Aug. 18, 1959 W. S. FINKEN 2,899,692

EVACUATION LITTER

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Fig 1

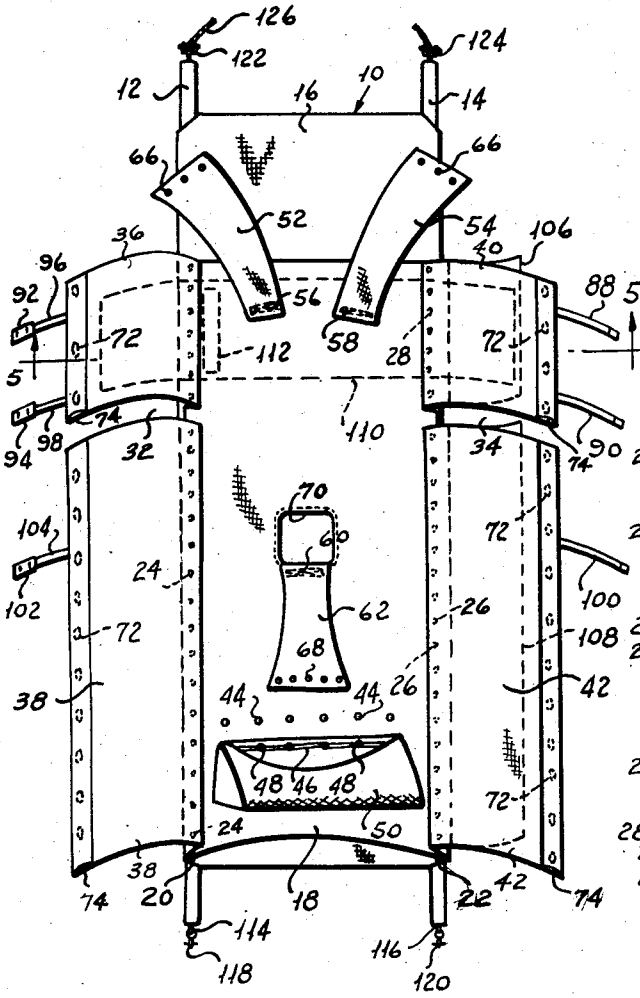
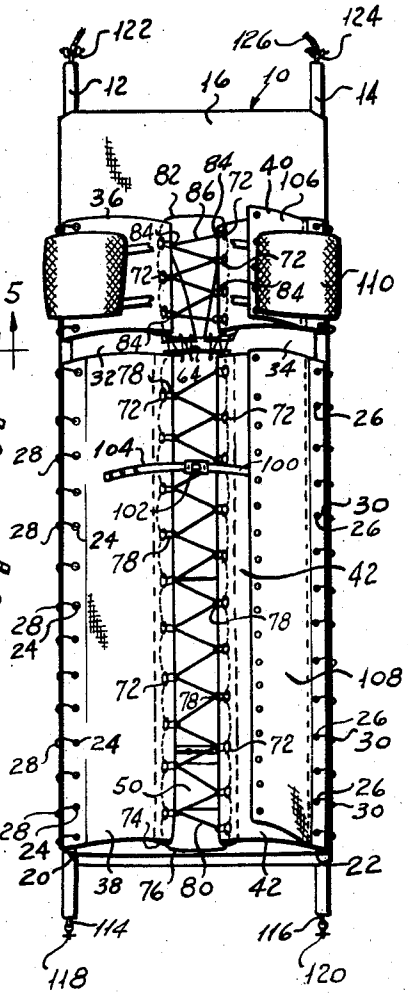


