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CLOSURE FOR AN INFLATABLE STRUCTURE

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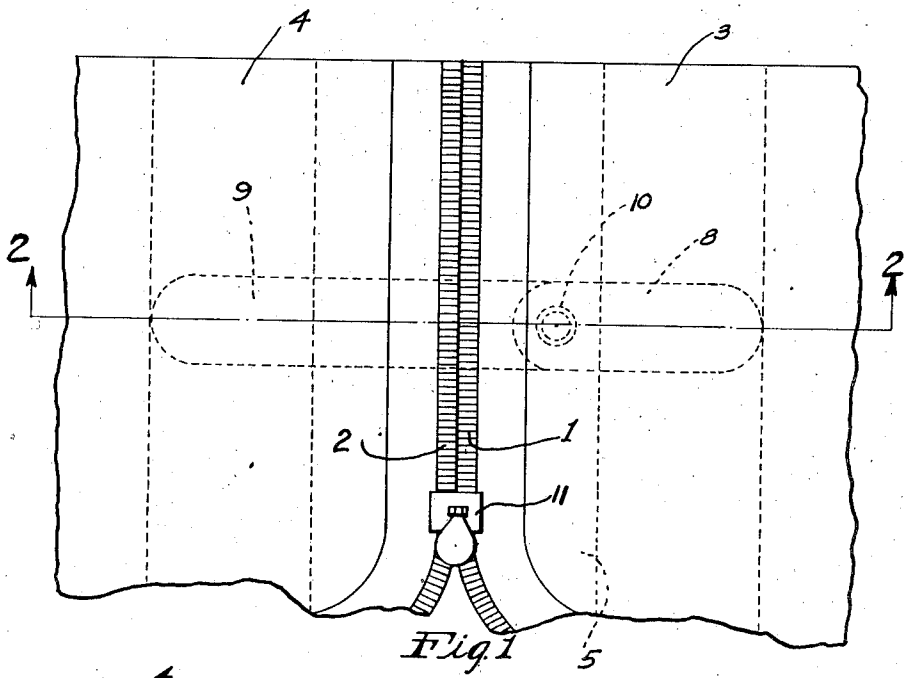


Fig. 1

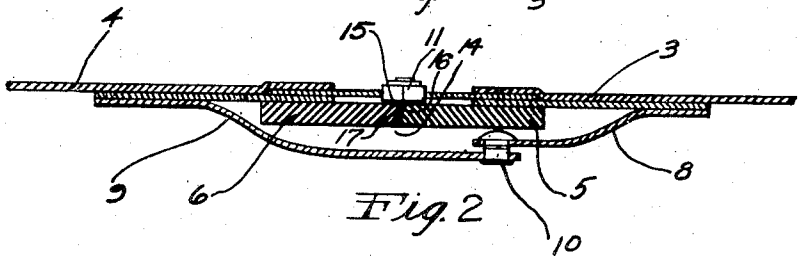


Fig. 2

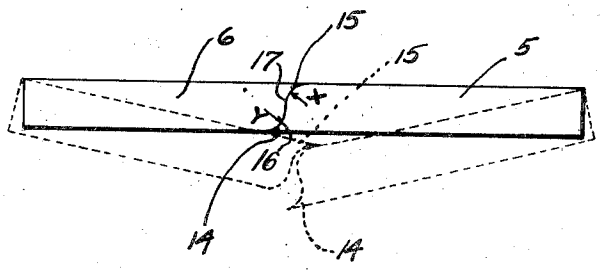


Fig. 3

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CLOSURE FOR INFLATABLE STRUCTURES

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1 Claim. (Cl. 24—205.1)

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This invention relates to a sealable closure means for an inflatable container, bag or the like which is adapted to be closed by the mere sliding of a slide fastener across a fingered opening as in the well known "zipper" closure.

Although the invention is applicable to closures for various types of structures, it will be described particularly in connection with a closure on an inflatable bag large enough to hold a human being and adapted to be placed under a pressure not exceeding, for example, 5 pounds. Such bags may be used for resuscitating persons carried to high altitudes by placing them in such bags and inflating the bags. Furthermore, such bags may be used to advantage for the treatment of sick persons with oxygen or other gas. For this purpose, pressures of 2 pounds or the like have been found satisfactory.

The invention relates to means for quickly closing such bags and maintaining them under pressure. In the bag directly under the slide-fastener opening is a sealing means or valve composed of two elongated cooperating members which are parallel to and substantially coextensive with the opening and are forced against the under side of the slide-fastener closure when the bag is inflated. The opposed marginal faces of these members are complementary and form an airtight seal when brought into register. The invention includes such a structure in combination with auxiliary means for partially restricting the flow of gas from the bag during early stages of inflation.

The invention will be more fully described in connection with the accompanying drawings, in which Fig. 1 is a plan view of the seam as it is about to be closed, Fig. 2 is a section on the line 2—2 of Fig. 1, and Fig. 3 is an enlarged detail of a portion of the closure means.

The opening which is to be closed may be, for example, 3 to 6 feet long, more or less. In closing the opening, the metal fingers 1 and 2 are brought into interlocking relation to hold the two portions 3 and 4 of the inflatable structure in the closed position. The closing is effected by the well-known slide fastener arrangement 11.

