Jan. 17, 1950 C. W. LEGUILLON ET AL 2,495,114

THERAPEUTIC BAG WITH SEALING CLOSURE

Filed July 12, 1946

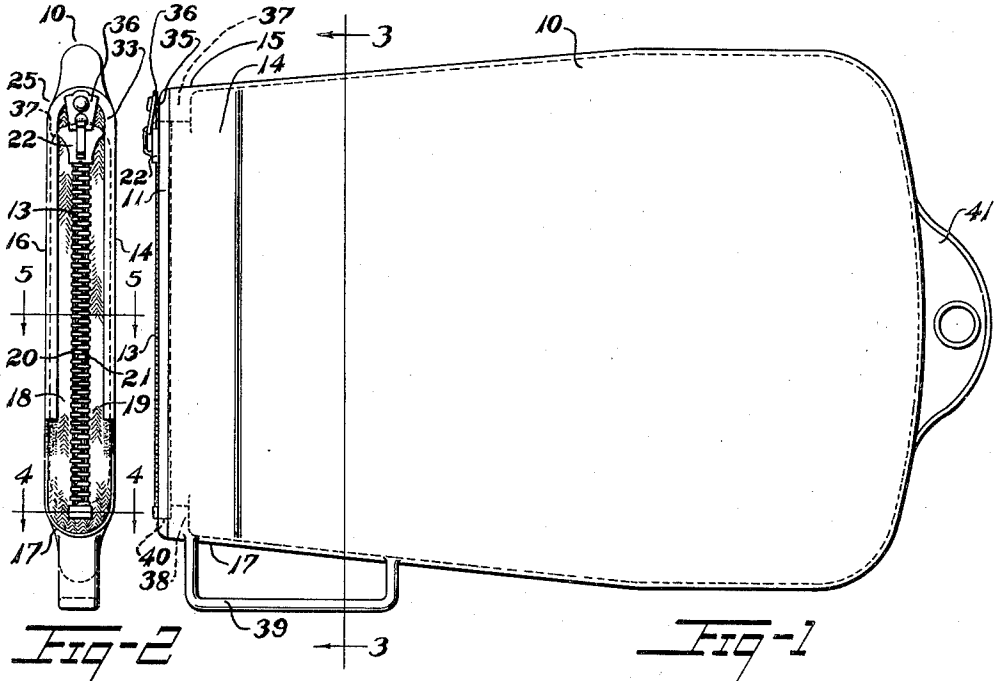


Fig-2 Fig-1

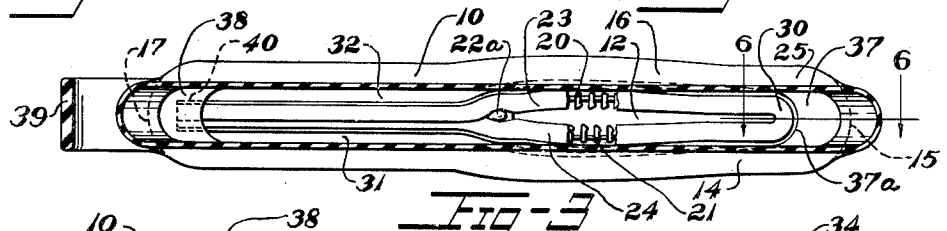


Fig-3

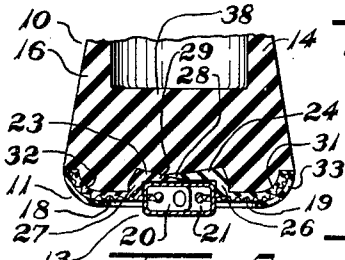


Fig-4

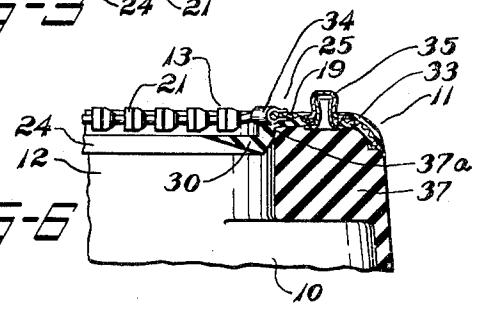


Fig-6

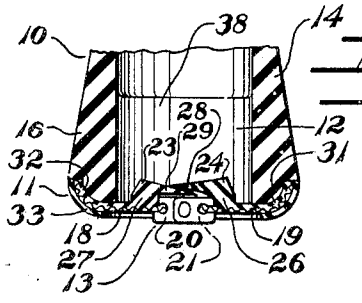


Fig-5

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Patented Jan. 17, 1950 2,495,114

