United States Patent

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[54] **APPARATUS FOR MOUNTING RESPIRATOR EQUIPMENT**
8 Claims, 4 Drawing Figs.

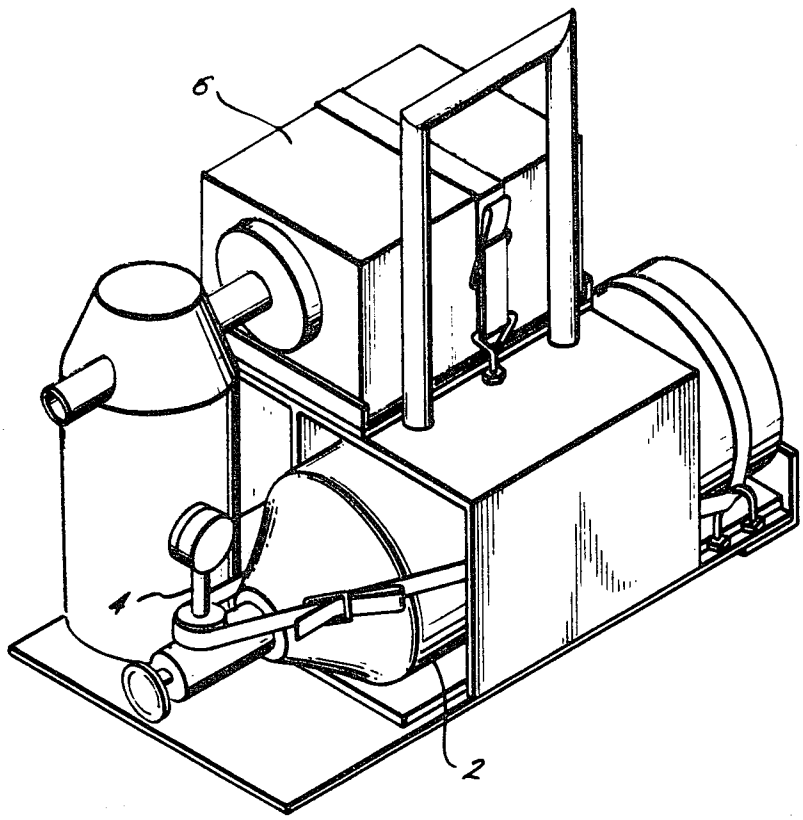
[52] **U.S. Cl.** ..... **128/145.8,** 224/45 R, 224/48 R
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[50] **Field of Search** ..... 224/45, 45 F, 45.1, 48, 48.4, 45.15; 128/145.5, 145.6, 145.8, 203

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ABSTRACT: A frame is provided which comprises a base plate, a bin suitable for receiving an oxygen cylinder, a shock-mounted support plate for a medical respirator unit, a carrying arm, and detachable flexible straps for retaining each the oxygen cylinder and the respirator unit on the frame but enabling the quick and efficient removal therefrom.

