A portable recompression chamber for emergency treatment of and transportation of divers stricken with the "bends." It is in the form of an elongate pressure chamber of circular cross section capable of receiving a patient on a stretcher. It is collapsible into a small space and has an end closure means which is reversible in order to protect the instruments located thereon during storage.

4 Claims, 7 Drawing Figures
PORTABLE COLLAPSIBLE RECOMPRESSION CHAMBER

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates generally to recompression chambers and in particular to a portable collapsible recompression chamber capable of immediate treatment of a diver stricken with the bends.

2. Description of the Prior Art

Various recompression chambers have been employed for treatment of divers stricken with the bends. However many of these chambers are subject to numerous limitations and disadvantages. Most are quite heavy and cannot conveniently be transported to areas where they may be needed. Also their external dimensions prohibit them from entering the large medical double lock recompression chambers where the diver can receive additional treatment under a doctor's care.

Some recompression chambers are collapsible but various essential parts thereof are not collapsible and do not fit within the interior of the collapsed stowed chamber. These loose parts are subject to being lost or misplaced. Furthermore, most collapsible recompression chambers have vulnerable seals which are subject to damage each time the chamber is expanded or collapsed.

SUMMARY OF THE INVENTION

The present invention involves a portable recompression chamber having three telescoping sections with dovetail flanges for O-ring seals, telescoping side rails which are pinned to the recompression device serve as an expansion bar to preseal the chamber and to provide a lifting means. A hatch cover which may be reversible is equipped with a double machined flange and is sealed to the chamber body by a ring and clamp arrangement and a viewing window is secured to the chamber body. The expanded chamber body is presealed by a sealing wheel to assure initial close engagement of the sealing surfaces.

STATEMENT OF THE OBJECTS OF THE INVENTION

Accordingly, it is an object of this invention to provide a portable collapsible recompression chamber for immediate on the spot treatment of a diver stricken with the bends and safe transportation of the diver to a large medical recompression chamber where he can receive additional treatment.

Another object is to provide a portable recompression chamber having telescoping side rails which preseal the recompression chamber and also serve as a lifting means.

Still another object is to provide a portable recompression chamber having protected O-ring seals for the telescoping chamber sections.

Yet another object of the invention is to provide a portable recompression chamber which is relatively simple in construction but effective in operation.

Other objects, advantages and novel features of the invention will become apparent from the following detailed description of the invention when considered in conjunction with the accompanying drawings wherein:

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side elevation partially broken away showing the recompression chamber in a telescoped condition.

FIG. 2 is an end view of the invention showing the instrumented hatch cover sealed with a clamp ring arrangement.

FIG. 3 is a top plan view of the recompression chamber partially broken away and in the expanded condition.

FIG. 4 is a fragmentary enlarged detail view of one of the telescoping tube arrangements of FIG. 3.

FIG. 5 is a fragmentary enlarged detail view of the seal portion of FIG. 3.

FIG. 6 is a fragmentary enlarged detail view of the broken away portion of FIG. 1 showing the pin arrangement for the side rails in the telescoped condition.

FIG. 7 is a diagrammatic view showing the recompression chamber in an expanded condition with the hatch removed and a patient being placed therein.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to the drawings, the present invention comprises a telescoping recompression chamber assembly which in its expanded state has the shape of an elongated sectioned cylinder. The chamber assembly 10 includes the telescoping sections 12, 14, and 16 with the ends of each section provided with dovetail ground flanges 18 and 20 for an O-ring seal 22. The O-ring is positioned in groove 24 as shown in FIGS. 4 and 5 which not only protects the O-ring but renders it readily accessible for securing a replacement.

It will be noted that Teflon (polymerized tetrafluoroethylene) guides 34 are mounted on flanges 18 and 20 of each telescoping section to provide ease in sliding movement and to prevent the sections from chafing or cocking. While the guides are preferably of the sliding type and are manufactured from Teflon, they may comprise a roller bearing arrangement if desirable.

A pair of telescoping side rails designated as 26, 28 and 30 are attached to opposite sides of the individual sections 12, 14 and 16 by the links 19 substantially as shown. The rails are equipped with pin holes 32 at each end thereof to allow insertion of release pins 35 which hold the sections in either an expanded or telescoped condition. The pin storage rack 33 located in the inner curve of rail 30 is adapted to hold several pins 35 while the chamber 10 is in the stowed position. The pins are also designed to prevent unnecessary movement of sections 12, 14 and 16 because of their attachment to the side rails thus further decreasing the possibility of damage to the O-ring seals 22. As shown in FIGS. 6 and 7 the pins 35 are attached to a corresponding side rail by the flexible wire 41. This arrangement obviates loss or misplacement of the pins. The telescoping side rails being attached to a corresponding body section serve as an expansion bar to preseal the recompression chamber and to provide a means of lifting the device.

