EMERGENCY MEDICAL HARNESS

Inventors: David J. Ochs, 707 W. Magnolia St.; James D. Behrens, 1016 McHugh St., both of Fort Collins, Colo. 80521

Filed: July 1, 1974

Appl. No.: 484,577

U.S. Cl. 128/134; 5/82; 2/44
Int. Cl. A61I 5/04


References Cited

UNITED STATES PATENTS
3,315,671 5/1967 Creelman 128/134
3,526,222 5/1970 Dreibelbis 128/139
3,707,734 1/1973 Mathews 5/82
3,737,923 6/1973 Prolo 5/82

Primary Examiner—Richard A. Gaudet
Assistant Examiner—Henry J. Recla
Attorney, Agent, or Firm—Hugh H. Drake

ABSTRACT

An emergency medical harness enables the rapid and yet secure binding of a person to a backboard or other solid support such as a stretcher. The harness includes a plurality of elongated flexible straps each oriented in a given direction and with the straps being laterally spaced successively one from the next. Disposed across the central region of those straps are a plurality of flexible webs. The combination of the straps and webs forms a matrix of a length and width that covers approximately the front upper torso of a wearer. Individual different portions of the straps are fastened to corresponding different portions of the webs at the mutual crossings. The harness further includes means, preferably of Velcro fasteners, for releasably and adjustably securing each outer end portion of each strap effectively back upon itself so as to form a loop engageable around a portion of the support which is placed behind the wearer. In addition, strips project away from one end of the aforesaid matrix for the purpose of releasably and adjustably binding the shoulders of the wearer to the support, while additional strips project generally outwardly from the outer end of the matrix in order to permit the releasable and adjustable binding of the upper thighs of the wearer.

9 Claims, 8 Drawing Figures
EMERGENCY MEDICAL HARNESS

The present invention pertains to an emergency medical harness and its combination with a solid support such as a backboard. More particularly, it relates to a harness assembly which is entirely flexible and yet particularly safe and easy to use.

In recent years, widespread attention has been directed to the field of emergency medical care. This emphasis has arisen, at least in part, by reason of increased awareness that the chances for successful recovery of a victim of an injury or ailment may be enhanced significantly through substantial improvement in the methods employed and the equipment utilized in retrieving the victim from an emergency situation and transporting him to an appropriate medical facility. Such emphasis has led to the establishment of intensive training throughout the country of emergency medical technicians or paramedics. At the same time, considerable effort has been devoted to the improvement and the expansion of the variety of kinds of equipment carried in ambulances, rescue vehicles and other emergency units.

One area of particular concern has been the removal and transportation of accident victims who may have been subjected to severe physical forces effective against their back, neck and head. Because both motor and response functions normally associated by the layman with the brain actually involve the entire spinal column, even comparatively slight physical damage to any portion of the spinal column may result in severe permanent impairment or even death. Moreover, it is all too easy, in removing and transporting a victim, to aggravate an initially simple and non-serious area of physical injury in such a way that permanent disability or death is inadvertently caused to occur.

In an effort to avoid such disastrous results, it has become customary, whenever at all possible, to immobilize the entire spinal column prior to premitting or effecting the slightest movement of the upper torso, neck and head of the victim. To that end, one attendant usually gently but firmly immobilizes the head of the victim while the other attendant affixes a cervical collar and then inserts what is called a backboard behind or beneath the victim's backside. Long flexible straps, having buckles at one end, are then woven through slots provided along the side edges of the backboard and criss-crossed behind the board and over the front of the upper torso of the victim, as well as around his upper thighs, in a manner to bind the victim immovably to the backboard. A separate harness assembly is placed over the point of the chin and around the forehead and then tightly secured, now usually by means of Velcro fasteners, to an upper portion of the backboard. When such an arrangement of straps and head harness is properly applied, the victim may then be removed and transported with greatly minimized risk of further injury. Analogous strapping approaches frequently are utilized in connection with the transport of a victim by means of a stretcher.