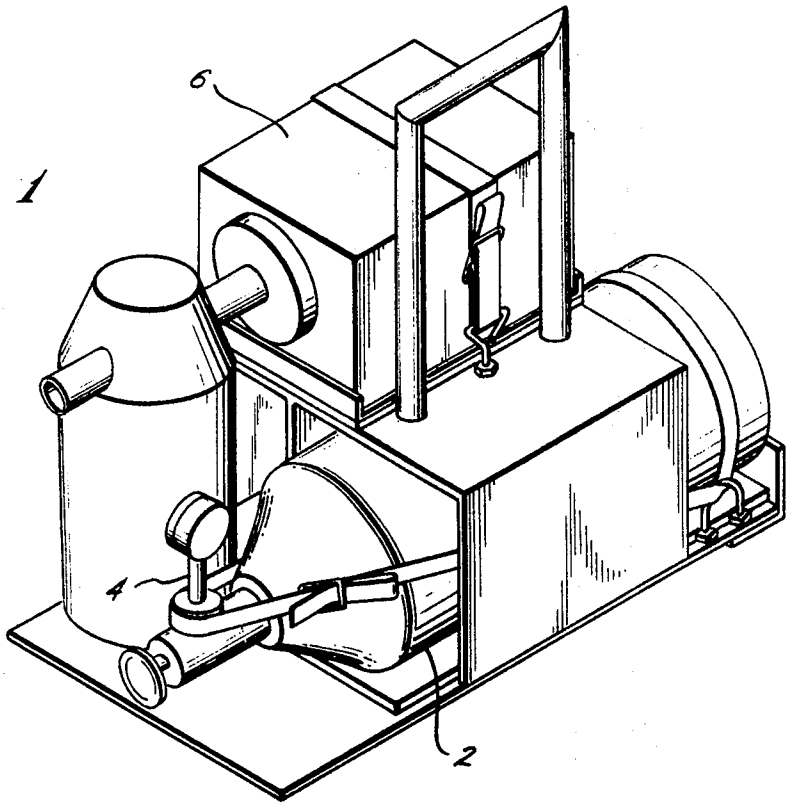


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SHEET 1 OF 2

Fig. 1



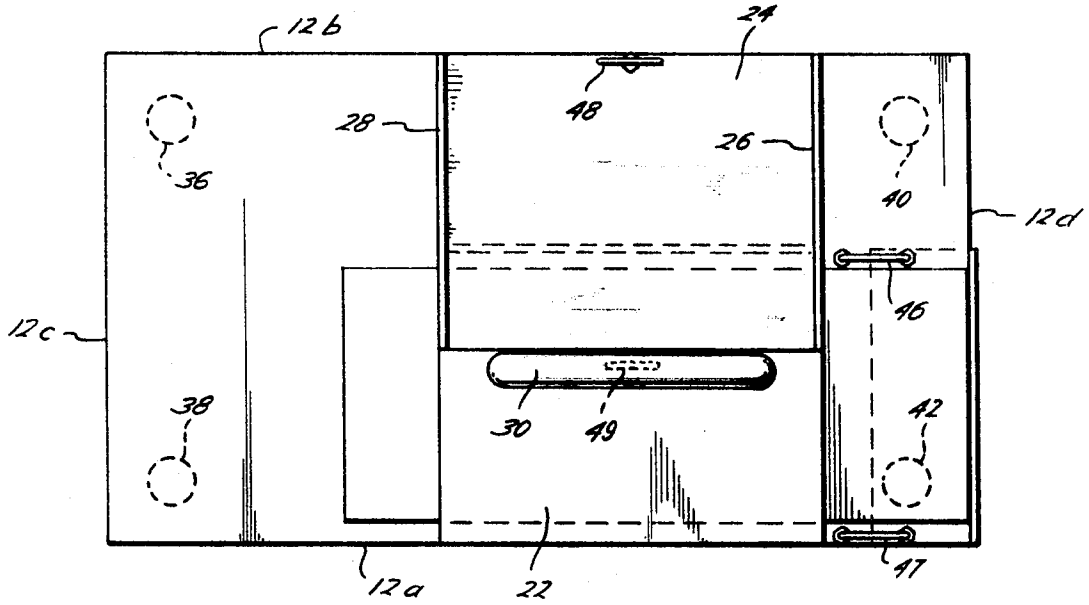


Fig. 2

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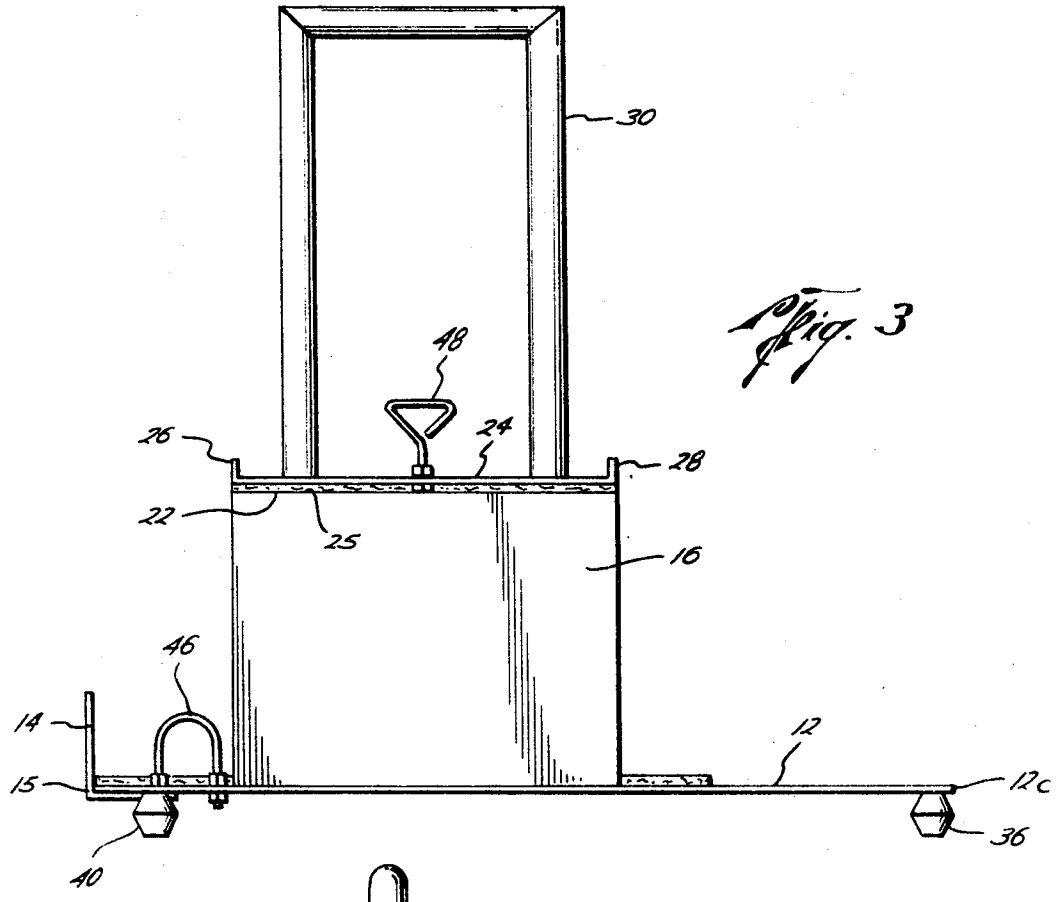


Fig. 3

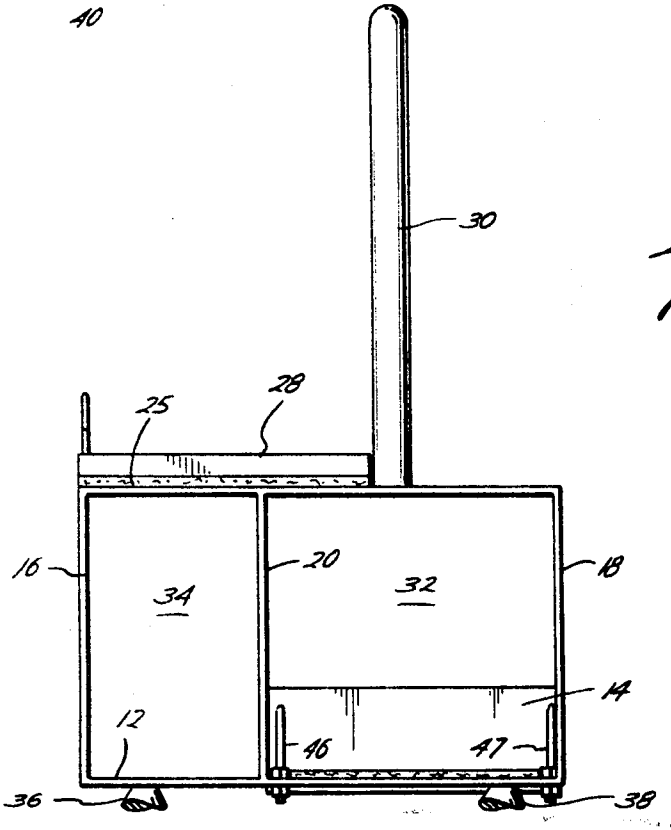


Fig. 4

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APPARATUS FOR MOUNTING RESPIRATOR EQUIPMENT

BACKGROUND OF THE INVENTION

This invention relates to emergency medical equipment which may be readily transported to a remote area to resuscitate a person in danger of asphyxiation, and to provide aid in respiration to such persons.

In the past, persons in critical need of aid in respiration often died before such aid arrived, especially if such persons were in remote localities when in need of such aid. Oftentimes, the speedy arrival of respirator apparatus or resuscitator equipment on the scene would have saved the life of the person in need. With modern communication and with the assistance of rapid transportation to such remote areas, as by helicopter, it is now possible to save lives in many such instances. There still exists a difficulty, however, in many instances of getting the necessary equipment on the scene of the accident. As one example, persons hiking on mountain trails are sometimes stricken with heart attacks. Although a helicopter can reach the general area, it is often impossible to land the craft in that area, in which case an assistant must be lowered to the stricken hiker. Prior to the present invention, it would be impossible in such an instance to get to the stricken person without great delay, anything other than the most rudimentary of medical supplies. If the stricken person were in need of respiratory aid, then generally the assistant would have to rely on artificial mouth-to-mouth respiration which is often not successful in keeping the patient alive until proper equipment arrives.