The hatch cover 36 is provided with the double machined flanges 38 and 40. A V-band 42 and ring clamp 44 with an over-center handle 46 seals the hatch cover to the forward chamber section 12. The hatch cover 36 contains all necessary equipment indicated generally as 48 to treat a stricken individual. A guard framework, not illustrated, may protect the delicate equipment 48 if required and the handles 50 and 52 assist in removal and implacement of the cover. It is emphasized that the hatch cover is reversible which allows the treating
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equipment 48 to be protected within the interior of the recompression chamber 10 when not in use. However, it is within the concept of this invention to render the hatch cover non-reversible with only a protective guard framework over the protruding sensitive equipment 48. Another type of reversible hatch closure, not illustrated, but which could be used in the present invention is a semielliptical hatch cover which is manually inserted into chamber body 12, rotated into position and then sealed by the internal pressure.

The top of chamber body section 12 is provided with a viewing window 54 fabricated preferably from a suitable acrylic plastic material. However, it may also be a suitable glass capable of withstanding not less than 125 psi. A gasket 56 may be placed on each side of the window and a clamp ring 58 secures the window and gaskets to section 12 with a plurality of bolts 60.

It will be noted that a presealing wheel 62 is mounted for rotational movement on the bracket 64 attached to the aft end of telescoping section 16 by bolt 66. The preseal wheel 62 is adapted to thread into the aft rail section 30 as shown in FIG. 3. Thus by rotating the wheel 62 the chamber sections 12, 14 and 16 are pulled taut allowing the O-ring seals 22 to initially seal the chamber 10.

While not considered as part of the invention, a lightweight collapsible stretcher 68 should be provided with the recompression chamber 10 to ensure that a means of carrying the patient will always be available. It should be collapsible in order to fit inside the stowed chamber thereby decreasing the chance of being misplaced.

Thus in operation the stowed recompression chamber 10 is laid horizontally with the viewing window 54 facing up. The clamp ring holding the hatch cover 36 is loosened and the hatch cover is removed. The stretcher 68 is removed from the interior of chamber 10 and unfolded.

The release pins 35 are removed from pin holes 32 in the forward rail 26 and in the storage rack 33 mounted on aft side rail 30.

The aft rail 30 is pulled to extend the center and aft sections 14 and 16 of chamber 10 and the release pins 35 are reinserted. The wheel 62 is turned so as to preseal chamber 10.

The patient is fitted with an inhalator mask 70 which is attached to the equipment 48. The patient now positioned on stretcher 68 is placed inside the chamber 10 and the hatch cover 36 is replaced and latched.

The chamber 10 with the patient is then transported to a hospital.

Obviously, many modifications and variations of the present invention are possible in the light of the above teachings. It is therefore to be understood that within the scope of the appended claims the invention may be practiced otherwise than as specifically described.

I claim:
1. In a portable recompression device adapted to enclose a patient's body, said device being a hermetically sealed elongated casing with a viewing window in the wall thereof and means attached to said device for treating the patient, the improvement comprising:
   a series of telescoping sections forming the casing, said sections being in the telescoped condition when the recompression device is not in use and in the extended condition during use, said sections having dovetail flanges;
   an O-ring positioned in a groove in one of said flanges and adapted to seal said sections when in the extended condition;
   plastic guides mounted on opposite flanges of each telescoping section to prevent chaffing;
   telescoping side rails mounted on opposite sides of each telescoping section, said side rails serving as an expansion bar to assist in presealing the recompression device and to act as a lifting bar;
   means for holding said side rails in an extended position to prevent undue movement thereof prior to sealing of the recompression device;
   adjustable presealing means adapted to properly position said sections prior to actual sealing, and;
   a hatch cover means adapted to afford an entrance for a patient to said recompression device and to seal the same after a patient has been placed therein, wherein the rim of the hatch cover consists of two parallel identical flanges whereby the hatch cover may be reversed during storage to protect sensitive instruments attached thereto.
2. The portable recompression device as defined in claim 1 wherein:
   three telescoping sections form said casing thus reducing the maintenance of O-ring seals between said sections.
3. The portable recompression device as defined in claim 1 wherein:
   said guides mounted on the flanges of each section are manufactured from polymerized tetrafluoroethylene.
4. The portable recompression of claim 1 wherein said hatch cover means includes;
   an inhalator mask attached to the inside of the hatch cover;
   a ring clamp to seal said hatch cover to the forward telescoping section of said recompression device.

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