

Aug. 24, 1954

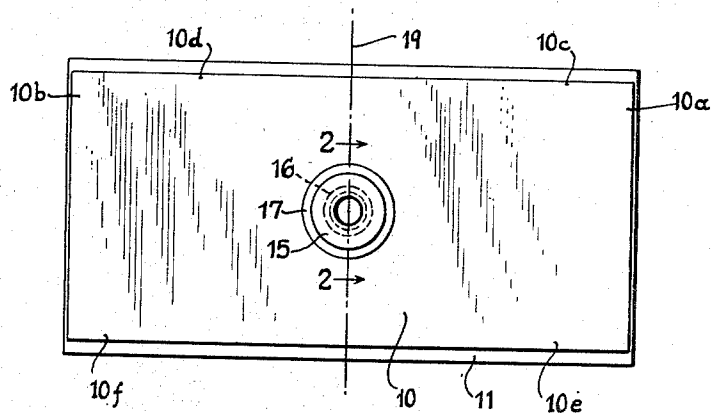
H. A. OWEN
FLEXIBLE CONTAINER

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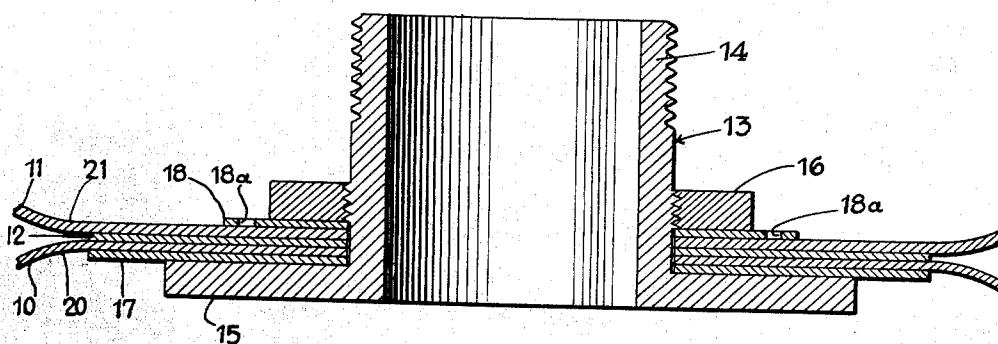
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5 Sheets-Sheet 1

Fig. 1.



Fæg. 2.



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Fig. 3.

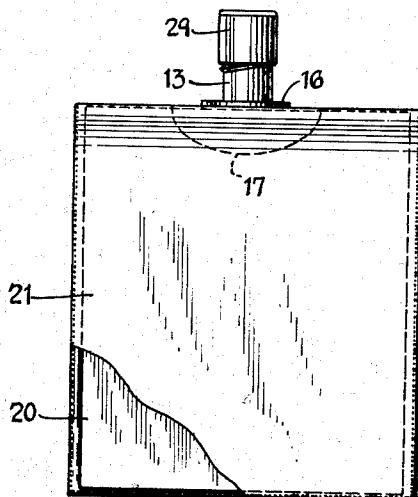
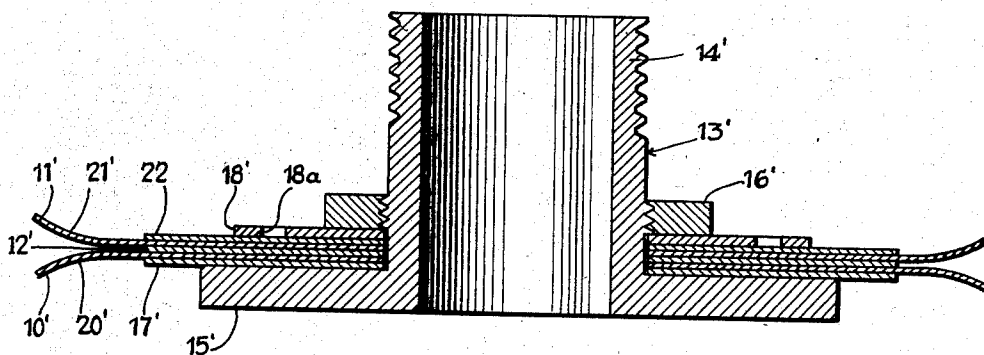


Fig. 4.



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Fig. 5.

