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SPINE BOARD APPARATUS FOR RESCUE OF FRACTURE PATIENTS AND THE LIKE

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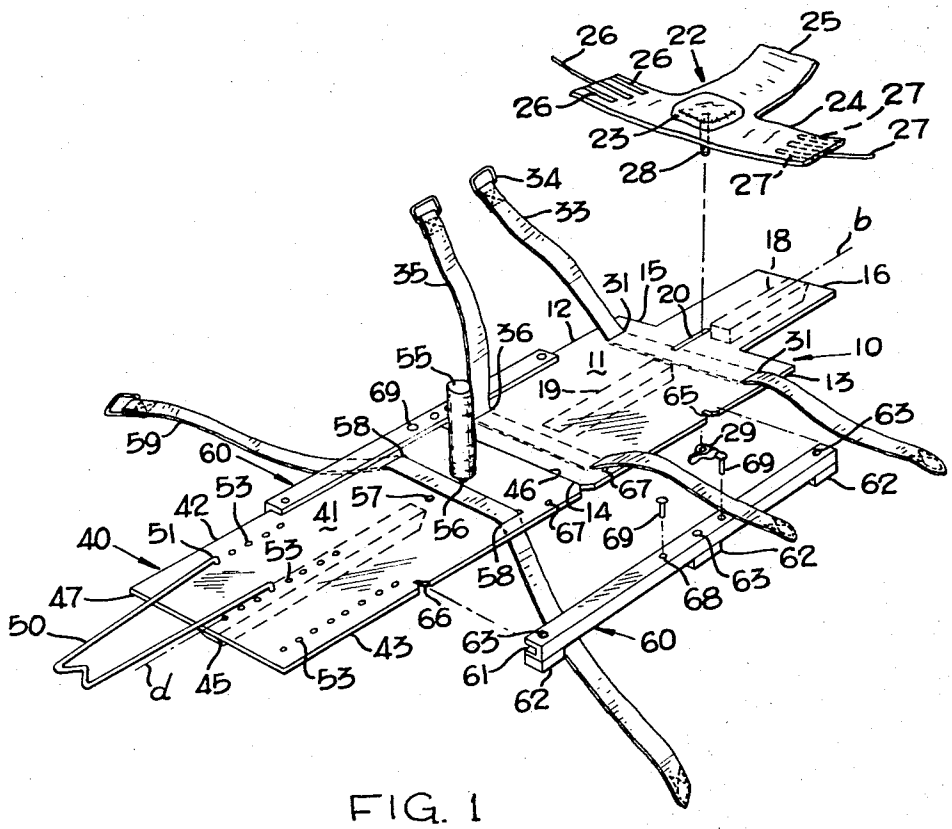


FIG. 1

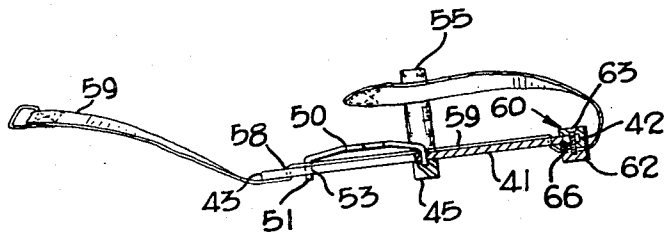


FIG. 2

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SPINE BOARD APPARATUS FOR RESCUE OF FRACTURE PATIENTS AND THE LIKE

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ABSTRACT OF THE DISCLOSURE

Spine board apparatus to be carried, dismantled, in emergency vehicles, for use in rescuing and tarnsporting fracture patients. A short upper board member is first secured behind the patient's back and neck. The patient's lower body is then secured to a short lower board member. Each of these board members has a centerline keel serving as a balancing support. When the two board members are aligned, resting on their keels and tilted downward to ward one side edge, a grooved rail is applied over the other side edges, to connect them. The assembly is then tilted to raise the lowered edges, and a second rail is applied to connect them.

BACKGROUND OF THE INVENTION

A need exists for rescue apparatus which may be used in extricating accident victims safely from an accident side and tarnsporting them to hospitals. Spine boards used to hold fracture patients immobilized, have heretofore been either full length, to accommodate the patient's entire body, or short, to accommodate the upper body only; and sometimes both a long and a short board have been used in combination. Use of such boards is reviewed in the Bulletin of the American College of Surgeons, vol. 52 No. 3. It has been suggested, as in U.S. Pat. No. 2,511,061 to Hughes, that such boards be foldable to achieve a degree of compactness. Generally, however, such board apparatus has been so large and awkward to handle as to preclude being carried in ordinary highway patrol and similar emergency vehicles. So far as is known, no spine board apparatus has heretofore been designed to be carried disassembled, so that its unassembled parts could be used to secure and immobilize critical portions of a patient's body before removal from a crashed automobile.