Fig 4



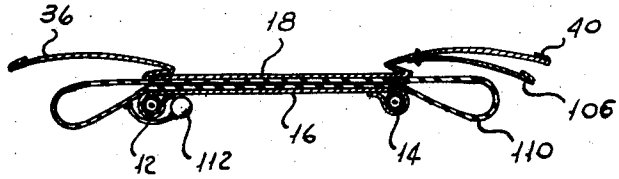


Fig 5

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Fig 2

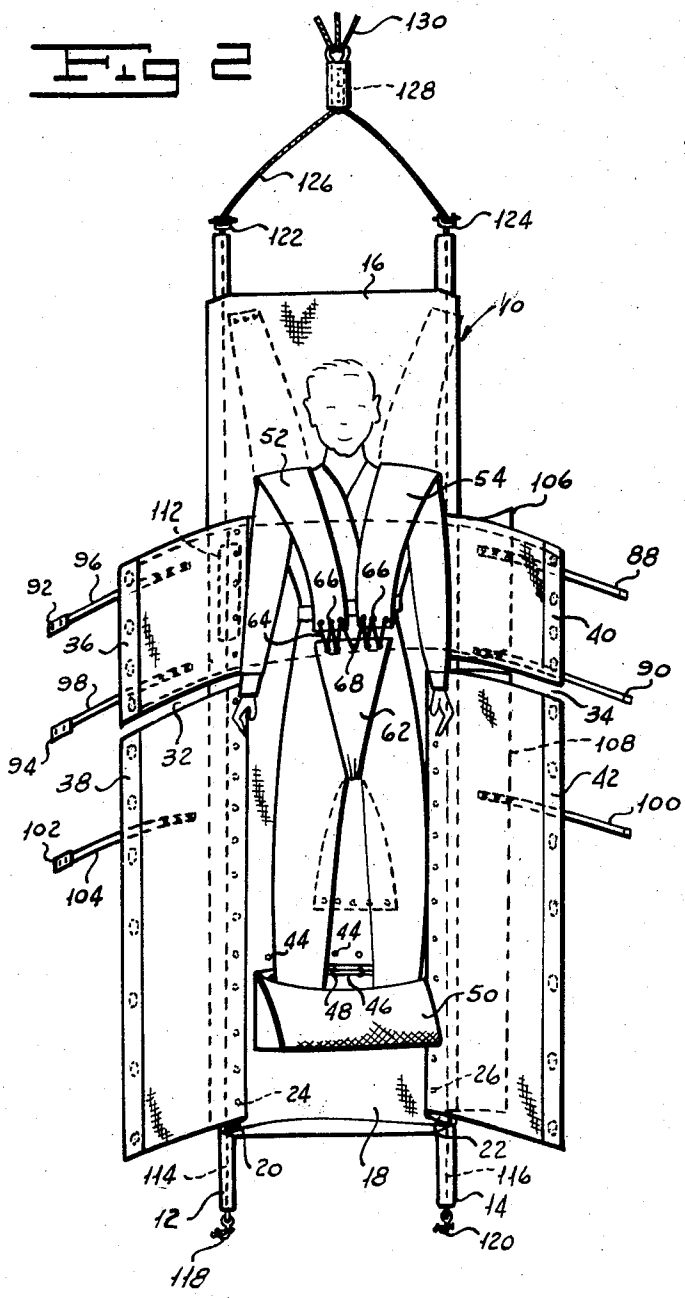
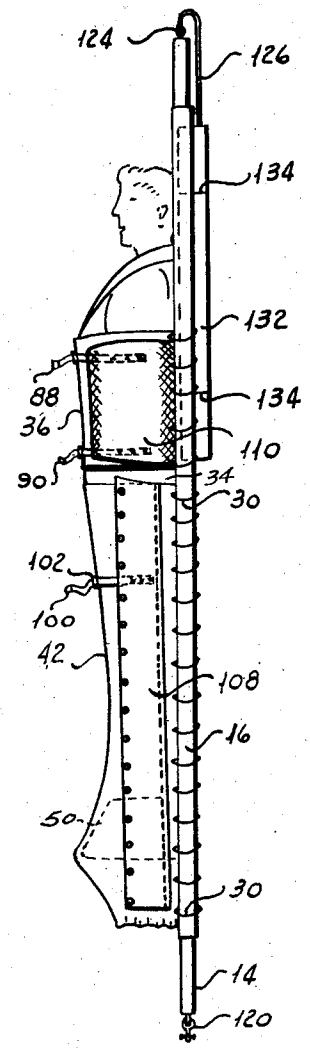


Fig 3



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EVACUATION LITTER

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3 Claims. (Cl. 5—82)

My invention relates to an evacuation litter and more particularly to an improved evacuation litter for carrying a patient in comfort with a high degree of safety.