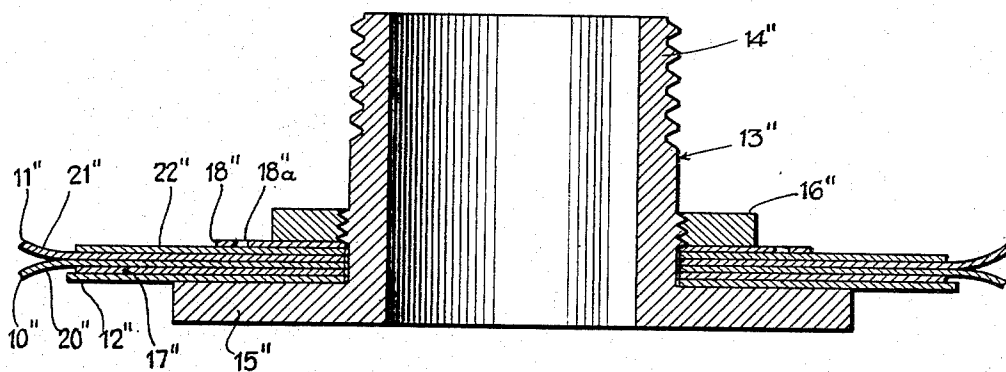
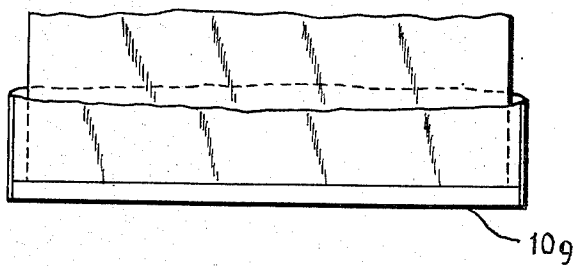


Fig. 3a



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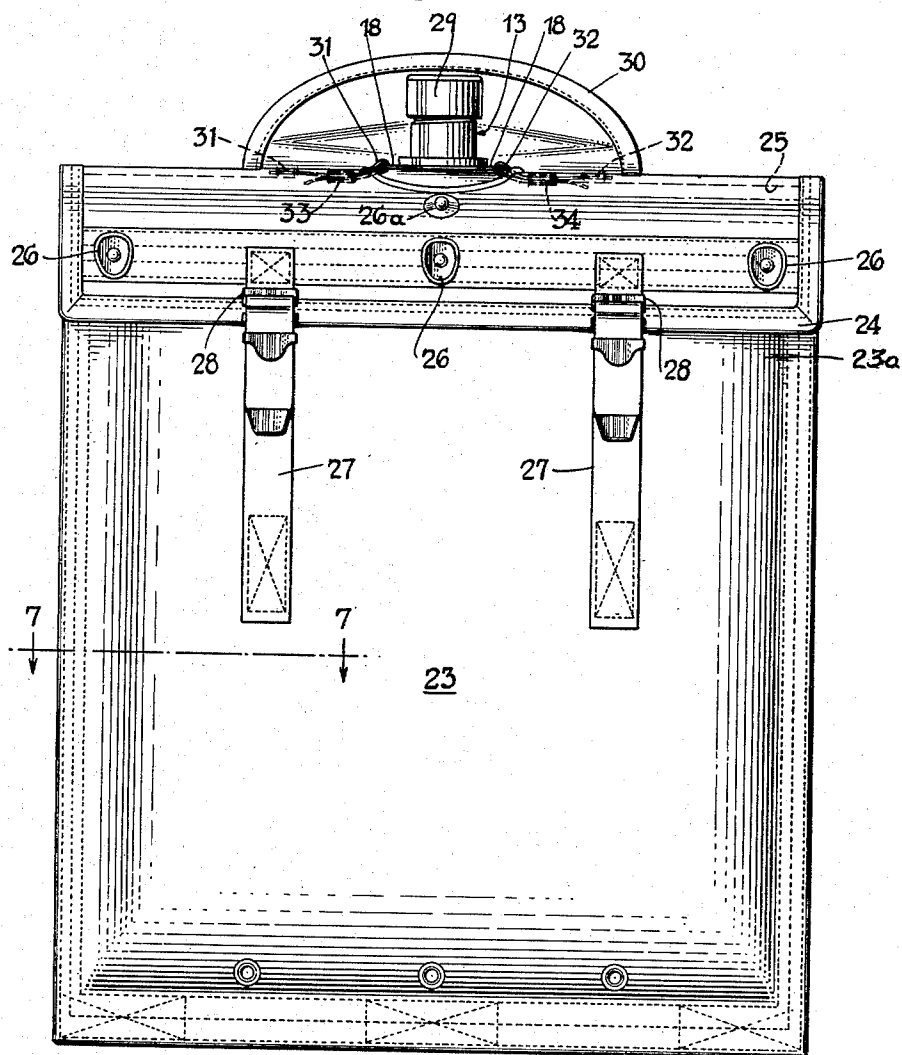
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Fig. 6.