The under sides of the fabric portions 3 and 4 of the inflatable container or bag support the sealing means or valve structure, which is composed of the two elongated, flexible cooperating members 5 and 6. In a preferred arrangement, each of the portions 3 and 4 of the inflatable container or bag is supplied with disengageable fastening means such, for example, as tab portions 8 and 9, which may be spaced at intervals

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of 1 or 2 feet for a large opening, and these are adapted to be snapped together by the usual snap means 10.

In closing the bag or other inflatable structure, the opposite sides of the opening are brought into close proximity to one another by snapping together the series of snaps on the tabs 8 and 9. This brings the two sides of the opening into approximately the position in which they will be maintained when the fingers 1 and 2 are interlocked.

An important feature of the invention is the interlocking arrangement of the flexible members 5 and 6. In the arrangement shown in the drawings, the member 5 is provided at one edge or marginal face, identified by reference character 16, of the sealing portion with a fin 14. The opposite member 6 is equipped at its edge or marginal face 17 with a corresponding fin 15. These fins are brought to knife-edge thickness.

The upper fin 15 helps to seal the opening before the two parts of the sealing means are brought into their closed relationship. The members 5 and 6 are provided with a substantial thickness so that they will retain sufficient stiffness to avoid a tendency to cross one another or buckle when being drawn in sealing engagement with one another by the closing action of the "Zipper" closure. The cooperating marginal faces 16 and 17 of the members 5 and 6, respectively, will function at maximum efficiency when formed by two reversed arcs tangentially joined to one another to interfit in complemental relation, the radii X and Y of said arcs being of a dimension equal to half the thickness of the members 5 and 6, respectively.

It is noted that the upper juncture of the members 5 and 6 comes at approximately the midpoint of the opening between the metal fingers 1 and 2. This reduces to a minimum the possibility of the flexible fins 14 and 15 becoming entangled with the metal fingers 1 and 2 when the sliding member 11 is drawn across the opening to interlock these metal fingers. The thickness of the members 5 and 6 is such that when brought together, the two portions easily register with one another without puckering or irregular overlapping of the fins 14 and 15.

In closing the bag for inflation, the first step is to bring the tabs 8 and 9 together and close the snaps 10. This brings the interlocking fingers 1 and 2 and the members 5 and 6 into approximately the position they will occupy when the bag is inflated. They may sag somewhat. The fin 15 provides a seal of a sort when it rests

on the member 5 even though the members 5 and 6 may sag somewhat prior to inflation. The seal will be found sufficient to prevent the escape of so much air as to hinder inflation of the bag. The presence of the snaps and the tabs 8 and 9 prevents the members 5 and 6 of the sealing means from falling so low that they are entirely separate from one another.

Once the temporary seal has been formed, the the pressure will build up within the bag, and the members 5 and 6 will flatten out as the pressure increases. Before any pressure is applied, the slide 11 will be drawn across the opening to interlock the fingers, and this prevents separation of the members 5 and 6 which automatically fall in place. As the pressure increases within the bag, the members 5 and 6 will be forced against the outer portion of the bag enclosure, and as the members flatten out, the seal will become airtight. The fin 14 lies flat on the surface of the member 6 and forms an airtight seal.

In some cases, it has been found desirable to eliminate the tabs 8 and 9, as where the container or bag is to be used in total darkness or under conditions of hysteria. Under such circumstances, it is found desirable to fill the voids between the metallic fingers with an adhering wax. In this manner, the loss of air on initial inflation is slowed down to a point where the bag will inflate and seat the cooperating members of the sealing means. This alternate design is especially suited for emergency conditions where fear and absence of light are factors. Effective closure is attained through merely pulling the closure slide up its chain without regard for position of the cooperating members. The design of the sealing means and its cooperating members prevents entanglement in the closure. The thickness of the cooperating members of the sealing means prevents crossovers of marginal faces or edges.

The members 5 and 6 are united to the edge portions of the fabric. They are fastened to the covering of the enclosure in such a position that when the sliding closure 11 has drawn the members 3 and 4 of the container or bag together, the members 5 and 6 will be brought into exact

register. Under these conditions, as the pressure is increased, the sealing means becomes tighter as both members 5 and 6 are pressed against the upper wall of the container. Such a closure made of highly flexible, rubber-like materials which are relatively stiff due to their thickness holds a pressure of several pounds with little or no leakage.

While in accordance with the patent statutes one best known embodiment of the invention has been illustrated and described in detail, it is to be particularly understood that the invention is not limited thereto or thereby, but that the inventive scope is defined in the appended claim.

What I claim is:

A sealable closure means for disengageably securing together the edges defining an opening in a container and the like, said closure means comprising a slide fastener for uniting the edges of the opening; and sealing means attached adjacent the edges of the opening and arranged to interfit in complemental relation when the edges of the opening are united by the slide fastener, each of said sealing means being characterized in cross section by two reversed arcuate portions tangentially joined to one another and having at the extremity of one of the arcuate portions a thin knife-edged flexible fin which is disposed in generally overlapping arrangement with a similar fin at the extremity of one of the arcuate portions of the other sealing means when both of said sealing means are interfitted by the uniting of the edges of the opening by the actuation of slide fastener.

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