# UNITED STATES PATENT OFFICE

2,495,114

## THERAPEUTIC BAG WITH SEALING CLOSURE

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Application July 12, 1946, Serial No. 683,124

5 Claims. (Cl. 150—2.1)

1

The invention relates to containers for flowable material and especially to therapeutic bags adapted for applying hot or cold treatments by filling the bags with hot water, ice or other flowable material, and positioning the filled bags where desired.

Objects of the invention are to provide for effectively and conveniently sealing the container against leakage of the flowable material; to provide for such sealing without removing any parts of the container; to provide for such sealing by closure means integral at all times with the container; to provide for widening the opening of the container to facilitate filling the latter together with sealing of the container upon closure of the opening; and to provide for sealing against leakage of contained flowable material under applied force on the container within the burst-resisting strength of the walls thereof.

Further objects are to provide for resisting sharp bending of margins of the opening; to provide for protecting fastener elements of the closure means against direct contact with the flowable material and for preventing accidental breakage of the seal at the opening especially under flexure laterally of the opening; to provide for opening and closing the container by slide fastener action and effecting sealing by lip-action; and to provide for simplicity of construction and convenience of manufacture and use, and for effectiveness of operation.

These and other objects and advantages of the invention will be apparent from the following description.

In the accompanying drawings which form a part of this specification and in which like numerals are employed to designate like parts throughout the same,

Fig. 1 is a plan view from above of a therapeutic bag for hot water, ice and the like, and constructed in accordance with and embodying the invention,

Fig. 2 is an end view of the bag showing closure means of the slide fastener type for sealing the elongated opening, the closure means being in the closed condition.

Fig. 3 is a sectional view taken along line 3—3 of Fig. 1 showing the closure means including sealing elements in a partially opened condition,

Fig. 4 is a sectional view taken along line 4—4 of Fig. 2, parts being broken away,

Fig. 5 is a sectional view taken along line 5—5 of Fig. 2, parts being broken away, and

Fig. 6 is a sectional view taken along line 6—6 of Fig. 3, parts being broken away.

2

In the illustrative embodiment of the invention shown in the drawings, the container construction includes a bag having a hollow body 10 adapted to receive and contain hot or cold water, ice, or other flowable materials or substances, the body 10 having impervious walls of flexible rubber or other rubber-like material, which may be reinforced as by sheet fabric material, if desired and are deformable in response to applied force on the bag to transmit the force to flowable material contained in the space within the body. The container or bag 10 is formed or molded in one piece, and may be of elongated and flattened shape or other suitable shape having an elongated opening 12, preferably in an end wall 11 and extending substantially the full length of the end wall 11 providing substantial area of the opening to facilitate conveniently filling and emptying the container. The bag may, if desired, be molded with the opening in a suitable widened arrangement for facilitating filling, in which case the margins of the opening may have an inherent spring-like spreading action for effecting the widened arrangement for the open condition of the bag.

For effectively sealing the elongated opening 12, there is provided closure means or sealing slide fastener means 13 integrally united and secured in sealing relation to relatively thick marginal portions 14 to 17 of the walls of the container and extending the entire length of the opening 12. The construction and arrangement of the closure means 13 and the marginal portions 14 to 17 provides a truss-like stiffening action along the opening 12 for resisting sharp bending of the marginal portions 14, 16 especially laterally of the opening, while permitting widening the opening by flexure of the marginal portions 14, 16 for the open condition of the closure means to facilitate filling the bag with the flowable material.