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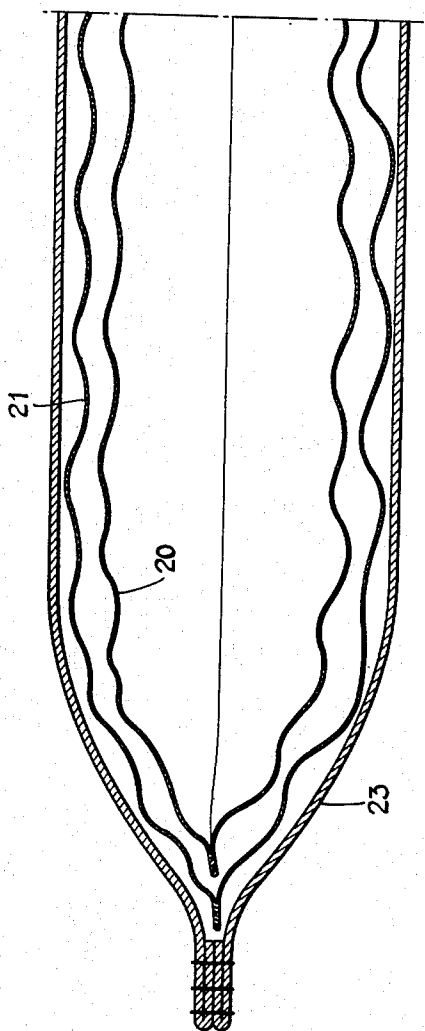
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Fig. 7.



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UNITED STATES PATENT OFFICE

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FLEXIBLE CONTAINER

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Application March 30, 1951, Serial No. 218,469

12 Claims. (Cl. 150—1)

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This invention relates to flexible collapsible containers and method for producing same. The invention more particularly relates to flexible collapsible canteens for holding and transporting liquids.

An object of the invention is to provide flexible collapsible containers for liquid which are capable of being dropped from a substantial height without rupture.

Another object of the present invention is to provide novel neck structure surrounding an opening in such container which will prevent leakage around or in the neighborhood of such neck structure.

The invention consists in the novel features, arrangements and combination of parts embodied, by way of example, in the method and article hereinafter described as illustrating a preferred form of the invention, and the invention will be more particularly pointed out in the appended claims.

Further objects, features and advantages of the invention will more clearly appear from the detailed description given below taken in connection with the accompanying drawings which form a part of the specification.

Referring to the drawings:

Fig. 1 is a plan view, on a reduced scale, of a pair of superimposed sheets from which an inner and outer bladder employed in the present invention may be made, such sheets having centrally disposed registered openings formed therein;

Fig. 2 is a cross-sectional view, on an enlarged scale, taken substantially along line 2—2 of Fig. 1;

Fig. 3 is a side elevation, on a reduced scale, with parts broken away, illustrating an inner and outer bladder formed from the superimposed sheets shown in Fig. 1;

Fig. 3a is a fragmentary view of the lower portion of a double bladder container showing a different type of endseam as compared to Fig. 3;

Fig. 4 is a vertical sectional view, on an enlarged scale, taken through a filling spout of a container embodying the present invention and illustrating a modified form of the neck region structure thereof;

Fig. 5 is a vertical sectional view, also on an enlarged scale, taken through such a filling spout and showing a further modification of the neck region structure of such container;

Fig. 6 is a side elevation of the novel container embodying the present invention including an outer casing of relatively heavy fibrous flexible material; and

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Fig. 7 is a sectional view taken along line 7—7 of Fig. 6.

