

[54] **SEALABLE CONTAINER FOR LIQUID  
FLOTATION OF CAST-BOUND LIMBS**

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[58] Field of Search..... 128/82, 83, 83.5,  
128/403, DIG. 20

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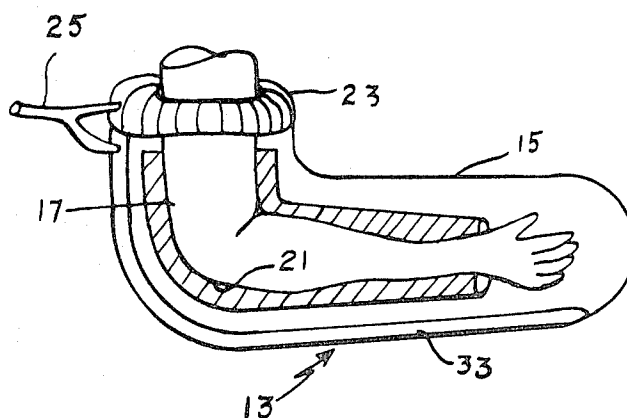
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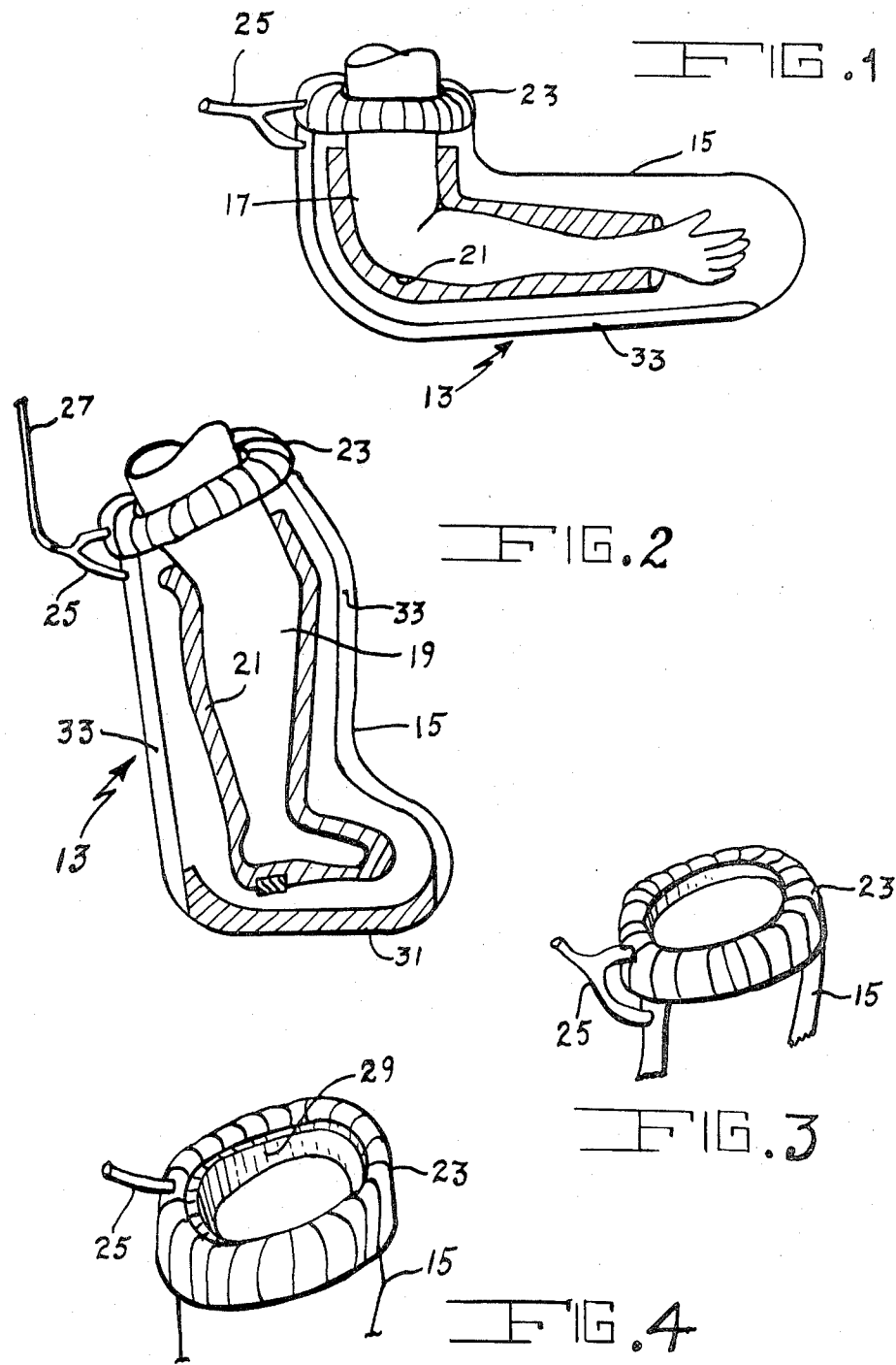
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[57] **ABSTRACT**