SUMMARY OF THE INVENTION

Summarizing the present invention generally, and without limiting it to this summary, the present spine board apparatus is normally maintained disassembled, to be carried in a compact package in a highway patrol or military or rescue vehicles, and is assembled in the actual course of rescue, as hereinafter described. An upper board member has means to restrain the head and upper body of the patient; its forward support surface terminates laterally in left and right side edges spaced from a top-to-bottom centerline. Projecting aft from the centerline is a keel or other centerline balancing support means. A lower board member, having means to restrain the lower body of the patient, is similarly constructed.

Means are provided to connect the upper and lower board members to each other with their forward support surfaces in alignment. The preferred means are grooved side rails which engage the left and right edges of the upper and lower board members. Alignment of the board members, preparatory to engaging one of the rails, is facilitated by resting the board members on their aft projecting keels, tilted toward one or the other side edges. This raises the opposite edges, aligning them so that one of said rails may be applied over them, to connect them.

Pressing down on the rail raises the lowered edges, so that a second rail may be applied to connect them.

Attachments to the two board members are used to so immobilize the patient's body as to avoid further injuries. One such attachment is a lower limb support, formed by bending a metal rod to an elongated U-shape. Extending beyond the lower edge of the lower board member, it has upper, downward turned ends which engage two selected bores in the lower board member. The number and placement of these bores permits affixing the limb support in a variety of positions, to extend the effective length of the spine board apparatus and to fit it to the individual patient.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is an exploded perspective view of disassembled spine board apparatus embodying the present invention.

FIG. 2 is a side view of the apparatus of FIG. 1, as assembled, shown partially broken away to illustrate certain features of construction.

DESCRIPTION OF PREFERRED EMBODIMENTS

Spine board apparatus, to be assembled in the course of a rescue operation, is shown disassembled in FIG. 1 and assembled in FIG. 2. An upper board member generally designated **10** is formed of strong wood or structural plastic material. It has a forward support surface **11** which terminates laterally in a left side edge **12** and a right side edge **13**, spaced equally from a top-to-bottom centerline *b*. Its square cut bottom edge **14**, perpendicular to the centerline *b*, is utilized on assembly for abutting alignment with the upper edge of a lower board member hereafter to be described. Its upper edge **15** has a rectangular extension **16** for supporting the head of a patient.

Aligned along the centerline *b* and standing out from the aft side of the board member **10** are aft projecting support means which provide a centerline balancing support. In the embodiment illustrated these means are simple rigid keel members, specifically an upper keel member **18** and a central keel member **19**, their aft projections being equal. Between them is central slot **20** through the board member **10**. Adjustable means to cushion and restrain the head of the patient is secured through the slot **20**. The preferred means is a head restrainer generally designated **22**, consisting of a padded neck block **23** resting on a broad thick neck strap **24** having an upward-extending head pad **25**. Securing strips **26**, **27**, preferably of Velcro material, engage the ends of the neck strap **24** to each other when folded over each other about the neck of the patient. The term Velcro material is here used to mean any of the known self-engaging soft materials, for example of the type wherein loop-like portions **26** on one side are engaged by hook-like portions **27** on the other. A downward extending bolt **28** passes downward from the neck block **23** through the slot **20** and is engaged by a wing nut **29**.

To secure the upper body of the patient, a pair of upper side slots **31** spaced inwardly from the left and right edges **12**, **13**, hold an upper strap **33**, to be secured across the chest of the patient immediately beneath his armpits and secured in conventional fashion as by a buckle **34**. A similar intermediate strap **35** passes through a second pair of side slots **36**.

A lower board member generally designated **40** is formed of the same material as the upper board member **10**, either wood or plastic, and is of the same thickness. It has a forward support surface **41**, and terminates laterally in left and right edges **42**, **43** spaced equally from a top-to-bottom centerline *d*. Aft projecting support means, linearly aligned with the centerline *d* and standing out from its aft side, provide centerline balancing support. The support illustrated is a full length lower keel mem-

ber **45**, whose aft projection equals that of the upper and central keel members **18, 19**.

The lower board member **40** has an upper edge **46**, perpendicular to the centerline *d*, and terminates in a lower edge **47**. Its length is substantially equal to the overall length of the upper board member **10**; this makes possible compact storage and easy transportation.

