

COLLAPSIBLE ISOLATION APPARATUS**CROSS REFERENCE TO RELATED APPLICATION**

Priority is claimed from U.S. provisional application Ser. No. 60/113,503, filed Dec. 21, 1998.

GOVERNMENTAL RIGHTS

The subject matter disclosed and claimed herein was developed under Department of Defense Contract No. DLA900-93-D-0011/0038. The government has certain rights in the invention.

BACKGROUND OF THE INVENTION

The invention relates to isolation pods and particularly to a collapsible low cost pod for isolating a person previously exposed to a chemical or biological hazard from a safe environment, or in the alternative, for isolating an unexposed person from a hazardous environment for medical transport.

The threat to health from biological and chemical contaminants has, if anything, increased over the last several years. The popular press is full of accounts of potential biological attacks which might either be privately or state sponsored. Chemical terrorist attacks have already occurred in various areas of the world and certain governments have engaged in chemical attacks against enemies and even members of their own society. While the risks from chemical attacks are believed to be substantial, in the future the threat of biological attack may continue to increase and may become more significant than chemical attacks.

Apparatus are currently available for transporting victims of natural biological hazards. Such victims may include persons who have been infected with Ebola or Marburg virus, anthrax or the like. One such system is the so-called Vickers box which comprises a relatively self-contained unit having an external frame with a biological hazard barrier comprising sheet polyvinyl chloride sheet suspended therefrom. The frame has a foot rest or step. A lower substantially oval loading port provides access to the interior through which a patient may be carried to rest on a stretcher-like structure. The barrier has a ventilation tube entering its foot end. Glove ports are formed on the sides of the frame thereof. A pass-through port extends through the barrier near where the calves of a patient would normally rest. There are pairs of glove ports on each side of the unit. Intravenous bags and the like may be suspended from the frame of the unit. An intravenous line may extend through a port in the side of the unit. The Vickers box weighs over 200 pounds unloaded. In addition, the Vickers box is not disposable and is very expensive. It typically costs \$20,000 to \$30,000. When assembled the Vickers frames are bulky and the unit is simply not adapted for storage in large numbers for use in the event of a biological emergency. In addition it cannot be transported in all types of military evac vehicles.

Another approach has been taken in U.S. Pat. No. 5,626,151 to Linden. Linden discloses a transportable life support system including a base 2, a stretcher 3, and a rigid cover 4. The base may be constructed from a fiber reinforced resin composite. Medical equipment is housed within the base including a ventilator 11, an oxygen source 12 such as an oxygen tank or oxygen generator, a suction unit 13 and an environmental control unit 14. A high volume intravenous pump 23, a pulse oximetry sensor 24 a blood pressure sensor 25 and electrocardiography sensor all are relatively bulky

and may or may not be needed for the treatment for the particular patient depending upon whether the patient had merely been exposed or has been infected. The environmental control unit includes means for providing contaminant-free air to the unit including at least one filter 14B, which may be a typical nuclear-biological-chemical type filter. The problem with such a unit is that it appears to be relatively bulky because of the built-in components in the base of the unit and the unit may not quickly and easily be stored in a compact configuration and may represent overkill for a variety of hazards.

What is needed then is an inexpensive easily transportable compact biological isolation system for use in isolating victims in a chemical or bioterror event.

SUMMARY OF THE INVENTION

A collapsible personnel isolation apparatus for isolating an individual who may have been exposed or has been infected with a biological agent or may have been exposed with a chemical agent embodies the present invention and is particularly well adapted for compact storage. The collapsible personnel isolation system embodying the present invention may include a pod, a suit or a flexible wrap. The system is inexpensive, may be completely disposed by burning or the like, and provides facilities for a variety of medical interventions without the necessity that expensive treatment equipment be associated therewith.

The system includes a flexible base, which may be made from polyvinyl chloride material and which is tear resistant. Specifically the base includes an outer sheet and an inner sheet. Each of the inner and outer sheets has first and second polyvinyl chloride outer layers with an intermediate nylon mesh layer positioned between. A nylon webbing formed in the shape of a ladder includes a pair of upright or runner elements extending longitudinally on opposite sides of the base for providing support when the base is carried. The nylon webbing is positioned between the inner and outer sheets. This prevents the base from tearing and provides support to handholds in the base. Lateral or central spine type support is provided by five nylon web strips connecting the two longitudinal strips.

Rectangular handholds are formed adjacent to the elongated nylon uprights for grasping by persons carrying the patient. If the patient is being carried by stretcher, grommets formed in the walls of the sheets accept hooks, cords or other tension members. The tension members wrap the base material around a stretcher, in particular a decontamination stretcher, for transport of the patient.

A clear 20 mil thick PVC material extends upwardly from the base into an over area and terminates at each side at a zipper half. The zipper halves are completely separable so that the apparatus may be opened in a clamshell arrangement and a patient may be laid therein. This is particularly important with patients infected by hemorrhagic fevers such as Ebola or Marburg. Such patients may resist handling. Attempts to place the patient into a prior art isolation system, such as a Vickers box, where there is a relatively small port of entry can be difficult without contaminating the handlers. It may be appreciated that contamination of the environment and other persons must be avoided in order to prevent the spread of these types of virulent viruses.

Accordingly, the present invention, as embodied in the apparatus, is easily closed around the patient without panicking the patient and without unwarranted spread of virus during the process.

The PVC material has a plurality of flexible, nylon ribs or stays positioned in sleeves to provide support. The stays are