Units attached to a litter have been available, but these units are not satisfactory unless the aircraft can land in the area of the accident.

The present invention provides a unit which may be transferred to the area of an accident or disaster by helicopter, then lowered to the scene of the accident by one (hereinafter referred to as an assistant) who will assist the person or persons in peril. Time is of the essence in many situations in which the apparatus of the present invention is especially useful, and the invention provides means by which the assistant may quickly detach and assemble the equipment. Further, and most importantly, the assistant may perform these functions with a single hand, leaving his other hand free for whatever other aid must be given the victim, for example holding against his face a mask connected to an emergency resuscitator, during the interim period before the respirator system is set up and ready to operate.

The present invention thus makes it possible to save the lives of many persons who otherwise would die before proper equipment could reach them by means heretofore available.

Still another problem with prior art apparatus has been the lack of such apparatus which would readily fit alongside the patient in the confines of a helicopter, once the patient is placed into the helicopter for transportation to a hospital, especially such apparatus which would allow an assistant to manipulate the respirator equipment with one hand while administering the patient with his other hand. This invention provides such apparatus.

A still further problem exists at present with respect to the sensitivity of respirator equipment to vibration (as in an airborne helicopter) and to impact. The present invention also provides apparatus for overcoming these prior art problems.

SUMMARY OF THE INVENTION

The invention comprises a novel frame which includes a carrying arm, a shock-mounted base for reception of a respirator unit, means for carrying therein a source of gas under pressure, and means for detachably securing to the frame each the respirator and the source of gas under pressure.

More particularly, the invention comprises in the illustrated embodiments, a frame which includes a generally rectangular base plate, a pair of upstanding plates along opposite edges of the base plate, an upper plate joining the upstanding plates and oriented generally parallel to the base plate, a carrying arm in the upper plate, a plate spaced above the upper plate and parallel thereto forming a cradle for a medical respirator unit, the cradle being shock mounted, and means in the cradle and the base plate for detachably retaining the respirator unit and a gas container, respectively.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will be described in terms of a particularly preferred embodiment which represents the best mode of the invention as known to the inventor at the time of this application, this embodiment being illustrated in the accompanying drawings which form a part of this specification and wherein:

FIG. 1 is a pictorial view showing the frame with respirator and gas cylinder mounted in position for transit;

FIG. 2 is a plan view of the frame shown in FIG. 1, the respirator and cylinder having been removed;

FIG. 3 is a side view of the frame shown in FIG. 1 and 2; and,

FIG. 4 is an end view of the frame shown in FIGS. 1—3.

DETAILED DESCRIPTION OF ILLUSTRATED EMBODIMENT

Turning now to a more detailed description of the embodiment of the invention illustrated in the drawings, there is shown in FIG. 1 apparatus in accordance with the present invention which includes in a single unit detached from other mountings, means for detachably retaining a source of gas under pressure such as an oxygen cylinder, means for detachably retaining a medical respirator, and means for conveniently carrying the apparatus and equipment mounted thereon.

In the contexts of use in which the present invention will be used, e.g., in locales where electrical connection is not available, the source of gas under pressure is conveniently a cylinder 2 filled with oxygen or a gaseous mixture rich in oxygen. The cylinder 2 is provided with the necessary attachments and pressure regulator valves 4 as is well known in the art. Means for detachably retaining the cylinder 2 and associated apparatus desirably includes a flat, generally rectangular metal base plate 12. The edges of the plate 12 are, for purposes of explanation herein, denoted as side edges 12*a* and 12*b*, front edge 12*c*, and rear edge 12*d*.

Along side edges 12*a* and 12*b* are upstanding walls 16 and 18 which extend through a central portion of the apparatus, terminating a substantial distance from each the front edge 12*c* and the rear edge 12*d* of base plate 12. The walls 16 and 18, which are parallel and of equal height, and perpendicular to base plate 12, are desirably formed by securing flat metal plates, as by welding, to the base plate 12. The top edges of the walls 16 and 18 are joined by an upper plate 22 which is parallel to base plate 12.