To provide greater length, lower limb support means is provided, to be affixed to the lower board member and project downwardly from its lower edge **47**. Preferred lower limb support means is a bent rod member **50** of steel or other material having some springiness. The shape of the rod member **50** is elongated U-shape somewhat like that of a hairpin, its bottom end being formed with an indentation and its upper ends **51** turned aft. These upper ends **51** are received within any two selected bores **53** through the lower board member. In the embodiment illustrated the bores **53** are located in three vertical lines, one along the centerline *d* and the others inwardly of the left and right edges respectively. This permits the bent rod member **50** to be located either at the left or the right side of the lower board member **40**, to project downward from it. A soft strap or bandage, tied from the patient's ankle to the bottom indentation of the rod member **50**, will hold the limb in traction.

To further adapt the apparatus to fit patients of various heights, providing support and restraint for the lower body, a padded perineal post **55** is used. It has a lower rod end **56** which may be fitted into one of the bores **57** located along the centerline *d* and spaced at intervals below the upper edge **46** of the board member **40**.

As further means to restrain the lower body of the patient, lower side slots **58** accommodate a long, lower support belt **59**. As seen in FIG. 1, this support belt **59** is drawn upwardly, from the back of the lower board member **40** through one of the side slots **58**, across the upper surface **41**, and back through the other of the side slots **58**.

In connecting the present spine board apparatus, the upper and lower board members **10, 40** are to be positioned adjacent to each other, with the lower edge **14** of the upper board member **10** abutting the upper edge **46** of the lower board member **40**. Preferred means to connect the two board members **10, 40** together includes two grooved connector members or rails, generally designated **60**, which extend from the upper board member **10** to the lower board member **40**, over, outwardly and beneath their left edges **12, 42** and right edges **13, 43**. The connector members **60** are preferably formed of metal or other rigid material to a U-shape, each having an inwardly facing groove **61** extending over its entire length. The length of the rail member **60** need not be as long as the combined lengths of the edges of the upper and lower board members **10, 40**, but preferably is at least half as great, so as to provide the apparatus with strength and rigidity when assembled in the manner as shown in FIG. 2.

Adjacent to the ends of the rails **60**, at an intermediate point, foot blocks **62** are secured to the undedsurfaces of the rails **60**. The securement of each includes a vertical fixed pin **63** which extends across and spans the groove **61**.

The spacing from each other of the fixed pins **63** adjacent to the upper and lower ends of each rail **60**, has its counterpart in the spacing of notches **65, 66** in the upper and lower board members **10, 40** respectively, at both their left and right edges. The corners of the upper and lower board members **10, 40** at their abutting edges **14, 46** are tapered, so that when these edges abut each other a triangular space is provided of approximately the same size as the notches **65, 66**. Close to the left and right edges of each of the board members **10, 40** between the notches **65, 66** and such adjacent board edges, are bores **67**, whose spacing corresponds to the spacing of latching bores **68** formed vertically through the rails **60**.

On assembly, as shown in FIG. 2, when the upper and lower board members **10, 40** are positioned adjacent to each other with their edges **14, 46** in abutting contact, the rails **60** may be slid along the edges of the board members **10, 40** with their grooves **61** positioned partly over, outwardly and beneath the left and right board edges. When the proper point for connection is reached, the fixed pins **63** adjacent to the ends of the rails **60** will engage and seat within the notches **65, 66**; and the fixed pins **63** at the midpoints of the rail members **60** will engage between the tapered corners of the board members **10, 40**. Such engagement will locate the latching bores **68** of the rail members **60** in registration with the board member bores **67**. Latching pins **69** are then engaged through the aligned bores **67, 68** to secure the assembly together.

A typical utilization of the spine board apparatus is in extricating persons who may be injured in automobile crashes. The upper board member **10** may be inserted behind the victim's back, and the neck strap **24** fastened to hold his head firmly. The upper strap **33** is secured beneath his armpits and across his chest, and the intermediate strap **35** is secured about his body. With the upper portions of the body thus securely held to the upper board member **10**, the patient is removed from the crashed vehicle.

With the lower board member **40** resting on the pavement, the lower body of the patient is placed on its forward surface **41**, and the upper and lower board members' edges **14, 46** are brought into abutting contact. The perineal post **55** is inserted between the patient's legs into one of the bores **57** at a suitable height to support the patient's crotch. While these steps are carried out, the board members **10, 40** are permitted to rest, in tilted position, on their keel members **18, 19, 45** and on their left or right edges **12, 42, 13, 43**. In this position, the opposite side edges are elevated and are aligned and readily accessible. A rail **60** is then engaged onto the side edges so elevated from the pavement, in the manner shown in FIG. 2, and is latched in place by the latching pins **69**. The rescue worker then presses downwardly on the rail member **60** so first assembled, that its foot blocks **62** contact the pavement, thus raising the opposite side edges so that the other rail member **60** may be similarly applied and latched thereto. The lower support strap **59** is then drawn outwardly of the rail members **60**, over them, and inward, and is buckled across the patient's body. It serves not only to secure the patient's lower body but also to aid in retaining the rails **60** securely in place.