One especially difficult removal problem often occurs in the case of vehicle accidents. The victim may be wedged behind bent and distorted portions of the vehicle, making it exceedingly difficult for the attendants to gain ready access. In that case, an attempt is usually made to insert what is termed a "short" backboard behind the back of the victim. Such a so-called short board is approximately the size of the victim's upper torso, in terms of length and width. Then, the person or persons aiding the victim must attempt to weave the aforementioned straps in and around the backboard and the victim even though often working in extremely tight quarters.

A general object of the present invention is to provide a new and improved emergency medical harness usable in situations such as those described above.

Another object of the present invention is to provide a new and improved emergency medical harness in combination with a correspondingly improved backboard.

A specific object of the present invention is to provide a new and improved emergency medical harness which is comparatively easy of application to a victim.

Still another object of the present invention is to provide a new and improved emergency medical harness which is capable of being affixed to a backboard or other support while an attendant is working in an extremely confined space.

A still further object of the present invention is to provide a new and improved emergency medical harness that may be utilized in association with a variety of different victim-transport devices.

An emergency medical harness constructed in accordance with the present invention includes a plurality of elongated flexible straps each oriented in a given direction and with the straps being laterally spaced successively from one to the next. A plurality of flexible webs are then disposed across the central regions of the straps with each web being oriented in a direction perpendicular to that given direction and with the webs themselves being laterally spaced successively from one from the next. The combination of the straps and webs forms a matrix of a length and width so as to cover approximately the front upper torso of a wearer. Individually different portions of the straps are fastened to corresponding different portions of the webs at their mutual crossings. Also included are means for releasably and adjustably securing each outer end portion of each of the straps effectively back upon itself so as to form a loop engageable around a portion of a solid support, placed behind the wearer, in order to bind the wearer firmly to that support. Finally, the harness includes upper means projecting generally laterally to the straps from one end of the matrix so as releasably and adjustably to bind the shoulders of the wearer to the support, together with lower means that project generally laterally to the straps from the other end of the matrix for releasably and adjustably binding the upper thighs of the wearer.

The features of the present invention which are believed to be novel are set forth with particularity in the appended claims. The organization and manner of operation of the invention, together with further objects and advantages thereof, may best be understood by reference to the following description taken in connection with the accompanying drawings, in the several figures of which like reference numerals identify like elements, and in which:

FIG. 1 is a perspective view of one embodiment of an emergency medical harness assembly as applied to a victim;

FIG. 2 is a front-elevational view of the harness assembly of FIG. 1;

FIG. 3 is a side-elevational view of the harness assembly, again as applied to a victim;
FIG. 4 is a cross-sectional view taken along the line 
4-4 in FIG. 2; 
FIG. 5 is a cross-sectional view taken along the line 
5-5 in FIG. 4; 
FIG. 6 is a cross-sectional view taken along the line 
6-6 in FIG. 3; 
FIG. 7 is a view of the harness as disconnected and 
laid out flat; and 
FIG. 8 is a front-elevational view of a support 
used with the harness as shown in FIGS. 1-4.

As herein embodied, an emergency medical harness 
10 includes three elongated flexible straps 12, 14, 
and 16 each oriented in a horizontal direction as illustrated 
and with each of straps 12, 14, and 16 being laterally 
spaced successively one from the next. Three flexible 
webs 18, 20, and 22 are disposed across the central re-
6 gions 24 of straps 12-16 with each of webs 18-22 being 
oriented in a direction perpendicular to that of straps 
12-16. Webs 18-22 are laterally spaced apart succes-
sively one from the next, so that the combination of 
straps 12-16 and webs 18-22 forms a matrix 26 of a 
length and width to cover approximately the front 
upper torso of a wearer 28. Individual different por-
tions of straps 12-16 are fastened at points 30, in this 
case by stitching with threads, to corresponding differ-
ent portions of webs 18-22, points 30 being the mutual 
crossings of the straps and webs.