Desirably, an intermediate upstanding wall 20 is formed by affixing another flat plate parallel to each of the walls 16 and 18 and of substantially equal height to those walls. The wall 20 cooperates with the wall 18, base plate 12 and upper plate 22 to form a cylinder retaining bin 32, and cooperates with the wall 16, upper plate 22 and base plate 12, to form an auxiliary equipment retaining bin 34.

One end of the cylinder retaining bin 32 is desirably provided with a retaining wall suitable for preventing the cylinder 2 from sliding out of the bin 32 upon tilting of the apparatus. The cylinder retaining wall 14 is desirably formed by affixing an L-shaped plate 15, as by welding, to the underside of the base plate 12 at the front end 12*c* thereof, in a manner such that the longer side of the plate extends across the opening at the front side of bin 32 from at least approximately the edge 12*a* of base plate 12 to a point at least approximately aligned with the center upstanding wall 20.

Suitable means are included in the base plate 12 for detachably retaining the cylinder 2 thereon, such means being

of a nature sufficient for quick and ready release of the cylinder from the base plate by use of a single hand of the assistant. Such means desirably comprise loop means such as the U-bolts **46** and **47** spaced apart on opposite sides of the projection made by the cylinder **2** on the base plate **12** when the cylinder is mounted on the plate, this location being illustrated in FIG. **2**. A flexible strap **50** may then be attached to one of these U-bolts and detachably secured to the other such bolt, so that release of the strap allows quick release of the cylinder **2** from its mounting. Alternatively, two more bolts of this nature near the other two corners of the projection of cylinder **2** on base plate **12** may be employed if desired.

Means for shock mounting a respirator unit **6** desirably comprise a generally flat metal support plate **24** mounted atop the upper plate **22**, and spaced a small distance therefrom, with a layer of shock-absorbing material **25**, such as cork, therebetween. The support plate **24** is desirably contiguous with the front edge, rear edge, and one side edge of the upper plate **22**, but does not extend completely across the upper plate **22**, instead terminating along a line approximately aligned with an upward projection of the center upstanding wall **20**. The plate **24** may be affixed to the plate **22** by any suitable means, for example by means of the bolts; substantially all the space between the plates **24** and **22** is desirably occupied by the shock-absorbing material.

Along each the front and rear edges of the support plate **24** are desirably formed upstanding lips **26** and **28**, respectively, to prevent the respirator unit **6** from sliding off either the front or the rear of the support plate **24** while the apparatus is being carried.

The type of respirator unit employed with this invention is not the "gas mask" type which is used to protect the wearer against noxious fumes, but rather the medical type respirator unit such as that sold under the trademark "Mark 7" by the Bird Corporation, Richmond California.

Means for detachably retaining the respirator unit **6** on the support plate **24** desirably include fixed loop means through which straps may be looped, such as the eye bolts **48**, **49**, one mounted on each side of the plate **24**. When the respirator unit **6** is placed in a central position on the plate **24**, a flexible strap **52** is securely affixed to one of the eye bolts and detachably secured to the other, in a manner such that the assistant may, with a single hand, readily detach the strap to quickly release the respirator unit.

Means by which an operator may readily carry the apparatus **10** and equipment mounted thereon desirably takes the form of a carrying arm **30** which could be of any suitable shape but desirably takes the form of an inverted U as illustrated in FIG. **3**. Provision of the carrying arm in this manner enables a single assistant to transport the apparatus with a single hand while using his other hand for another purpose. This is of vital importance in the contexts of use in which the present invention finds its greatest utility, as presently viewed. For example, provision of the carrying arm in this manner enables an assistant to carry the apparatus and rescue equipment while being lowered on a rope from a helicopter to a victim located in an area where the helicopter cannot land. The carrying arm **30** should extend a greater distance from upper plate **22** than the uppermost part of respirator unit **6**, so that the unit may be more conveniently carried.

Means for softening the impact upon the apparatus as a result of impact upon a surface (as would occur, for example, if an assistant is lowered from a helicopter to the ground with the unit in his hand) are desirably included on the underside of the base plate **12**. Such means desirably take the form of rubber bumpers **36**, **38**, **40**, **42**, advantageously spaced near the four corners of the base plate **12**.

Any type of auxiliary equipment such as a flexible bag emergency resuscitator unit, face mask, medication, flexible hose, etc. may be conveniently placed in the auxiliary equipment bin **34**.

