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**(54) SYSTEM FOR ANCHORING A BED**

(57) The invention describes an anchoring system for a stretcher (1), comprising: a pair of horizontal rails (2) coupleable to an ambulance floor; a pair of first auxiliary wheels (3) fixed to a front portion of a frame (11) of the stretcher (1) and coupleable to said pair of horizontal rails (2); a pair of second auxiliary wheels (4) fixed to the frame (11) in a position longitudinally adjacent to, and aligned with, the corresponding first auxiliary wheel (3),

and they are also coupleable to said pair of horizontal rails (2). Furthermore, the profile of the rails (2) comprises an upper horizontal segment (23), such that when the auxiliary wheels (3, 4) are introduced into the rails (2), they are confined between the lower horizontal segment (21) and the upper horizontal segment (23) of said rails (2), preventing any vertical movement thereof.

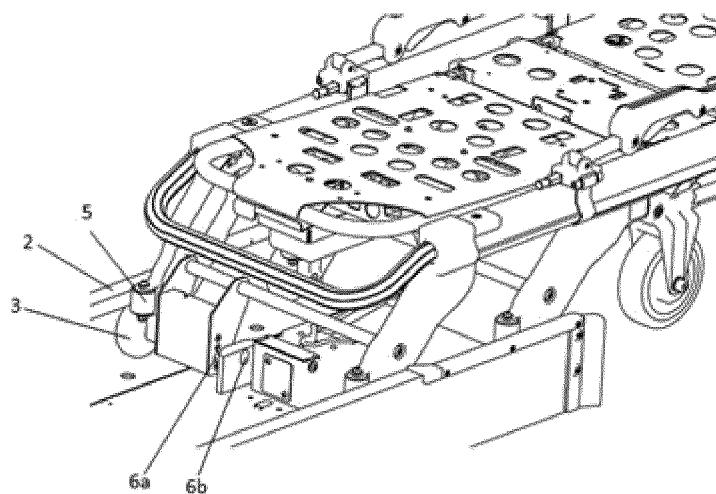


FIG. 8

**Description****OBJECT OF THE INVENTION**

**[0001]** The present invention generally belongs to the field of the emergency healthcare.

**[0002]** The object of the present invention is a new anchoring system for a stretcher which prevents, in a simple and effective manner, the person operating it from having to support a considerable part of its weight during an operation of introducing it into an ambulance.

**BACKGROUND OF THE INVENTION**

**[0003]** As is known, stretchers commonly used in emergency healthcare feature retractable legs having two usage positions: an extended position in which the legs are extended so as to allow moving a patient over the surface of the floor or ground; and a compressed position in which the legs are compressed such that the stretcher can be placed on the lower surface of an ambulance patient compartment. The operation of introducing a stretcher into the ambulance involves the stretcher transitioning from the extended position to the compressed position.

**[0004]** This operation of introducing the stretcher into the ambulance today has a considerable drawback because there is a moment when the person performing said operation, i.e., the paramedic, must almost completely support all the weight of the stretcher and the patient lying on it. In fact, the paramedic first pushes towards the ambulance the stretcher (100) supported on wheels arranged at the lower end of the retractable legs (101) in their extended position. The stretcher (100) furthermore features a pair of auxiliary wheels (102) fixed to a front portion of the structure or frame of the stretcher (100), this pair of auxiliary wheels (102) constituting the first element of the stretcher (100) that enters the ambulance patient compartment. In that moment, the retractable legs (101) start to fold up. The folding up can be done in various ways, for example due to the retractable legs (101) hitting against the lower edge of the ambulance patient compartment. When only the front pair of retractable legs (101) has folded up, the stretcher (100) is supported on the rear pair of retractable legs (101) and on the auxiliary wheels (102), as shown in Figure 1a. Therefore, in this situation the paramedic is still not supporting any weight. However, once the rear pair of retractable legs (101) folds up, the stretcher (100) is supported only on the auxiliary wheels (102), and the paramedic must therefore hold the stretcher (100) at its rear end, supporting virtually all the weight of the stretcher and the patient. This situation is depicted in Figure 1b.

**[0005]** Therefore, there is a need in the art today for an anchoring system that anchors a stretcher to an ambulance that prevents the need for the paramedic to support all its weight during the operation of introducing it into the ambulance.

**DESCRIPTION OF THE INVENTION**

**[0006]** This patent document solves the aforementioned problem as a result of a novel anchoring system which supports all the weight of the stretcher and the patient at all times during the process of introducing the stretcher into the ambulance. This prevents the paramedic from having to support all the weight of the stretcher and the patient, which thereby prevents the occurrence of the usual injuries caused by handling conventional stretchers used today.