The invention in one aspect thereof comprises a relatively thin flexible outer bladder which encloses therewithin a relatively thin, substantially elastic liquid-tight inner bladder. The outer bladder is of a normal volumetric capacity substantially greater than the normal volumetric capacity of the inner bladder when the latter is distended and full but before its walls have stretched. A neck zone for said bladders is provided comprising a fabric reinforcing collar and a plastic collar in aligned series therewith, the collars and corresponding superimposed areas of the two bladders being intimately adhered together in liquid-tight relationship, for example, by fusing, to provide such reinforced neck zone. The neck zone in turn is provided with an opening through which communication may be had, through a filling spout positioned therein, between the exterior of the container and the interior of the inner bladder. An outer casing for such bladders is provided of strong, fibrous, non-elastic, substantially non-stretchable material such as canvas or duck, the volumetric capacity of which casing is substantially smaller than the normal volumetric capacity of either one of said inner and outer bladders. The combined action of said two bladders and said casing and the special relation of their volumes provides a container having a strength and impact resistance heretofore unattained.

In Fig. 1 there are shown two unfolded, relatively thin sheets 10 and 11 preferably of a substantially elastic thermoplastic material, such as Vinylite, said sheets being flattened and superimposed one upon the other as a preliminary step in the method for forming the inner and outer bladders above mentioned. Said sheets 10 and 11 preferably are rectangular in shape and of a common length, that is, their horizontal dimensions, as viewed in Fig. 1, are preferably equal. However, the width of sheet 10 is less than that of 11. As an example, the length of sheets 10 and 11 may be fifty inches whereas the width of sheet 10 may be twenty-one inches and that of sheet 11 twenty-two inches. Vinylite sheets of the thickness of about .008 inch to .016 inch have been found to be satisfactory.

A neck zone of adequate strength and leak-proof character through which a filling spout may extend is provided, one form of which is shown in Fig. 2, wherein there is interposed between the sheets 10 and 11 a suitable reinforcing member 12 which may be of fabric, such as closely woven nylon or muslin preferably coated with

a thermoactive material which will facilitate the adhering thereof to the sheets 10 and 11 under the influence of heat and pressure. The function of the reinforcing member 12 is to adhere to the inner and outer bladders 10 and 11 to increase the wrinkle resistant qualities thereof thereby to facilitate the securing thereto of a filling spout shown generally at 13 which is inserted through suitable registered openings in said sheets 10, 11 and member 12. The filling spout 13 includes a tube or neck 14 having a base flange 15 and a clamping collar 16 which threadably engages an outer threaded portion of the tube 14 thereby to clamp the laminae comprising the neck zone of the container as will appear more fully hereinafter. In installing the clamping collar 16 and tightening same upon the laminae, the reinforcing collar 12 prevents a wrinkling of the flexible thermoplastic sheets 10 and 11, such reinforcing collar 12 being suitably connected to one or more of the sheets.

It has been found desirable, in addition to providing the reinforcing collar 12, also to provide a thickening collar 17 which may be of any suitable material, such as thermoplastic, which is in aligned series with such registered openings and which may be adhered to one of the bladders, for example, by fusing or by suitable adhesive. However, the invention is not limited to adhering the thickening collar 17 to any of the laminae of the neck zone.

After said reinforcing collar 12 is interposed between the sheets 10 and 11, the thickening collar 17 is placed in aligned series therewith and in the form shown in Fig. 2 directly adjacent the inner sheet 10 whereby it is interposed between the flange 15 and said inner sheet 10.

The superimposed laminae 11, 12, 10 and 17 (Figs. 1 and 2) thereupon may be intimately adhesively connected throughout the neck zone as by the application of heat and pressure.

After forming such an intimate adhesive connection, an opening is formed in the laminae so connected, for example, by a punch tool, and the tubular filling spout portion 14 is inserted therein, as shown in Fig. 2. It has been found desirable to provide means at the neck region of the container for fastening same to an outer casing to be described hereinafter and such fastening means preferably may be in the form of a pair of straps secured to such outer casing, each of which passes through a respective loop formed in a strap collar surrounding the filling spout 13. As shown in Fig. 2, a rigid collar, preferably of metal, is shown as at 18 embracing the tube 14 and superimposed upon the outer sheet 11, the metal collar 18 having strap openings 18a formed preferably on diametrically opposite sides thereof. The metal collar 18 is thus interposed between the clamping nut or collar 16 and the outer sheet 11.