A first plurality of Velcro fastener parts 32 are indi-
vidually fastened, as by sewing, to respective differ-
ent ones of the outer sides, facing upwardly in the drawing, 
near the respective ends of each of straps 12-16. A sec-
ond and like plurality of Velcro fastener parts 34, mata-
ble with the first plurality 32 of such parts, are individu-
ally fastened to respective different ones of the central 
regions 24 of each of straps 12-14. As is well known, 
as such, Velcro fasteners are formed with one part hav-
ing a mass of tiny hook-shaped projections. When the two 
parts are pressed together, the projections engage 
the loops in a manner which establishes a tight bond 
between the two parts as against sliding movement of one 
part relative to the other. At the same time, however, 
a user need only peel off one part from the other in 
order to break the bond. While buckles or other de-
vices could be used, Velcro fasteners are preferable in 
that they permit an infinite adjustment of position of 
one part relative to the other part to which it is secured, 
thus permitting an infinite degree of adjustment in the 
length of a loop formed by a strap carrying such fasten-
ers.

Desirably associated with harness 10 is a solid sup-
port 36 in the form of a rigid, planar board of generally 
rectangular shape having a length and width to cover 
approximately the back upper torso of wearer 28. A sub-
38, formed integrally with and as a part of support 
36, projects laterally from one end of support 36 so as, 
in use, to be disposed behind the head of the wearer or 
victim. A plurality of slots 40, 41, and 42 and 43, 44, 
and 45 are distributed along opposing side portions of 
support or board 36 with the spacing between all such 
slots individually corresponding to the respective spac-
ings between straps 12-16. Slots 40-45 are each di-
6 mensioned so as to be capable of receiving respective 
one of straps 12-16.

It will be observed by the person skilled in the art that 
support 36 closely resembles the so-called short back-
board heretofore frequently employed by emergency 
medical technicians and others. Like that prior art de-
vice, the opposing side portions of stub 38 preferably 
are serrated, as at 48, so as to provide a means for re-
ceiving and securing a band 49 wrapped around the 
head of the victim for the purpose of binding that head 
tightly to stub 38. The conventional short backboard 
also includes slots disposed similarly to the positions of 
slots 40, 42, 43 and 45 for the purpose of receiving the 
very long straps mentioned in the introduction as being 
criss-crossed in back of such a support and across the 
upper torso of the victim. As in the case of the prior 
short backboard, support 36 may simply be formed of 
a rigid material such as one-half inch thick plywood. 
Alternatively, support 36 may be formed of a light-
weight cellulose-variety material such as that com-
monly employed in the fabrication of kick boards util-
ized for swimming training.

In any event, it will be seen that fastener parts 32 and 
34 together constitute means for releasably and adjust-
ably securing each outer end portion of each of straps 
12-14 effectively back upon itself so as to form a loop 
engageable, by insertion through a respective one of 
slots 40-45, around a portion of support 36, when 
placed behind the victim, in order to bind the victim 
firmly to support 36. The essentially infinite adjustabil-
ity, in terms of ultimate length of the resultant loops, of 
the Velcro fastening parts insures the availability to the 
attendant of a very solid binding of the victim to the 
backboard or support regardless of the particular size 
of the victim concerned.