**[0007]** The anchoring system according to the invention is designed for anchoring a stretcher to an ambulance floor, wherein the stretcher comprises a rectangular frame supporting a surface for bearing the patient and to which there are fixed two pairs of retractable legs equipped with wheels at their free ends. The frame is typically formed by four bars that are parallel to one another in twos, where the two longest bars are referred to as "side bars" and the two shortest bars are referred to as "end bars". As regards the legs, there are two pairs of conventional retractable legs that can alternate between an extended position, in which they allow moving the stretcher by rolling it over the floor or ground, and a retracted position, designed for when the stretcher is inside the ambulance. The retractable legs have wheels at their lower end that allow moving the stretcher over the floor or ground.

**[0008]** The term "*front end*" of the stretcher will be interpreted herein according to the direction of movement of said stretcher upon introducing it into the ambulance. In other words, the "*front end*" of the stretcher is that end which is first introduced into the ambulance. Similarly, the term "*rear end*" of the stretcher will be interpreted according to the direction of movement of said stretcher upon introducing it into the ambulance. Therefore, the "*rear end*" of the stretcher is that end which enters the ambulance last. The term "*longitudinal direction*" refers to the natural direction of movement of the stretcher for introducing same into the ambulance, and therefore also to the direction of the rails arranged therein.

**[0009]** Taking this into account, the anchoring system of the invention comprises:

45 a) A pair of horizontal rails coupleable to an ambulance floor. These rails are usually integrated at the sides of a structure or assembly formed by a rectangular plate designed to be fixed on the floor of an ambulance patient compartment. This structure may further comprise other auxiliary elements of the anchoring system that are not the object of the present invention.

50 b) A pair of first auxiliary wheels, wherein each first auxiliary wheel is rigidly fixed to a front end portion of a respective side bar of the frame of the stretcher, and wherein the pair of first auxiliary wheels is slidably coupleable in the longitudinal direction to said

pair of horizontal rails. Therefore, this pair of first auxiliary wheels essentially constitutes the first element of the stretcher that enters the ambulance patient compartment during an operation of introducing the stretcher, being coupled to the aforementioned rails and thereby providing front support.

**[0010]** The usual elements in anchoring systems conventionally used today have been described up to this point. However, the anchoring system of the invention differs from them fundamentally in that it further comprises the following features.

c) The anchoring system of the invention further comprises a pair of second auxiliary wheels. Each second auxiliary wheel is rigidly fixed to the respective side bar of the frame of the stretcher in a position longitudinally adjacent to, and aligned with, the first auxiliary wheel fixed to the same side bar. Therefore, the pair of second auxiliary wheels is also slidably coupleable in the longitudinal direction to said pair of horizontal rails. In other words, a forward longitudinal movement of the stretcher causes the successive introduction of the first auxiliary wheels and the second auxiliary wheels into the rails.

The second auxiliary wheels will preferably be located in a longitudinal position located between the attachment of front retractable legs to the frame of the stretcher and the position of the first auxiliary wheels. It is thereby assured that the second auxiliary wheels enter the rails before the retractable legs start to fold up. This is important because once the second auxiliary wheels are inside the rails, the stretcher is completely supported by the anchoring system. After this moment, the retractable legs can be folded up without the paramedic having to support the weight of the stretcher and the patient.

On the other hand, the distance between each second auxiliary wheel and the first auxiliary wheel fixed to the same side bar is preferably between 10 cm and 100 cm.

d) The horizontal rails of the invention have a profile comprising a lower horizontal segment and an upper horizontal segment separated from one another by a distance essentially equal to the diameter of the auxiliary wheels. So when the auxiliary wheels are introduced into the rails, they are confined between the lower horizontal segment and the upper horizontal segment of said rails, preventing any vertical movement thereof. As a result of the auxiliary wheels not being able to move vertically with respect to the rails, once both pairs of auxiliary wheels are introduced into the rails, the stretcher is completely supported, being borne on said auxiliary wheels.

Preferably, the profile of the rails adopts an essentially C-shape formed by the lower horizontal segment, an intermediate vertical segment, and the upper horizontal segment. The open side of the C

leaves room for the connecting element between the auxiliary wheels and the corresponding side bars of the stretcher. The lower and upper horizontal segments prevent any movement of the auxiliary wheels in a direction other than the longitudinal direction of the rails.

**[0011]** The operation of this novel anchoring system is therefore as follows. The paramedic first pushes the stretcher with its front end towards the ambulance such that the first pair of auxiliary wheels enters the rails. The paramedic then continues pushing until the second pair of auxiliary wheels also enters the rails. Since the profile of the rails has an upper horizontal segment, none of the auxiliary wheels can move vertically upwards, i.e., none of the auxiliary wheels can lift off the ambulance floor. Therefore, the stretcher cannot tip over when the retractable legs fold up, since it is forced to maintain its horizontal position. The paramedic can thereby retract the retractable legs, either by hand or automatically, and then finish completely introducing the stretcher into the ambulance, making the pairs of auxiliary wheels roll forward in the rails. The paramedic does not need to hold the weight of the stretcher and the patient at any time throughout the entire operation.