Thereafter the inner sheet 10 is folded about a transverse or median line indicated at 19 so as to place the opposite end margins 10a and 10b thereof in registered relationship. Such folding over will also place the side margins 10c, 10d and 10e, 10f in registered relation. Thereupon such registered side and end margins of the sheet 10 are adhered together into intimate liquid sealing relationship, for example, by the application of heat and pressure. Thus the inner sheet 10 becomes an inner bladder 20 (Fig. 3.)

Thereafter said outer sheet 11 is analogously folded about the transverse or median line 19 bringing its side and end margins into registering relationship and these margins are in turn ad-

hered together also into intimate liquid sealing relationship as by the application of heat and pressure. It is desirable to have the inner bladder separate from the outer except at the neck zone area. Therefore, in forming the end seal of the outer bladder, when the sheets are of the same length, the end seal of the inner bladder is moved away from the corresponding ends of the outer bladder.

Thus the outer sheet 11 is formed into an outer bladder 21. The outer bladder 21 thus encloses the inner bladder and is of larger size than the latter.

As an alternative procedure in the sealing of said margins, the inner sheet 10 may be first folded about the transverse or median line 19 thereby bringing the side margins 10c, 10d and 10e, 10f into registered relationship, end margins 10a and 10b also thereby being brought into registered relationship whereupon the said registered side margins may be intimately adhered together in liquid-sealing relationship as by the application of heat and pressure. Thereafter the outer sheet 11 may be folded about said transverse line 19 whereby its end and side margins are brought into registered relationship, the end margins of sheet 11 thus also being in registered relationship with the end margins 10a, 10b of sheet 10. Thereupon said end margins of both sheets 10 and 11 may be simultaneously adhered to form an end seam by the application of heat and pressure. Thus a common end seam for both sheets 10 and 11 is formed, as shown at 10g in Fig. 3a.

A neck zone construction is shown in Fig. 4 which is alternative to that shown in Fig. 2. The parts in the embodiment of Fig. 4 which correspond to analogous parts in the embodiment of Fig. 2 are indicated by similar reference characters, a suffix prime being added to such characters in Fig. 4.

A new element is added in the embodiment of Fig. 4 as compared to that of Fig. 2 comprising a reinforcing collar member 22 which is interposed between the metal collar 18' and the outer bladder 21'. Such reinforcing collar member 22 is preferably of a character similar to that of reinforcing collar 12 of Fig. 2 and thus may comprise a fabric portion having applied thereto thermoactive material to facilitate intimate adhesive connection thereof with the outer bladder 21'.

In Fig. 5 a further alternative neck zone structure is shown, the parts thereof bearing analogous relationship to corresponding parts of the embodiment of Fig. 4 also being indicated by similar reference characters but bearing the suffix double prime. It will be noted in the embodiment of Fig. 5 no reinforcing collar member is interposed between the inner and outer bladders 20'', 21''. A thickening collar member 17'' is positioned next adjacent the inner bladder 20'' in a manner analogous to elements 17' and 20' in the embodiment of Fig. 4. However, a reinforcing collar member 12'' is positioned in aligned relationship with the other laminae shown in this figure but interposed between a base flange 15'' and said thickening collar member 17''. Said laminae in this embodiment also are intimately adhesively connected throughout a preselected region thereof, that is, throughout a preselected area surrounding the opening therein.

The application of heat and pressure to the thermoplastic laminae 20'', 21'' and 17'' may

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fuse same into an integral blended portion, the reinforcing members 12'' and 22'', of course, also being closely and intimately adhered thereto by virtue of the thermoactive material thereupon. However, the invention is not limited to the fusing or blending together of such laminae in the neck region, it being sufficient if such laminae are adhered together to provide a liquid-tight seal.

As in the embodiments of Figs. 2 and 4, the clamping collar 16'' threadedly engages the tube 14'' and tightly clamps the laminae against the base flange 15'' thereby preventing the leakage of fluid from within the bladder 20'' via a path between the base flange 15'' and the clamping collar 16''.

The above-mentioned outer casing is indicated in Fig. 6 as at 23 and consists preferably of a strong fibrous non-elastic and non-stretchable substance, such as canvas or duck. A top flap 24 is formed along the upper edge of the outer casing 23 which may be folded over an opening 25, as shown in this figure, the outermost edges of such flap 24 being fastenable to a side wall 23a by suitable snap fasteners as at 26. In order to prevent the flap 24 from snapping open under the influence of, for example, a severe impact, suitable straps as at 27 are secured to the side wall 23a and are fastenable to buckles 28 which are in turn secured to the flap 24.