Any suitable materials of construction might be employed in construction of the frame **10**, but it has been found particularly desirable to construct the major portions of apparatus, such as the plates **12**, **16**, **18**, **20**, **22** and **24**, of a lightweight metal such as aluminum.

It is seen from the above discussion that apparatus is provided for facilitating transport of respirator equipment to the scene of an accident or the like, even though such scene may be difficult to reach. The apparatus is readily portable and may be carried by a single assistant using only one hand. Importantly, the necessary rescue equipment is detachably mounted on the apparatus for ready detachment by the assistant requiring again the use of only a single hand. Further, the respirator unit and associated equipment is mounted in a manner such that the possibility of damage to the equipment by jarring or impact is minimized.

The apparatus provided as described above is small and compact in size so that it may readily fit into a helicopter alongside the patient after the patient has been placed into the helicopter for transit to a hospital. Further, the apparatus provided allows the assistant in this situation to manipulate the respirator equipment with one hand while administering the patient with his other hand.

The shock mountings provided for the apparatus as described above, in addition to providing cushioning against impact, also serve the important function of protecting the equipment against the sometimes extreme vibrations which occur in the airborne helicopter.

Although the invention has been described in terms of a particular illustrated embodiment, it will be understood by those of skill in the art that certain changes may be made in the apparatus illustrated without departing from the scope of the invention, which is defined by the following claims.

What I claim is:

1. Apparatus for mounting a medical respirator unit and a cylinder containing gas under pressure, in a manner such that said respirator unit and gas supply can be readily transported to a victim located in a remote region, comprising:

means for mounting said gas cylinder including a base plate, means in said base plate for receipt of a first flexible strap, and a flexible strap fitting over said cylinder, said flexible strap being readily detachable by an assistant using a single hand, for ready removal of said cylinder from its mounting;

means for shock mounting said respirator unit, including a support plate operably connected to said base plate and oriented parallel thereto, shock-absorbing material underlying said support plate, means in said support plate for receipt of a second flexible strap, and a flexible strap detachably secured to said means and overlying said respirator unit in such a manner that said strap may be readily released by an assistant using a single hand, for quick and easy removal of the respirator unit; and,

a carrying arm on said apparatus, operably connected to each said base plate and said support plate, said arm being of sufficient size to enable the assistant to carry said apparatus with a single hand, thereby leaving his other hand free for other operations.

2. Apparatus in accordance with claim **1**, wherein said apparatus includes a bin defined by a top wall, said base plate forming a bottom wall, and two sidewalls, open at each end, in which said cylinder is detachably mounted.

3. Apparatus in accordance with claim **2**, wherein said base plate includes a retaining wall mounted across the front of said bin, spaced from the front of said bin, for preventing said cylinder from sliding off said base plate.

4. Apparatus in accordance with claim **2**, wherein said apparatus includes a second bin of similar construction, said second bin being suitable for receipt of auxiliary equipment.

5. Apparatus in accordance with claim **1**, wherein said base plate is joined to an upper plate oriented parallel to said base plate, by at least two upstanding plates generally perpendicular to said base plate, said support plate and said carrying arm being fixedly mounted on said upper plate.

6. Apparatus in accordance with claim 5, wherein said support plate is mounted just above said upper plate and generally parallel thereto, the space between said upper plate and said support plate being substantially completely occupied by shock-absorbing material.

7. Apparatus for assisting a victim in need of respiratory aid in a remote locality, comprising:

a frame which includes

a base plate,

first loop means in said base plate for receiving a flexible strap,

an upper plate affixed to said base plate, oriented parallel to said base plate but spaced therefrom,

means joining said upper plate to said base plate and retaining said plates in fixed, spaced-apart relationship,

a support plate mounted above said upper plate and oriented parallel thereto,

means joining said support plate to said upper plate,

second loop means in said support plate for receiving a flexible strap, and

a carrying arm mounted in said upper plate;

a cylinder containing gas under pressure mounted on said base plate beneath said upper plate, said cylinder being detachably retained on said base plate by at least one flexible strap retained through said first loop means; and,

a medical respirator unit mounted on said support plate, said unit being detachably retained thereon by at least one flexible strap retained through said second loop means,

all whereby an assistant using a single hand may carry said apparatus by said carrying arm to a remote location, and readily detach each said cylinder and said respirator unit from said frame also by the use of a single hand.

8. Apparatus in accordance with claim 7, wherein the space between said upper plate and said support plate is substantially filled with a shock-absorbing material.