In carrying nonambulatory patients in litters, as when evacuating patients in an aircraft or the like, it is important that the patients be carried in safety. The patients should be so carried that little likelihood of injury exists as a result of sudden shocks applied to the carrying litter. For example, one requirement is that the patient carried on a litter be restrained against movement resulting from high accelerations or decelerations of the craft transporting the litter and patient. A carrying litter which meets this requirement should, in addition to restraining the patient with safety, permit ready access to any part of the patient's body by a medical attendant. The restraint of the patient should be accomplished without unduly stressing any part of his body. Further, the litter should be as comfortable as is possible consistent with safety. In the event it becomes necessary to evacuate the patient together with the litter, means should be provided for conveying the patient and litter safely to the ground. Further, in the event evacuation takes place over water, means should be provided for floating the patient and litter until a rescue party reaches the patient. It is desirable that a safety litter may be employed with a standard pole litter and with existing aircraft installations.

I have invented an evacuation litter by means of which injured personnel may be transported in comfort with a high degree of safety. My litter restrains a carried patient against movement under the influence of high accelerations or decelerations without injury. My litter permits ready access by a medical attendant to any part of the patient's body. I provide my litter with means for conveying the patient and litter safely to the ground in the event emergency evacuation becomes necessary. I have also provided my litter with means for the flotation of my litter and a patient carried thereby in the event they are deplaned over water in an emergency.

One object of my invention is to provide an evacuation litter for conveying injured personnel in comfort with a high degree of safety.

Another object of my invention is to provide an evacuation litter for restraining a patient against movement owing to high accelerations or decelerations without injury.

A further object of my invention is to provide a safe and comfortable evacuation litter which permits ready access to any part of the patient's body by a medical attendant.

A still further object of my invention is to provide an evacuation litter which may be employed with a standard pole litter and which may be used with existing aircraft installations.

Yet another object of my invention is to provide an evacuation litter which permits deplaning of a patient over land or water with safety.

A still further object of my invention is to provide an

evacuation litter which accommodates a wide variety of sizes of personnel.

Other and further objects of my invention will appear from the following description.

In general, my invention contemplates the provision of an evacuation litter including a pair of hollow poles carrying the litter fabric apron to which I secure a fabric envelope to be wrapped about the patient's body. I provide the fabric envelope with releasable means for holding the patient in position on the litter in comfort. This holding means restrains the patient's body against movement under the force of acceleration or deceleration and reduces danger or injury. I provide my litter with means for supporting the patient and litter from a parachute and with means for floating the litter in the event the patient is deplaned over water.

In the accompanying drawings which form part of the instant specification and which are to be read in conjunction therewith and in which like reference numerals are used to indicate like parts in the various views:

Figure 1 is a plan view of my evacuation litter in condition to receive a patient.

Figure 2 is a plan view of my evacuation litter showing the disposition of a patient on the litter with the restraining means partly secured.

Figure 3 is a side elevation of my evacuation litter with a patient in position on the litter and with the fabric envelope secured around the patient's body.

Figure 4 is a plan view of my evacuation litter showing the means for closing the fabric envelope and the means for securing the envelope to the litter.

Figure 5 is a sectional view of my evacuation litter, taken along the line 5—5 of Figure 1, showing the means for floating the litter.

More particularly referring now to Figures 1 and 2 of the drawings, my evacuation litter includes a standard litter, indicated generally by the reference character **10**, including a pair of hollow carrying poles **12** and **14**. Any suitable means known to the art secures the litter fabric apron **16** to poles **12** and **14** to prevent shifting of the apron **16** with respect to the poles.

My evacuation litter includes a fabric envelope **18** formed of any suitable lightweight and strong material such as nylon fabric or the like. As can be seen by reference to Figures 1, 2 and 4, I form the envelope **18** with a pair of folds **20** and **22** in which I fix respective rows of spaced grommets **24** and **26**. Grommets **24** and **26** admit respective lashings **28** and **30** which secure the envelope **18** to the poles **12** and **14**. In securing envelope **18** to the poles lashings **28** and **30** pass through suitable openings (not shown) formed in apron **16**. The lashings **28** and **30** may be tied, or secured in any other convenient manner, to hold the envelope **18** on the poles.

I form respective slots **32** and **34** in envelope **18**. These slots **32** and **34** extend from the edges of the envelope to points slightly inboard of poles **12** and **14** to divide the portions of envelope **18** extending outwardly from the sides of the litter into respective pairs of flaps **36** and **38** and **40** and **42**.