Projecting generally laterally from strap 12 at one 
end of matrix 26 is an arrangement of strips 50 and 51 
for releasably and adjustably binding the shoulders of 
the victim or wearer to support 36. Strips 50 and 51 are 
both fastened, again by threaded sewing, at one end to 
the center of strap 12 with strips 50 and 51 being ori-
ented so as to diverge outwardly and away from matrix 
26. Secured on the upper side of each of strips 50 and 
51 near their respective outer ends is a Velcro fastener 
part 54 designed to securely mate with a correspond-
ing Velcro fastener part 55 secured to each of strips 
50 and 51 near their junction and fastening at strap 12. 
Corresponding slits 58 and 59 are individually disposed 
on respective opposite sides of stub 38 and along the 
upper end of support 36. Slits 58 and 59 are, of course, 
dimensioned to receive respective ones of strip 50 and 
51. Moreover, slits 58 and 59 preferably are oriented 
so as to extend downwardly and outwardly away from 
stub 38. It will be observed that the combination of 
strips 50 and 51 together with fastener parts 54 and 55 
constitute means for releasably and adjustably securing 
each outer end portion of each of strips 50 and 51 ef-
fectively back upon itself to form a loop engageable 
around a portion of support 36 as defined by slits 58 
and 59. For desired comfort of the victim, as well as 
aiding in the avoidance of undue compression upon 
vascular vessels located in and near the upper portion 
of the victims shoulder, resilient padding 60 is fastened 
under the central region, to be disposed over the shoul-
der of the wearer, of each of strips 50 and 51.

Still another pair of elongated flexible strips 62 and 
63 project generally laterally and outwardly from strap 
16. Strips 62 and 63 are both fastened, again preferably 
by threaded sewing, at one end to the center of strap 
16. Strips 62 and 63 diverge outwardly and away from 
strap 16. Near one outer end portion of strip 62 is a first 
Velcro fastener 64, in this case exposed on the upper
3,889,668

side, as illustrated, of strip 62. A mating Velcro fastener part 66 is disposed on the outer end portion of companion strip 63, but in this case being on the underside of strip 63 as viewed in the drawing. In use, strips 62 and 63 are individually woven inside, under and around the thighs of the victim and then brought respectively across the tops of those thighs at which point fastener parts 64 and 66 are tightly engaged mutually together.

In retrospect, harness 10 is a comparatively simple assembly, capable of being manufactured by the use of readily available straps, webs and strips secured together at the appropriate places by simple stitching on an appropriate sewing machine. In practice, all of these different flexible members may be formed from a 50-per cent polyester, 50 -per cent cotton strapping that finds common usage in various fields, and thus is readily available, and which is fully washable. A typical assemblage involves the use of strapping that is approximately one-eighth inch thick and 2 inches in width. For the majority of users, each of straps 12-16 is approximately 57 inches in length, while strips 50 and 51 as well as strips 62 and 63 are of an appropriately shorter length. Given the flexibility of the Velcro or equivalent fasteners, such lengths will accommodate most victims. It will be understood, of course, that an overall smaller version may desirably be provided for use in the case of a smaller child and, conversely, an oversized version may be provided for use in the case of handling an extremely obese or otherwise large adult. Moreover, the function of webs 18-22 may be incorporated by use of a single flexible sheet of material that, in effect, defines the size of matrix 26 and to which straps 12-16 and strips 50-51 and 62-63 are affixed.

It is to be especially noted that harness 10 is desirably utilizable with other than a short backboard such as support 36. One frequently employed litter is the so-called scoop stretcher. That device includes two halves which, when mated, define a generally concave cavity in which a victim is placed. One half is brought laterally toward the victim from one side, after which its other half is "scooped" under the victim from the underside and latched to the first. Harness 10 is capable of fastening securely to the perimeter of such a stretcher unit. It will be equally apparent to those skilled in this art that various outer litters, including baskets and flats, are already made so as to present rods, struts, or openings disposed along the sides of the victim in positions to accommodate the outer end portions of straps 12-16 in forming loops back upon themselves so as to be able to bind tightly the victim onto the stretcher or other unit. Even when suitable slots or slits are not available in some sort of available stretcher, the attendant need only either make a slit with a knife or other tool, so as to receive the strap or strip ends, or the attendant might, in the case of using extremely crude materials as a stretcher, simply nail or otherwise affix the strap outer end portions to an available supporting structure. Desirably, the straps and strips may be color-coded to correlate the various different fastening points for quick connection accurately. Similarly, web 12 and strips 50-51 may be differently colored, bright orange for example, so as to indicate the shoulder end of the harness.