The volumetric capacity of said outer casing 23, with the flap 24 thereof closed, as shown in Fig. 6, is substantially smaller than the normal volumetric capacity of any of said inner bladders above mentioned. The inner dimensions of the outer casing 23, when the latter is collapsed and closed, are smaller than the dimensions of any of said inner bladders above mentioned.

The filling spout 13, as shown in Fig. 6, is provided with a suitable cover 29 which engages threads thereupon in a conventional manner and said outer casing is provided with a cover flap 30 which is shown folded back to expose said filling spout 13 but which may be folded over to cover said filling spout and to be fastened by a suitable fastener as at 26a.

The metal collar 18 is secured to the outer casing 23, for example by straps 31 and 32, one extremity of which is fastened to the upper inner surface of the flap 24 and which pass through corresponding openings 18a in the collar 18 and which are secured by suitable buckles as at 33 and 34, respectively.

The outer casing 23 being smaller than the inner bladders, both the inner and outer bladders 20 and 21 are constrained and therefore have inherent slackness. In Fig. 7 the parts have been separated to better illustrate this condition.

In operation a severe impact upon the canteen when filled with liquid is absorbed substantially entirely by the outer casing 23, a portion, of course, being absorbed by the bladders 20 and 21. It has been found that the special relationship of sizes between said bladders and outer casing as above described causes, upon impact or strain, the walls of the inner bladder 20 to stretch until the strain is distributed partially upon the outer bladder 21 and upon the outer casing 23, the outer bladder 21 acting in the nature of a cushion between the outer casing and the inner bladder 20 and providing a surface against which the walls of the inner bladder 20 may move without severe friction which might initiate a rupture. It has been found that where a single bladder is employed that the bladder, in order to be re-

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lieved from undue strain, has to be substantially smaller than the outer casing and therefore crowds the small folds or wrinkles. When said single inner bladder is filled, it often happens that the liquid does not crowd the entire bladder against the outer casing and upon sudden impact—especially on one corner, the single bladder will be caused to tear or rupture. I have found that the particular arrangement of bladders above described avoids this difficulty and is far superior to a mere multiwall thickness in which the bladders are substantially of the same size.

Having thus described my invention particularly with reference to a preferred form of the same and in connection with a preferred method of producing the same, and having referred to certain modifications, it will be obvious to those skilled in the art, after understanding my invention, that other changes and modifications may be made therein without departing from the spirit and scope of my invention, and I aim in the appended claims to cover such changes and modifications as are within the scope of the invention.

What I claim is:

1. In a collapsible container for use with an outer casing of substantially non-stretchable, non-elastic, flexible fibrous material, the combination of such outer casing, an outer bladder having relatively thin flexible walls, an inner bladder having substantially elastic relatively thin walls of liquidproof material, said inner bladder being enclosed within said outer bladder, the normal volumetric capacity of said inner bladder being substantially smaller than the normal volumetric capacity of said outer bladder, said bladders each having an opening therein which is in register with the opening in the other bladder, and a collar member having an opening therein and positioned with such opening in register with said other openings, said bladders and collar member being intimately secured together in liquid-tight engagement throughout a preselected neck area surrounding the openings in said bladders, said outer casing being smaller in volumetric capacity than either one of said bladders.

2. In a collapsible container for use with an outer casing of substantially non-stretchable, flexible fibrous material, the combination of such outer casing, a liquid-tight substantially elastic inner bladder, a substantially elastic outer bladder having relatively thin flexible walls enclosing said inner bladder, said outer bladder being sufficiently larger than said inner bladder to provide for substantial expansion of said inner bladder before expansion of said outer bladder, said bladders having neck openings in registered alignment and being in liquid-tight sealed relationship throughout a neck zone surrounding said openings, and a filling spout secured to said neck zone and providing ingress and egress to said inner bladder only, the normal volumetric capacity of said outer casing when distended being smaller than that of either one of said bladders.