The sealing slide fastener means 13, which also functions to draw the sidewall marginal portions 14 and 16 together and maintain the marginal portions 14 to 17 in the desired spaced relationship, includes stringers 18, 19 of flexible impervious material, preferably treated fabric material, extending continuously along the opening 12 in superimposed relation to the faces of sidewall and end marginal portions 14 to 17, inclusive, defining the opening 12, as shown especially in Figs. 4, 5 and 6, the stringers being integrally secured to the marginal portions desirably by a suitable adhesive such, for example, as rubber cement. Cooperating fastener elements 20, 21 extend in

series along and are attached to adjacent margins of the stringers for detachably joining the stringers. A slider or runner **22** having a suitably shaped plate element **22***a* is movable along the adjacent margins of the stringers and provides for engaging and disengaging the fastener elements **20, 21**.

Sealing elements **23, 24** of resilient rubber or other rubber-like material may be mounted directly upon the fastener elements at a face of the slide fastener means and preferably are disposed at the interior of the bag, as shown especially in Figs. 3, 5 and 6, whereby the fastener elements are protected and the sealing elements are exposed to the contained flowable material, the latter elements being subjected directly to the pressure exerted by the flowable material for increased sealing action and operate effectively to prevent leakage despite such pressure. The sealing elements **23, 24** extend continuously along substantially the entire length of the adjacent margins of the stringers **18, 19** and unitedly merge with one another at the end at **25** of the elongated opening **12** providing continuity of the sealing elements especially continuously about such end, which constitutes in effect a sealing element extending along one of said margins and continuing about the end at **25** and along the other of said margins, as shown especially in Figs. 3 and 6.

The sealing elements include base portions **26, 27** desirably mounted directly on and bonded to the fastener elements **20, 21** and include portions **28, 29** projecting laterally from the base portions toward one another and tapering to edges for effecting sealing by lip-action of an edge of one of such portions against the sealing surface of the other sealing element. The merging of the sealing elements **23, 24** provides a tapered-in-section projecting portion **30** extending continuously about the end at **25** for cooperation with the runner including seating means **22***a* to effect sealing by lip-action continuously about such end at **25**. The sealing elements coacting with the other parts of the slide fastener means **13** thus provide for sealing by lip-action of the edges against leakage of contained flowable material under applied force on the bag within the burst-resisting strength of the walls thereof.

For facilitating assembly with the walls of the container and assuring continuity of sealing throughout the faces of the stringers, such stringers may be provided at their inner faces with thin coatings **31, 32** of suitable rubber-like material in continuation of the rubber-like material of the sealing elements, thus rendering the fabric material of the stringers impervious. The stringers and their coatings **31, 32** serve as flexible intervening portions of reduced wall thickness joining the sealing elements to the marginal portions throughout the major portion of the length of the opening, as shown especially in Figs. 3 and 5, which construction facilitates flexure of the sealing elements relative to the marginal portions and maintenance of the seal despite flexure of the bag as a whole. The outer faces of the stringers may be covered in part entirely around the periphery of the opening **12** with a shield element **33** of thin flexible rubber-like material for sealing and improved appearance, the shield element **33** merging smoothly with the marginal portions **14** to **17**. The shield element **33** is preferably adhered to the stringers after assembly of the slide fastener means with the bag **10**.

A suitable stop **34** may be provided at a margin



of one of the stringers for positioning the runner **22** at the end at **25** to assure the desired continuity of lip-action sealing by cooperation of the runner with the sealing elements, especially the projecting portion **30**. A stud element **35** may be secured to the stringers at the end at **25** to engage a pull tab **36** of the runner **22** in a detachable manner facilitating holding the runner **22** to prevent effectively accidental movement of the runner and accidental breakage of the lip-seal because of such movement.

For the arrangement shown in the drawings, the marginal portions **14** and **16** of the bag **10** extending in spaced-apart generally parallel relation to one another along the opening, are relatively thick as compared to other portions of the walls and are diverging in cross-section toward the opening. Recessed end faces each of substantial area facilitate the secure attachment of the stringers, as shown especially in Fig. 5. The sidewall marginal portions **14, 16** merge with the end marginal portions **15, 17**, which are relatively thick and project inwardly of the ends of the opening at **37, 38** for closing such ends and supporting the sealing elements. The sidewall marginal portions **14, 16** being integrally united with the end marginal portions **15, 17** provide with the sealing slide fastener means **13** a truss-like stiffening action along the opening **12** for resisting objectionable localized lateral flexing or sharp bending of the closure. Such stiffening action assures especially the maintenance of the sealing elements in the desired lip-sealing relationship for the closed condition of the closure means **13** under normal flexure conditions and prevents accidental breakage of the seal by separation of the sealing elements one from another under severe flexure conditions by resisting localized sharp bending of the closure arrangement along the opening.