I dispose a plurality of rows of spaced grommets **44** across envelope **18** between flaps **38** and **42**. I place the rows at predetermined locations along the length of envelope **18**. A cord **46** or the like passing through the grommets **44** of one row and through grommets **48** secures a pouch **50** to envelope **18**. As can best be seen by reference to Figure 2, pouch **50** is so formed that it provides a convenient and comfortable retaining means for the feet of a patient carried on the litter. The position of pouch **50** along the length of envelope **18** may be adjusted by using different rows of the grommets **44**.

I secure a pair of respective shoulder straps **52** and

54 to envelope 18 by respective rows of stitching 56 and 58. A row of stitching 60 secures a crotch strap 62 to the envelope 18. The relative disposition of shoulder straps 52 and 54, crotch strap 62 and pouch 50 is such that patients of various heights can be accommodated on my evacuation litter in a manner which will be explained hereinafter.

As can best be seen by reference to Figures 2 and 3, a patient is placed on the litter with his feet disposed in pouch 50. When this has been accomplished shoulder straps 52 and 54 are passed over the respective shoulders of the wearer and crotch strap 62 is passed between his legs. Lacing 64 or the like provides a means for securing straps 52 and 54 to strap 62. I thread lacing or cord 64 through grommets 66 in straps 52 and 54 and through grommets 68 in strap 62. It will be appreciated that lacing 64 forms a means for adjusting the snugness of fit of shoulder straps 52 and 54 and crotch strap 62 to the wearer's body. In addition, lacing 64 provides a means by which patients having torsos of various lengths may be accommodated on my evacuation litter. If desired, a reinforced opening 70 may be provided in envelope 18 and in apron 16 to permit the patient to relieve himself without having to remove the patient from the litter.

After cord 64 has been tied to secure straps 52, 54, and 62 together and the feet of the patient are disposed in pouch 50, flaps 36, 38, 40, and 42 are closed over the patient's body. As can best be seen by reference to Figures 1 and 4, I provide each of the flaps 36, 38, 40, and 42 with a plurality of spaced, elongated grommets 72 along its edges. I hem the edge of each of the flaps 36, 38, 40, and 42 to form respective passageways 74 below grommets 72. In order to secure flaps 38 and 42 to each other, I pass a cord 76 through passageways 74 in the flaps and draw loops 78 of cord 76 through each of the grommets 72. I secure a lacing drawstring 80 to the lowest of the loops 78 in flap 42, as viewed in Figure 4, and alternately pass the string 80 through the loops 78 in the respective flaps 38 and 42 and secure string 80 to the highest of the loops 78 in flap 38, as viewed in Figure 4. I pass a cord 82 through the passageways 74 in each of the flaps 36 and 40 and draw loops 84 of cord 82 through grommets 72. A lacing drawstring 86 passing through loops 84 pulls flaps 36 and 40 together. It will be appreciated that lacing drawstrings 80 and 86 afford a means for drawing flaps 36 and 40 and 38 and 42 together over their entire length.

Straps 88 and 90, secured to flap 40 by any convenient means, such as stitching or the like, are adapted to pass through respective buckles 92 and 94 carried by straps 96 and 98 secured to flap 36 by means such as stitching. Straps 88, 90, 96 and 98 provide an auxiliary means for holding flaps 36 and 40 over the patient's body. A strap 100 carried by flap 42 is adapted to pass through a buckle 102 carried by a strap 104 fastened to flap 38 by means, such as stitching or the like, to provide an auxiliary means for holding flaps 38 and 42 over the patient's body.

If desired, I secure auxiliary flaps 106 and 108 to flaps 40 and 42 by means such as stitching. These auxiliary flaps 106 and 108 are shorter than flaps 40 and 42 and may be secured to flaps 36 and 38 in the same manner as are flaps 40 and 42 to accommodate a patient having a smaller girth than can conveniently be accommodated by flaps 40 and 42.

I provide my evacuation litter with means for floating the litter and patient in the event it becomes necessary to deplane them over water. As can best be seen by reference to Figures 3, 4 and 5, I secure an inflatable bag 110 to envelope 18 by any convenient means and extend the bag over a portion of the area of flaps 36 and 40. Compressed air or gas flask 112 provides a means for inflating bag 110 when a release means of any type known to the art (not shown) comes into contact with the water or is operated manually.