An elongated, waterproof, flexible bag having an opening at one end through which a cast-bound limb is inserted and sealing means around the opening including an inflatable cuff of substantially toroidal configuration and sufficiently wide to distribute the sealing pressure over a large enough area to prevent interference with the blood supply to the injured limb when the cuff is inflated. Longitudinally oriented flotation sections may be disposed in the wall of the bag to further aid in buoying up the cast-bound limb while swimming and/or for therapeutic water treatments.

**5 Claims, 4 Drawing Figures**





# SEALABLE CONTAINER FOR LIQUID FLOTATION OF CAST-BOUND LIMBS

## BACKGROUND OF THE INVENTION

This invention relates to a sealable container for liquid flotation of cast-bound limbs for therapy and, more particularly, the invention is concerned with providing an improved elongated, waterproof, flexible bag with a sealable opening at one end wherein a toroidal inflatable cuff having a wide contact area is positioned around the opening so that, when inflated, the sealing pressure from the cuff does not interfere with the blood flow to the injured limb.

It is well known that the plaster generally used to form a cast around broken or severely injured limbs and joints becomes soft and deteriorates when it gets wet. Therefore, every effort is made to keep the cast dry at all times. Heretofore, a common practice has been to cover the outside surface of the cast with sheet plastic in an attempt to prevent water from reaching the surface of the plaster. This arrangement requires a seal of some kind around the upper portion of the cast-bound limb to prevent water from leaking between the limb and the plastic and thereby coming in contact with the plaster cast. Of the presently known sealing arrangements, it has been found that, when the seal is tight enough to prevent water leakage, a tourniquet effect occurs and the blood supply to the injured limb is cut-off or dangerously curtailed. If the seal is loosened, water leakage will occur. Thus, it would be most desirable and a step forward in the art to provide a waterproof covering for a cast-bound limb having a sealing arrangement which effectively prevents water from contacting the plaster cast while at the same time having little or no effect on the circulation of blood to the injured limb. Also, it would be desirable to provide means for buoying up the cast-bound limb so that the person wearing the cast could swim or bathe with greater ease and comfort.

## SUMMARY OF THE INVENTION

The present invention is concerned with providing a new and improved cover for a cast-bound limb wherein a waterproof bag having an inflatable toroidal seal around the open end thereof is positioned over the limb so that the seal contacts a wide area of the limb surface above the cast causing the sealing pressure to be spread over a larger area so that the blood can circulate freely through the cast-bound limb.

Accordingly, it is an object of the present invention to provide a waterproof covering for a cast-bound limb wherein the sealable opening through which the limb is inserted includes an inflatable cuff which operates to distribute the sealing pressure over a wider area in order to prevent interference with blood flow to the injured limb.

Another object of the invention is to provide a sealable bag for water flotation of cast-bound limbs wherein non-porous foam or soft latex rubber material is positioned between an inflatable cuff at the opening of the bag and the limb of the wearer above the top of the cast.

Still another object of the invention is to provide a sealable leg or arm bag of suitable length with an inflatable sealing means around the top and including a suitable protective material at the closed end of the bag to prevent puncture thereof.

A further object of the invention is to provide a sealable bag for water flotation of cast-bound limbs for therapy wherein a flotation section is longitudinally disposed in the wall of the bag to further buoy up the cast-bound limb during swimming therapy or the like.

These and other objects, features, and advantages will become more apparent after considering the following detailed description taken in conjunction with the annexed drawings and appended claims.

## BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a view in partial section showing the sealable bag according to the invention in position on a cast-bound arm showing the toroidal shaped cuff seal and including optional inflatable sections for additional flotation;

FIG. 2 is a view in partial section of a cast-bound leg enclosed in a sealable bag with the toroidal inflatable cuff and including a foam material under the foot to prevent accidental puncture;

FIG. 3 is a detail view of one form of the inflatable cuff seal wherein the cuff and bag are integral and constructed of soft latex rubber; and

FIG. 4 is detail view of another form of the inflatable cuff seal wherein a material such as non-porous foam is positioned between the cuff and the wearer's limb to effectively distribute the sealing pressure over a wider area of contact.