The construction and arrangement of the marginal portions **14** to **17** together with the sealing slide fastener means **13** integrally secured therewith not only advantageously provides an effective truss-like stiffening action along the opening for the closed condition of the closure resisting sharp bending of the marginal portions **14, 16** in the same direction laterally of the opening, but in addition, assures maintenance of alignment of the parts of the closure in the desired relationship for the open condition of the closure facilitating filling, emptying, and ventilation. The construction and arrangement facilitates filling the bag by permitting the shortening and widening of the elongated opening **12** under lateral flexure of the adjacent marginal portions **14, 16** in opposite directions, when the end marginal portions **15** and **17** are pressed toward one another as by the thumb and fingers of one hand of the user. The separated and flexed marginal portions **14, 16** including the stringers and sealing elements attached thereto tend to resume their original aligned position for the open condition of the closure upon the release of such endwise pressure, by virtue of the flexibility and resiliency of the material of such parts of the closure.

The inwardly projecting shoulder **37** of substantial area facilitates the attachment of the stringers and is provided with a rounded inner face at **37***a* substantially conforming to the curvature of the rounded-end contour of the merged sealing elements **23, 24** for closely embracing the base portions of the latter at the portion **30** to

effect substantial bracing thereof at their region of merger, as shown especially in Figs. 3 and 6.

The other inwardly projecting shoulder **38** is provided with a recess **40** adapted to receive snugly therein the end portions of the sealing elements **23, 24**, as shown especially in Figs. 1 and 3. The end portions of the sealing elements at the recess **40** are adhered to the shoulder **38** and adhered together at the overlapping laterally-projecting portions **28, 29** thereof thus comprising means for fluid-sealing at such end of the opening, the laterally-projecting portions **28, 29** being in unattached relation adjacent the recess **40**.

The bag **10** may be provided with a tab **39** of suitable rubber-like material at the end marginal portion **17** for facilitating manipulation of the runner **22** along the opening **12** to close the latter. The bag also may be provided with an apertured extension **41** at the end opposite the end wall **11** for facilitating storage as by hanging the bag from a hook.

In the use of the bag, the same may be stored with the slide fastener means in the fully or partially-opened condition to assure the entrance of air into the interior space of the bag for drying and airing. To fill the bag, the opening **12** may be widened by urging the end marginal portions **15, 17** toward one another under force applied by the thumb and fingers of one hand thereby laterally flexing the adjacent marginal portions **14, 16** and attached parts of the slide fastener means in opposite directions. Manipulating the runner **22** away from the end at **25** of the opening **12** disengages the fastener elements **20, 21** and separates the sealing elements **23, 24** thus placing the bag in condition for the filling operation. Holding the opened bag by the tab **39**, hot water may be conveniently poured into the interior space directly through the closure means, while the air in such space is vented rapidly through the widened opening of substantial area. The opening **12** may be then sealed by manipulating the runner **22** toward the end at **25** until it reaches stop **34** and the end position shown especially in Fig. 2, whereby the marginal portions **14** and **16** are drawn toward one another, the fastener elements are engaged, and the sealing elements are disposed in overlapping and lip-sealing relation continuously along the opening **12** and continuously about the end at **25**, the laterally-projecting portion **30** cooperating with the seating surface of the runner to effect sealing continuously about such end. The pull tab **36** may be engaged with the stud element **35** assuring holding the runner in the desired position and preventing accidental movement of the runner and accidental breakage of the seal. Thus, the marginal portions **14** to **17** of the opening **12** are joined and the opening effectively closed and sealed.