I pass respective lengths of webbing 114 and 116 through the bores in tubular poles 12 and 14 and anchor the respective lengths at one end by fittings 118 and 120. I secure respective shackles 122 and 124 to the other ends of webbings 114 and 116. Shackles 122 and 124 support the yoke 126 of a parachute. Yoke 126 carries an automatic release device 128 of a type known to the art which detaches the parachute shroud lines 130 in a manner known to the art when they are relieved of the weight of the litter and patient upon reaching the earth. As can be seen by reference to Figure 3, I secure the parachute pack 132 to the underside of the litter by means of frangible cords 134 which are broken in a manner known to the art by hand or by a static line when the litter and patient are jettisoned from an aircraft.

In use of my evacuation litter, in order to secure a patient to the litter he is placed on the open litter shown in Figure 1, with his feet disposed in pouch 50. Shoulder straps 52 and 54 and crotch strap 62 are passed over the patient's body and secured to each other by lacings 64 in the manner shown in Figure 2. As is shown in Figure 4, after the straps have been secured, flaps 36 and 38 and 40 and 42 are passed over the patient's body and secured to each other by cords 76 and 82 and draw-strings 80 and 86. Straps 88 and 96, 90 and 98, and 100 and 104 are fastened together securely to hold the patient on the litter. In the event it becomes necessary to jettison the patient and litter, cords 134 are broken and the patient and litter are suspended from parachute shroud lines 130 until they reach the ground or water. As soon as the patient and litter have landed, automatic release device 128 releases the parachute shroud lines in a manner known to the art. If the patient and litter have landed on water, compressed air from flask 112 inflates bag 110. As can be seen by reference to Figure 5, bag 110 has a greater cross-sectional area at its ends than at its middle, with the result that the patient and litter are floated with the patient's face up.

It is to be noted that my litter provides ready access to any part of the patient's body without entirely releasing the patient from the litter. For example, if access to any part of the patient's body above his waist is desired, flaps 36 and 40 may be opened independently of flaps 38 and 42. If access to a part of the patient's body below the waist is desired, flaps 38 and 42 may be opened independently of flaps 36 and 40. Even with all the flaps 36, 40, 38 and 42 open, the patient is still securely retained on the litter by shoulder straps 52 and 54, crotch strap 62 and foot pouch 50. My litter retains the patient in position on the litter under the force of high acceleration or deceleration without injury.

It will be seen that I have accomplished the objects of my invention. I have provided an improved evacuation litter which supports a patient on a litter in comfort and without danger of injury under the action of high acceleration or deceleration. My litter permits ready access to any part of the patient's body. I provide my litter with means for parachuting the patient safely to the earth in the event it becomes necessary to jettison the patient and litter from an aircraft. I provide means for floating the patient and litter in the event they are jettisoned or deplaned over water.

It will be understood that certain features and subcombinations are of utility and may be employed without reference to other features and subcombinations. This is contemplated by and is within the scope of my claims. It is further obvious that various changes may be made in details within the scope of my claims without departing from the spirit of my invention. It is therefore to be understood that my invention is not to be limited to the specific details shown and described.

Having thus described my invention, what I claim is:

1. An evacuation litter for transporting a patient including a litter having an apron and having means for carrying the apron, an envelope formed with pairs of flaps adapted to be folded over the patient, means for securing said envelope to said apron, means for retaining a patient in position in said envelope, means for individually closing said pairs of flaps over the patient, said pairs of flaps being adapted to be individually opened to permit access to predetermined parts of the patient's body, a pair of auxiliary flaps carried by the respective flaps of one pair of said envelope flaps, said auxiliary flaps being shorter than the envelope flaps with which they are associated and means for closing said auxiliary flaps over said envelope flaps carrying the auxiliary flaps to accommodate a patient of smaller size than the size of the patient accommodated by said envelope flaps carrying said auxiliary flaps.

2. An evacuation litter for transporting a patient including in combination a litter having an apron and a pair of rigid tubular poles for carrying the apron, a parachute harness, respective lengths of webbing passing through said poles, means for securing one end of each of said lengths of webbing to said harness and respective means carried by the other ends of said lengths of webbing for retaining said lengths of webbing in said poles whereby said poles are placed under compression when a force is exerted on said harness.

3. An evacuation litter for transporting a patient including in combination a litter having an apron and having means for carrying the apron, an inflatable bag, means

for securing said bag to said apron, said bag having a central portion and end portions of greater cross-sectional area than said central portion and means for securing said end portions over the front of a patient on said litter to cause said patient to be floated face up.

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