The over-all length of the assembled board members **10, 40** may be substantially less than the height of the patient; yet his condition may call for immobilizing one or both of his lower limbs. For this purpose, the bent rod member **50** is positioned to extend downwardly well beyond the lower edge **47** of the lower board member **40**, and its upper ends **51** are inserted into two bores **53** which will position it appropriately, at the left or right side of the lower board member **40**. A simple fabric bandage or soft strap, tied about the ankle and secured to the indented lower end of the limb support rod **50**, will support the limb and may also apply traction to it.

The height of the foot blocks **62** is such that when both rails **60** are in place the assembled spine board apparatus will not tilt on the keel members **18, 19, 45** when on a flat surface. The spacing between the foot blocks **62** makes the rails **60** easy to grasp, so that the patient may be lifted and safely carried.

Use of the present apparatus greatly lessens the danger of injuries to accident victims in extricating them from the site of the accident and in transporting them to hospitals. In effect, the care of the victim commences with the step of extricating him, not at the hospital.

Such apparatus would not be available in emergency vehicles if it could not be compactly carried. One great advantage of the present apparatus is in its compactness

when disassembled. Thus, although the combined length of the upper board member **10**, the lower board member **40** and the projecting limb support **50** is greater than the height of a tall adult, all the components may be carried compactly in a bag or package which will fit easily within the trunk space of an ordinary automobile.

What is claimed is:

1. For use in transporting fracture patients,

spine board apparatus comprising

an upper board member including a forward support surface terminating laterally in left and right side edges and having,

means to restrain the head and upper body of a patient,

a lower board member including a forward support surface terminating laterally in left and right side edges and having,

means to restrain the lower body of a patient,

means to connect said upper board member and lower board member to each other with their forward support surfaces in alignment,

the lower board member having a lower edge and a plurality of bores spaced from said lower edge and from each other, together with,

an elongated limb support member having upper ends turned aft,

the bores being of such size and spacing as to receive the said upper ends of the limb support member.

2. For use in rescuing and transporting fracture patients,

spine board apparatus to be assembled in the course of rescue, comprising,

an upper board member including a forward support surface terminating laterally in left and right side edges and having means to restrain the head and upper body of a patient,

a lower board member including a forward support surface terminating laterally in left and right side edges and having means to restrain the lower body of a patient,

the left and right side edges of the upper and lower board members each having a notch and a bore spaced therefrom, and

grooved connector members extending from the upper to the lower board member, over, outwardly, of and beneath their left and right edges,

each grooved connector member having fixed means vertically spanning its groove, said fixed means being spaced apart from each other a distance equal to the spacing of the notches from each other when the upper and lower board members are so positioned adjacent to each other, and

further having latch means to engage the bores of the board edges, said means being spaced from the fixed means a distance equal to the spacing, in the board member edges, of said bores from said notches,

whereby sliding the grooved connector members along the edges of the board members, until the fixed means engage within the notches, locates said connector members so that the latch means may be engaged through the bores in said edges.

3. For use in rescuing and transporting fracture patients,

spine board apparatus to be assembled in the course of rescue, comprising,

an upper board member including,

a forward support surface terminating laterally in left and right side edges spaced from a top-to-bottom centerline, and having means to restrain the head and upper body of a patient, further comprising,

a lower board member including a forward support surface terminating laterally in left and right side edges spaced from a top-to-bottom centerline, and having means to restrain the lower body of a patient, and

means to connect said upper board member and lower board member to each other, said means including,

connector members securable to their said left edges and to their said right edges and extending from the upper to the lower board member,

the upper board member and lower board member each having means linearly aligned along the aft side of the centerline to provide centerline balancing support prior to completing their securement,

whereby positioning said board members tilted on such balancing support means and on their edges on one side permits insertion of that side under a portion of the body of the patient and brings their edges at the other side into alignment.

4. Spine board apparatus as defined in claim **3**, wherein,

each of said connector members has a groove fittable over said edges and has foot means to support them at the level established by said centerline support means.

5. Spine board apparatus as defined in claim **3**, wherein,

one of said means to restrain the patient includes strap means, and

the outer portions of said strap means extend downward, around and over said grooved connector members,

whereby the securing of said strap means together to restrain the patient aids in retaining the grooved connector members inwardly over the edges of the board.

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