3. In a collapsible container, the combination of an inner bladder having relatively thin, substantially elastic walls of liquidproof material, an outer bladder of similar material encasing said inner bladder, said bladders being of substantially corresponding shape when in a collapsed condition and also when at full volumetric capacity and before substantial stretching the normal volumetric capacity of said inner bladder being substantially smaller than the normal

volumetric capacity of said outer bladder, said bladders each having an opening which is in register with the opening in the other bladder, a collar member having an opening in register with the openings in said bladders, the collar member and bladders comprising laminae which are secured in liquid-tight engagement in a neck zone surrounding said openings, a filling spout having a neck passing through said openings and being secured to said neck zone, and an outer casing of relatively heavier and stronger fibrous material encasing said bladders and also having an opening for receiving said neck therethrough.

4. In a collapsible container, the combination of an inner bladder having relatively thin, substantially elastic walls of liquidproof material, an outer bladder of similar material encasing said inner bladder, said bladders being of substantially corresponding shape when in a collapsed condition and also when at full volumetric capacity and before substantial stretching the normal volumetric capacity of said inner bladder being substantially smaller than the normal volumetric capacity of said outer bladder, said bladders each having an opening which is in register with the opening in the other bladder, a collar member having an opening in register with the openings in said bladders, the collar member and bladders comprising laminae which are secured in liquid-tight engagement in a neck zone area surrounding said openings, a filling spout having a neck passing through said openings and being secured to said neck zone, and an outer casing of relatively heavier and stronger fibrous material encasing said bladders and also having an opening for receiving said neck therethrough, said outer casing being of a volumetric capacity substantially smaller than the normal volumetric capacity of said inner bladders.

5. In a collapsible container, the combination of an inner bladder having relatively thin, substantially elastic walls of thermoplastic, liquidproof material, an outer bladder having relatively thin walls of thermoplastic material, said outer bladder encasing said inner bladder, said outer bladder having a normal volumetric capacity substantially greater than the normal volumetric capacity of said inner bladder when the latter is distended and full but before said walls thereof have stretched, said inner and outer bladders when collapsed and when full being of substantially corresponding shape, each of said bladders having an opening therein which is in register with the opening in the other bladder, a relatively inelastic member having an opening therein positioned in register with the openings in said bladders, said relatively inelastic member and the portions of said bladders thereadjacent comprising superimposed laminae which are intimately connected throughout a preselected region surrounding said opening, and an outer casing of relatively heavier and stronger fibrous material enveloping said outer bladder and having an opening in register with said other openings.

6. In a collapsible fluid container of the class described, the combination of an inner bladder having an opening therein, an outer bladder enveloping said inner bladder and also having an opening therein in register with the first-mentioned opening, said bladders having substantially elastic, relatively thin walls of thermoplastic, liquidproof material, said inner bladder having a normal volumetric capacity when distended which is smaller than the corresponding capacity of said outer bladder, said inner and outer bladders when

collapsed and when full being of substantially corresponding shape, and a reinforcing member of flexible material having an opening therein, said member being positioned with its opening in register with said other openings and engaging, in the area surrounding said openings, at least one of said bladders, said member and bladders being intimately adhesively bound together in such area surrounding the openings.

7. In a collapsible container, the combination of a relatively thin flexible outer bladder, a relatively thin substantially elastic liquid-tight inner bladder, said inner bladder being enclosed within said outer bladder, the lengths of said bladders being substantially the same and the width of said inner bladder being substantially less than the width of said outer bladder when said bladders are collapsed, said bladders being intimately secured together in liquid-tight relationship in an end zone area, and a relatively inelastic collar member secured to said zone thereby to provide a strengthened wall portion, said wall portion having an opening therethrough.

8. In a collapsible container, the combination of a liquid-tight inner bladder having relatively thin substantially elastic walls of thermoplastic material, an outer bladder having relatively thin elastic walls of thermoplastic material, said outer bladder encasing said inner bladder and having a normal volumetric capacity substantially greater than the normal volumetric capacity of said inner bladder when the latter is distended and full but before its walls have stretched, a fabric reinforcing collar and a plastic collar in aligned series therewith, said collars and corresponding superimposed areas of said two bladders being fused together to provide a reinforced neck zone wherein said bladders are in liquid-tight sealed relationship, said neck zone being provided with an opening through which communication may be had between the exterior of said container and the interior of said inner bladder, a filling spout having a neck passing through said opening and being secured to said neck zone, and an outer casing of relatively heavier and stronger fibrous material encasing said bladders, the normal volumetric capacity of said outer casing when distended being smaller than that of either one of said bladders.