Under some conditions of use, there may be a tendency of the walls, especially the sidewall marginal portions **14** and **16**, to flex or bend sharply and laterally of the opening, which sharp flexing is resisted effectively by the truss-like stiffening action of the relatively thick marginal portions **14** to **17**. The closure means **13**, while permitted to flex as necessary for normal usage, is thus prevented from becoming distorted by such sharp bending to an extent inducing separating movement of the lip-sealing elements at one or more local regions along the opening.

The hereinabove described construction of the bag **10** thus provides advantageously for sealing effectively the elongated opening **12** against the leakage of contained flowable material, even under applied force on the bag within the burst-resisting strength of the walls thereof, together with facilitating conveniently filling and emptying the bag, while avoiding loss or mislaying of parts of the closure as in prior constructions of therapeutic bags. The construction advantageously eliminates the bulky and protruding closure arrangements of the prior therapeutic bags and instead provides a compact, non-protruding, integral closure arrangement while protecting the slide fastener means and effecting sealing continuously throughout the entire extent of the opening by lip-action, which lip-action sealing is increased with increased transmitted force of the flowable material acting upon the sealing elements. The closure arrangement maintains its sealing action under and withstands fluid-pressure forces substantially equal to the burst-resisting strength of the walls of the bag itself.



Variations may be made without departing from the scope of the invention as it is defined in the following claims.

We claim:

1. A container for flowable material, said container comprising a hollow body having impervious walls of flexible material including marginal portions defining an elongated opening in a wall of the container, and sealing slide fastener means secured to said marginal portions, said fastener means comprising a pair of sealing elements of elastic rubber-like material extending along said marginal portions and united therewith by flexible intervening portions of reduced wall thickness as compared to said elements and marginal portions throughout the major portion of the length of said opening and closed at the ends of said opening, at least one of said sealing elements including a portion projecting laterally of said opening toward the other element and tapering to an edge for contacting said other element in overlapping relation in the direction of said opening and in sliding engagement laterally of said opening with said elements in sealing relation by lip-action of said edge, said marginal portions being relatively thick as compared to other portions of said walls and constructed and arranged to provide with said sealing slide fastener means and said intervening portions a truss-like stiffening action along said opening for resisting sharp bending of said marginal portions while permitting widening of said opening by flexure of said marginal portions to facilitate filling and emptying the container.

2. A therapeutic bag adapted to hold water, ice and other flowable material, said bag comprising a hollow body having impervious walls of flexible rubber-like material including marginal portions defining an elongated opening in a wall of the bag, sealing slide fastener means secured to said marginal portions integrally therewith, said slide fastener means comprising a pair of sealing elements of elastic rubber-like material extending along said marginal portions from end to end of said opening and united with said marginal portions by flexible intervening portions of reduced wall thickness as compared to said elements and marginal portions throughout the major portion of the length of said opening, at least one of said sealing elements including a portion projecting laterally of said opening toward the other element and tapering to an edge for contacting said other element in overlapping relation in the direction of said opening and in sliding engagement laterally of said opening with said elements in sealing relation by lip-action of said edge, and means for join-

ing said sealing slide fastener means including said sealing elements, said marginal portions being relatively thick as compared to other portions of said walls and constructed and arranged to provide with said sealing slide fastener means and said intervening portions a truss-like stiffening action along said opening for resisting sharp bending of said marginal portions while permitting widening of said opening by flexure of said marginal portions to facilitate filling and emptying the bag.