Whatever the particular problem at hand in the case of recovery of a particular victim, harness 10 affords a means of securely binding the victim to some kind of support with a minimum of need for access space around the victim. Moreover, the ready attachability of the different straps and strips back upon themselves enables the attendant or rescuer to accomplish his task not only quickly but with a minimum, if any, related movement of the victim in order to securely and firmly immobilize him. Yet, all of this is presented by a matrix of straps, webs and strips which are capable of being made in available in an easily washable form that is reasonably inexpensive of manufacture.

While a particular embodiment of the invention has been shown and described, it will be obvious to those skilled in the art that changes and modifications may be made without departing from the invention in its broader aspects, and, therefore, the aim in the appended claims is to cover all such changes and modifications as fall within the true spirit and scope of the invention.

We claim:

1. In an emergency medical harness in combination with a solid rigid planar back support, the improvement comprising:
   a plurality of elongated flexible straps each oriented in a given direction, said straps being laterally spaced successively one from the next;
   an effective plurality of flexible webs disposed across the central regions of said straps, each web being oriented in a direction perpendicular to said given direction and said webs being laterally spaced successively one from the next;
   the combination of said straps and webs forming a matrix of length and width to cover approximately the front upper torso of a wearer;
   means fastening individual different portions of said straps to corresponding different portions of said webs at the mutual crossings of said straps and webs;
   means for releasably and adjustably securing each outer end portion of each of said straps effectively back upon itself to form a loop engagable around a portion of said solid support, placed behind the wearer, to bind the wearer firmly to said support;
   upper means projecting generally laterally to said straps from one end of said matrix for releasably and adjustably binding the shoulders of the wearer to said solid support;
   and lower means projecting generally laterally to said straps from the end of said matrix opposite said one end for releasably and adjustably binding the upper thighs of the wearer.

2. A harness as defined in claim 1 in which said upper means includes a pair of elongated flexible strips both fastened at one end to the center of the one of said straps at said one end of said matrix, said strips diverging outwardly and away from said matrix, and said upper means further including means for releasably and adjustably securing each outer end portion of each of said strips effectively back upon itself to form a loop engagable around a portion of said solid support.

3. A harness as defined in claim 2 in which resilient padding is fastened under the central region, to be disposed over the shoulder of the wearer, of each of said strips.

4. A harness as defined in claim 2 in combination with said solid support and in which said solid support comprises:
3,889,668

7

a rigid, planar board of generally rectangular shape having a length and width to cover approximately the back upper torso of the wearer;
a stub integral with and projecting laterally from one end of said board to be disposed behind the head of the wearer;
means defining a plurality of slots distributed along opposing side portions of said board with the spacings between said slots corresponding to the respective spacings between said straps and with said slots each being dimensioned to receive respective ones of said strips;
and means defining a pair of slits individually disposed on respective opposite sides of said stub and along said one end of said board with said slits each being dimensioned to receive respective ones of said strips.

5. A harness combination as defined in claim 4 in which each of said slits is oriented to extend downwardly and outwardly away from said stub.

6. A harness as defined in claim 1 in which said lower means includes a pair of elongated flexible strips both fastened at one end to the center of the one of said straps at said opposite end of said matrix, said strips diverging outwardly and away from said matrix, and said lower means further including means for releasably and adjustably securing together the respective outer end portions of said strips to form a loop engageable around the upper thighs of the wearer.

7. A harness as defined in claim 1 in which said securing means includes a first plurality of Velcro fastener parts individually fastened to respective different ones of the outer sides, near the respective ends, of said straps, and a second and like plurality of Velcro fastener parts, mating with said first plurality, individually fastened effectively to respective different ones of said central regions of said straps.

8. A harness as defined in claim 1 which includes a total of three of said flexible straps.

9. A harness as defined in claim 8 which includes a total of three of said flexible webs.

* * * * *