## DESCRIPTION OF PREFERRED EMBODIMENTS

Referring now to the drawings, the hereinafter disclosed improved cast cover is designated generally by the reference numeral 13 and includes waterproof container in the form of a bag 15 fabricated of plastic, latex rubber, or similar material. The bag 15 is open at its upper end and closed at the lower end and is generally elongated in configuration in order to loosely enclose a cast-bound arm 17 or leg 19. The cast 21 is first applied to the injured limb for the well established purpose of immobilizing the joint and maintaining the limb in a fixed position. In FIGS. 1 and 2 the cast 21 is shown in cross section and is preferably made of plaster.

Under certain conditions such as during physical therapy swimming treatments, it is necessary to submerge the cast-bound limb under water. This necessitates the provision of a sealing means to prevent water from entering the bag 15 through the open upper end and damaging the cast 21. An inflatable cuff 23 is attached to the open upper end of the bag 15 for the purpose of holding the bag 15 in place and preventing water from entering. The cuff 23 is generally toroidal in configuration and is fabricated of an inflatable, stretchy material such as latex rubber or plastic. One end of a connection 25 is attached to the cuff 23 while the other end is connected to a piece of rubber or plastic tubing which is long enough to allow mouth inflation of the cuff 23 after the cast cover 13 has been fitted over the cast-bound limb.

The cuff 23 is relatively wide where it makes contact with the surface of the arm 17 or leg 19 so that the sealing pressure produced when the cuff 23 is inflated is distributed over a relatively wide area of the limb. This arrangement operates to prevent water from entering the bag 15 and at the same time allows normal blood supply to reach the injured limb. In a preferred embodiment of the invention, the entire bag 15 is molded of soft latex rubber and the wise sealing cuff 23 is fabri-

cated of the same material so that the region of contact with the limb is extensive and the inflation pressure is widely distributed and not concentrated enough to cause interference with the blood circulation.

The cast cover 13 including the bag 15 and the cuff 23 can also be fabricated of a plastic material. If plastic is used, it would be desirable to insert a ring 29 of non-porous foam (see FIG. 4). This arrangement prevents the relatively hard plastic material from pressing on the injured limb and causing the cuff 23 to act as a tourniquet. The foam 29 serves to distribute the sealing pressure of the inflatable cuff 23 over a larger area as well as providing a better seal with less pressure. In the cast cover 13 for the leg 19 (shown in FIG. 2) a foam lining 31 is positioned in the lowermost part of the bag 15 to prevent the cast 21 from puncturing the bag 15 when the wearer walks with the cast cover 13 in place.

For therapeutic treatments in water and/or while swimming, it may be desirable to provide additional buoyancy to the cast-bound limb. This can be accomplished by providing elongated flotation sections 33 in the wall of the bag 15. These flotation sections 33 may be longitudinally disposed air sacs with separate inflating means or may be inserts of expanded synthetic resinous material such as Styrofoam. It should be noted that the sealed bag 15 itself does provide considerable flotation and the flotation sections 33 are only necessary when additional buoyancy of the cast-bound limb is desired. Another way of obtaining more buoyancy would be to inflate the entire bag 15 by filling it with air after it has been applied over the cast-bound limb.

Although the invention has been illustrated in terms of preferred embodiments thereof, the invention is not limited to these embodiments or to the preferred configurations mentioned. It will be apparent to those skilled in the art that my invention can also be practiced by wrapping the cast 21 itself in a thin waterproof plastic film material prior to placement inside the bag 15 to further protect the cast 21 in case of leakage.

Also, it should be understood that various changes, alterations, modifications and substitutions, particularly with respect to the construction details can be made in the arrangement of the several elements without departing from the true spirit and scope of the appended claims.

Having thus described my invention, what I claim and desire to secure by Letters Patent of the United States is:

1. A cast cover for protecting and buoying up the cast-bound limb of a wearer comprising, an elongated, waterproof, flexible bag having an opening at one end thereof, sealing means at said opening comprising an inflatable cuff of toroidal configuration having sufficient width to distribute the sealing pressure over a relatively wide area and adapted to fit closely around the limb of the wearer above the top of the cast, longitudinally disposed flotation sections secured to and made part of said cast cover for providing additional buoyancy to the cast-bound limb, and means for inflating said cuff to produce a seal for preventing water from entering the elongated bag through the opening without causing interference with the normal flow of blood to the cast-bound limb.
2. The cast cover defined in claim 1 including a non-porous foam lining on the inner portion of said cuff.
3. The cast cover defined in claim 1 including a soft latex rubber surface on the inner portion of said cuff.
4. The cast cover defined in claim 1 including a suitable protective material at the end of said bag opposite said opening to protect said cast cover from puncture by rough edges of the cast.
5. The cast cover defined in claim 1 wherein the longitudinally disposed flotation sections include separate means for inflating said flotation sections.

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