3. A therapeutic bag adapted to hold water, ice and other flowable material, said bag comprising a hollow body having impervious walls of flexible rubber-like material including marginal portions defining an elongated opening in a wall of the bag, sealing slide fastener means secured to said marginal portions integrally therewith, said slide fastener means comprising a pair of stringers of impervious flexible material secured to and extending along said marginal portions from end to end of said opening, cooperating fastener elements in series along said stringers, and a sealing element of elastic rubber-like material extending along one of the stringers with a flexible intervening portion of the stringer joining the sealing element to the wall marginal portion adjacent thereto and said sealing element extending continuously in a continuously curved path around one end of said opening and along the other of said stringers with a flexible intervening portion of said other stringer joining the sealing element to the wall marginal portion adjacent thereto, said intervening portions being of reduced wall thickness as compared to said sealing element and marginal portions, throughout the major portion of the length of said opening, said sealing element comprising a portion at one stringer projecting laterally of said opening and tapering to an edge for contacting a portion of said sealing element at the other stringer in overlapping relation in the direction of said opening and in sliding engagement laterally of said opening with said portions of the sealing element in sealing relation by lip-action of said edge against said portion of said sealing element at the other stringer, said lateral portion and edge extending about the end of said opening, and a runner movable along said stringers to engage and disengage said fastener elements, said runner having a seating surface with a continuously rounded end area matching the curve of said sealing element and being positionable at the end of the opening to cooperate with said sealing element for continuity of sealing about the end by flexure of said sealing element and contact of said edge with said seating surface, said marginal portions of said walls of the body being relatively thick as compared to other portions of said walls and constructed and arranged to provide with said sealing slide fastener means and said intervening portions of the stringers a truss-like stiffening action along said opening for resisting sharp bending of said marginal portions while permitting widening of said opening by flexure of said marginal portions to facilitate filling and emptying the bag.

4. A therapeutic bag adapted to hold water, ice and other flowable material, said bag comprising an elongated hollow body having impervious walls of flexible rubber-like material including marginal portions defining an elongated opening in an end wall of said body, sealing slide fastener means secured to said marginal portions integrally therewith, said slide fastener means comprising a pair of stringers of flexible impervious material,



cooperating fastener elements in series along said stringers, and a sealing element of elastic rubber-like material mounted directly on said fastener elements at the inside face of said stringers and extending along one of said stringers with a flexible intervening portion of the stringer joining the sealing element to the wall marginal portion adjacent thereto and said sealing element extending continuously in a continuously curved path around the end of said opening and along the other stringer with a flexible intervening portion of said other stringer joining the sealing element to the wall marginal portion adjacent thereto, said intervening portions being of reduced wall thickness as compared to said sealing element and marginal portions, throughout the major portion of the length of said opening, said sealing element comprising a portion at one stringer projecting laterally of said opening and tapering to an edge for contacting a portion of said sealing element at the other stringer in overlapping relation in the direction of said opening and in sliding engagement laterally of said opening with said portions of the sealing element in sealing relation by lip-action of said edge against said portion of said sealing element at the other stringer, a runner movable along said margins and positionable at the end of the opening to cooperate with said sealing element for closing said opening, said runner having a seating surface with a continuously rounded end area matching the curve of said sealing element for continuity of sealing about the end of the opening by flexure of said lateral portion and contact of said edge with said seating surface, and a shield element of flexible rubber-like material extending peripherally about said opening and superimposed on and secured to said stringers and said marginal portions in sealing relation therewith, the wall of said body diverging in cross-section toward said opening to provide increased thickness to the marginal portions, said marginal portions at the ends of said openings projecting inwardly of the opening, and said marginal portions along the opening providing with said slide fastener means and said intervening portions of the stringers a truss-like stiffening action for resisting sharp bending of said marginal portions while permitting widening of said opening by flexure of said marginal portions to facilitate filling and emptying the bag.

5. A therapeutic bag adapted to hold water, ice and other flowable material, said bag comprising a hollow body having impervious walls of flexible rubber-like material deformable in response to applied force on the bag to transmit the force to contained flowable material and having marginal portions defining an elongated opening in a wall of the bag, and sealing slide fastener means secured to said marginal portions, said fastener means comprising a pair of sealing elements of elastic rubber-like material at the inside face of the fastener means in exposure to flowable material contained in the space within said body, said sealing elements extending along said marginal portions and united therewith by flexible intervening portions of reduced wall thickness as compared to said elements and marginal portions throughout the major portion of the length of said opening and closed at the ends of said opening, at least one of said sealing elements including a portion projecting laterally of said opening toward the other element and tapering to an edge for contacting said other element in overlapping relation in the direction of said opening and in sliding engagement laterally of said opening with

said sealing elements in sealing relation by lip-action of said edge against said other element to prevent leakage of contained flowable material under applied force on the bag within the burst-resisting strength of the walls thereof.

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