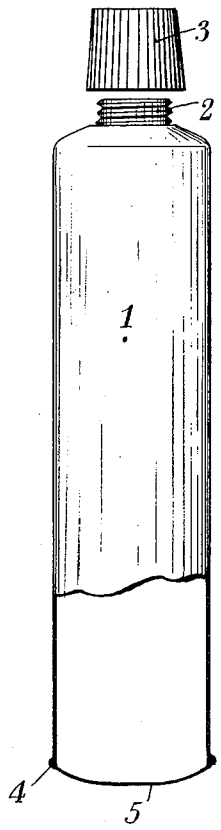


Fig.2

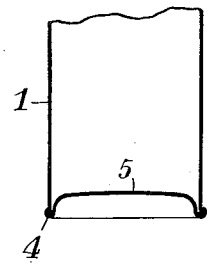


Fig.3

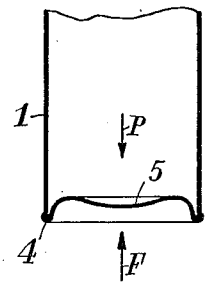
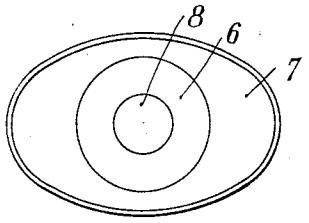


Fig.4



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METHOD OF PACKING PRODUCTS AND CONTAINER THEREFOR

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This invention relates generally to flexible containers and more particularly to a flexible tube container for containing fluent contents.

It is known that one of the conveniences characterizing tubular containers of all shapes and dimensions, and mainly containers made of flexible or pliable material such as plastics, are subject, due to osmosis, humidity and other physical or chemical action, to deformations caused by intense pressure changes which tend to alter their shape and are detrimental to their aspect. This inconvenience is particularly accentuated in the case of plastic tubes which become flattened, even though filled, and give the impression of having already been used.

It is an object of the present invention to provide a flexible tube container and method of filling containers of flexible and resilient material, for example a plastic material.

A feature of the flexible tube container according to the invention is that the bottom of the container consists of a flexible and resiliently deformable membrane which is subjected to deformation so as to cup it axially outwardly of the body portion of the container for filling and subsequent to filling it is cupped into the body portion in order to compress the contents of the tubular container.

The material utilized for making this bottom may be a plastic or metallic material, provided that it is capable of assuming two stable positions or shapes in relation to a transverse plane of the container.

Another feature of the containers constituting a practical application of the method of the invention is that they are formed with a bottom consisting partly of a flexible and resilient membrane, for example of plastic material, adapted to assume nearly symmetrically in relation to a transverse plane of the container at least two positions of stable equilibrium.

The bottom or deformable membrane constituting it may be secured to the container according to any known process, such as screwing, riveting, gluing, welding, etc. The container bottom may be made of plastic integral with a plastic body portion of the tube or container.

The plastic membrane or bottom proper, of course, has a greater area than that of a flat bottom or cross section of the tube so that it can assume a bulged shape when set in position.

In order to afford a clearer understanding of the invention and of the manner in which the same may be carried out, a typical form of embodiment thereof will now be described with reference to the accompanying drawing forming part of this specification. In the drawing:

FIG. 1 is a side elevation view partly in section of a tube according to the invention before filling same and is illustrative of the tube bottom in its first position of equilibrium;

FIG. 2 is a fragmentary axial sectional view illustrative of the form of the bottom of the tube in FIG. 1 in its second position of equilibrium.

FIG. 3 is a fragmentary sectional view similar to FIG. 2 but showing the shape of the bottom after the tube-filling operation, and

FIG. 4 is a plan view of a container bottom according to the invention.

In the example illustrated the container comprises a

flexible container tube 1 made of a flexible plastic material and has a circular cross section. The tube is formed with a screw-threaded neck 2 adapted to receive a stopper or cap 3 of any suitable type, and has a bottom consisting of a collar or outer marginal portion 4 of a circular membrane 5.

The membrane 5 has a greater area than the cross section of the tube 1. The outer annular marginal portion 4 is more flexible than the rest of the membrane 5 and functions to allow positioning of the membrane in two stable positions relative to a plane transverse to the tube longitudinal dimension, for example a plane corresponding with the lower rim of the tube 1.

The flexible tube 1 has side walls that are collapsible radially inwardly and is intended for receiving fluent contents. In collapsible tubes once they are filled if any voids remain and the tube walls are subjected to pressure directed radially inwardly the known collapsible tubes are deformed and tend to hold this deformation particularly if subjected to the deformation for a period of time, for example in transit or in storage.

The tube 1 is constructed to preclude any deformation once filled with fluent material and capped or closed. Prior to filling the tube the membrane 5 is cupped axially outwardly of the body portion. The tube is filled with fluent contents with the bottom membrane in this first position which is a stable position. Upon completion of the filling operation pressure directed axially in a direction corresponding to the arrow F toward the interior of the tube will displace the membrane into the interior space of the tube 1 enclosed by the body portion thereof. The axially applied pressure in the direction of the arrow F causes the outer marginal portion 4 to be reversibly folded over the lower rim of the tube body portion and extend internally into the space defined by the side walls of the container body portion and substantially conform to the inner surfaces of said side walls.

The rest of the membrane has greater rigidity than the annular outer marginal portion 4 and is held extending transversely of the tube body portion in a fixed second stable position. When the membrane 5 is displaced to its second position it is cupped axially inwardly of the body portion and will displace the fluent contents causing it to hold the collapsible side walls in a noncollapsible condition while the cap 3 is on the tube. If the membrane central portion is substantially rigid it will hold the position shown in FIG. 2 and may assume the dished condition illustrated in FIG. 3 due to the downward pressure of the contents denoted by the arrow P.

The bottom deformable membrane may be disposed centrally of the bottom of a container as illustrated in FIG. 4. In this figure a flexible membrane 6 is disposed centrally of an oval bottom 7 and has a central portion 8 of greater rigidity than the marginal portion thereof.

Of course, the containers manufactured according to this method may vary in shape according to their specific application, provided that the bottom consists wholly or partially of a resiliently deformable membrane adapted to take two bulged positions of stable equilibrium on either side of a transverse plane of the container.

The same method may be used for filling cans for tinned foods and like containers having no capsule or screw-threaded neck, but two deformable bottoms.

What I claim is:

A flexible container tube comprising a tubular body portion having side walls made of a flexible material defining a space for containing fluent contents, said body portion having a discharge opening at one end and at an opposite end a flexible membrane forming a bottom of said container, said membrane having an annular outer marginal portion made of a flexible material integrally joined to the body portion, said membrane having an

area greater than the cross-sectional area of the container so that it is displaceable into a first position in which it is cupped axially outwardly of the body portion for filling the container and subsequent to filling is displaceable into a second position in which it is cupped into said space enclosed by said body portion of the tube container in a stable position in which said annular marginal portion of the membrane is reversibly folded and extends internally into the space defined by the side walls of said body portion conforming to the inner surfaces of said side walls, said membrane having a central portion extending transversely of said body portion disposed and held in a fixed position by said marginal portion of said membrane when said membrane is in said second position, and said central portion having greater rigidity than said outer marginal portion, whereby when the tube container is filled with the bottom membrane cupped outwardly of the body portion and said bottom membrane is displaced into said second position, said central portion

cooperates with said marginal portion to hold said bottom membrane in said second stable position and the tube contents rigidly maintain the body portion walls in a non-collapsible condition while said contents with which the tube container is filled are in said tube and said discharge opening is closed.

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