9. In a collapsible container, the combination of a liquid-tight inner bladder having relatively thin substantially elastic walls of thermoplastic material, an outer bladder having relatively thin elastic walls of thermoplastic material, said outer bladder encasing said inner bladder and having a normal volumetric capacity substantially greater than the normal volumetric capacity of said inner bladder when the latter is distended and full but before its walls have stretched, a fabric reinforcing collar disposed between said bladders and a thermoplastic collar in aligned series with said fabric collar and corresponding areas of said bladders, said collars and corresponding superimposed areas of said two bladders being fused together to provide a reinforced neck zone wherein said bladders are in liquid-tight sealed relationship, said neck zone being provided with an opening through which communication may be had between the exterior of said container and the interior of said inner bladder, a filling spout having a neck passing through said opening and being secured to said neck zone, and an outer casing of relatively heavier and stronger fibrous material encasing said bladders, the normal volumetric capacity of said

outer casing when distended being smaller than that of either one of said bladders.

10. In a collapsible container, the combination of a liquid tight inner bladder having relatively thin substantially elastic walls of thermoplastic material, an outer bladder having relatively thin elastic walls of thermoplastic material, said outer bladder encasing said inner bladder and having a normal volumetric capacity substantially greater than the normal volumetric capacity of said inner bladder when the latter is distended and full but before its walls have stretched, a fabric reinforcing collar disposed exterior said outer bladder, a second fabric reinforcing collar disposed between said bladders in aligned series with said first fabric collar and a thermoplastic collar in aligned series with said two fabric collars, said collars and corresponding superimposed areas of said two bladders being fused together to provide a reinforced neck zone wherein said bladders are in liquid-tight sealed relationship, said neck zone being provided with an opening through which communication may be had between the exterior of said container and the interior of said inner bladder, a filling spout having a neck passing through said opening and being secured to said neck zone, and an outer casing of relatively heavier and stronger fibrous material encasing said bladders, the normal volumetric capacity of said outer casing when distended being smaller than that of either one of said bladders.

11. In a collapsible container, the combination of a liquid tight inner bladder having relatively thin substantially elastic walls of thermoplastic material, an outer bladder having relatively thin elastic walls of thermoplastic material, said outer bladder encasing said inner bladder and having a normal volumetric capacity substantially greater than the normal volumetric capacity of said inner bladder when the latter is distended and full but before its walls have stretched, a fabric reinforcing collar disposed exterior said outer bladder, a second fabric reinforcing collar disposed interior said inner bladder in aligned series with said first fabric collar, and a thermoplastic collar disposed between one of said bladders and its corresponding fabric collar in aligned series therewith, said collars and corresponding superimposed areas of said two bladders being fused together to provide a reinforced neck zone wherein said bladders are in liquid-tight

sealed relationship, said neck zone being provided with an opening through which communication may be had between the exterior of said container and the interior of said inner bladder, a filling spout having a neck passing through said opening and being secured to said neck zone, and an outer casing of relatively heavier and stronger fibrous material encasing said bladders, the normal volumetric capacity of said outer casing when distended being smaller than that of either one of said bladders.

12. The method of making a multiple bladder collapsible container which comprises disposing in overlying relationship a sheet of relatively thin elastic thermoplastic material of relatively smaller size and a sheet of relatively thin elastic thermoplastic material of relatively larger size with margins of the larger sheet extending beyond corresponding margins of the smaller sheet, applying a relatively inelastic piece of sheet material adjacent a surface of at least one of said sheets at a position centrally of the opposite ends of said sheets and intermediate their opposite side edges, said relatively inelastic piece of sheet material being fusible to at least one of said sheets of relatively thin elastic thermoplastic material, fusing said thermoplastic sheets and inelastic piece together into intimate adherence to provide a neck zone area, providing a neck opening through said area, securing to said area a filling spout having a neck passing through said opening, folding said smaller sheet about a median transverse line so as to bring corresponding marginal side edges and end edges of said folds into register, fusing said marginal edges to provide a liquid-tight inner bladder, correspondingly folding said outer sheet over said inner bladder and similarly fusing the side and end edges to provide an outer bladder of larger size enclosing said inner bladder.

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