**[0012]** In a preferred embodiment of the invention, the system further comprises centering rollers arranged in a position adjacent to each of the auxiliary wheels. For example, they can be rollers having a vertical axis of rotation which are fixed to the connecting element between the auxiliary wheels and the corresponding side bar of the frame of the stretcher. These rollers tend to center the auxiliary wheels with respect to the ends where said rollers enter the rails, thereby making the initial operation of introducing the auxiliary wheels into the rails easier when the stretcher is introduced into the ambulance.

**[0013]** In another preferred embodiment of the invention, the anchoring system further comprises locking means which are automatically activated after the second pair of auxiliary wheels enters the rails to prevent any longitudinal movement of the auxiliary wheels along the rails. In other words, these locking means are automatically activated once the stretcher is completely supported by the anchoring system. During the process in which the retractable legs fold up, the locking means prevent an outward longitudinal movement of the stretcher, which causes the second auxiliary wheels to pop out of the rails, with the subsequent risk of the stretcher tipping over, from taking place. For example, this is particularly useful when the ambulance is located on a sloped surface. Therefore, once the locking means are activated, the paramedic can then fold up the retractable legs, by hand or automatically depending on the particular design of the stretcher, without the risk of said stretcher rolling out of the ambulance.

**[0014]** In another preferred embodiment, the anchoring system further comprises means for unlocking the locking means that can be operated from a rear end of

the stretcher. This will allow the paramedic to deactivate the locking means once the retractable legs have been completely folded up, such that said paramedic can then continue pushing the stretcher into the ambulance.

**[0015]** In principle, the locking means can be configured in different ways, depending on each particular application, although in one particularly preferred embodiment of the invention, the locking means comprise a spring-driven projection rigidly fixed to the frame of the stretcher, and a corresponding housing rigidly fixed to the pair of horizontal rails. In this context, it must be understood that the expression "*rigidly fixed*" to the frame of the stretcher or to the horizontal rails includes both a direct fixing to said elements and an indirect fixing through other parts. In any case, the underlying concept is that the projection moves integrally with the stretcher and the housing is in a fixed position like the horizontal rails are. The respective positions of the projection and the housing are conceived so that the projection gradually moves closer to the housing as the first auxiliary wheels longitudinally move along the rails into the ambulance. The projection reaches the position in which the housing is located and is automatically introduced therein once the second auxiliary wheels have entered the rails.

#### BRIEF DESCRIPTION OF THE DRAWINGS

**[0016]**

Figures 1a and 1b show two moments of introducing a stretcher into an ambulance with an anchoring system according to the prior art.

Figure 2 shows a perspective view of a stretcher equipped with an anchoring system according to the present invention.

Figure 3 shows a detail view of the front end portion of a stretcher equipped with an anchoring system according to the present invention.

Figure 4 shows a perspective view of a pair of rails of an anchoring system according to the present invention.

Figure 5 shows a cross-section of the rails of an anchoring system according to the present invention.

Figure 6 shows an enlarged cross-section of a rail of an anchoring system according to the present invention.

Figure 7 shows a perspective view of a stretcher at a moment of its coupling to rails in an anchoring system according to the present invention.

Figure 8 shows a detail of the operation of the locking means which prevent any longitudinal movement of

the auxiliary wheels along the rails.

Figures 9a and 9b show two moments of introducing a stretcher into an ambulance with an anchoring system according to the present invention.

#### PREFERRED EMBODIMENT OF THE INVENTION

**[0017]** The invention is described below in reference to the attached drawings, which show various views of a particular example of an anchoring system according to the present invention. However, the scope of protection of this application is not limited by the details described in these examples, but rather by what is defined by the attached claims.

**[0018]** Figure 2 shows a perspective view of a stretcher (1) equipped with an anchoring system according to the present invention. The stretcher (1) is fundamentally formed by a frame (11) having a rectangular shape with two lateral sides in the longitudinal direction, and rear and front sides perpendicular to the longitudinal direction. A horizontal surface (12), which is usually cushioned, is fixed to the frame (11) so as to allow the patient to lie or sit down on same. Furthermore, rear retractable legs (13t) and front retractable legs (13d), respectively, are fixed to the frame (11) on the lower part thereof. Retractable legs (13t, 13d) are known in the art and can be implemented in different ways, although as can be seen in Figure 2 they adopt a scissor structure which allows alternating between an extended position and a folded up position. The free ends of the retractable legs (13t, 13d) comprise wheels which allow moving the stretcher (1) over the floor or ground before introducing it into the ambulance.

**[0019]** This stretcher (1) also includes a pair of first auxiliary wheels (3) fixed to the side bars of the frame (11) in a front portion of said side bars, as can be seen in further detail in Figure 3. Specifically, in this example the first auxiliary wheels (3) are fixed through a rigid connecting element to the front end of the side bars of the frame (11). A pair of second auxiliary wheels (4) is located a greater distance away from the front end of the side bars of the frame (11) in a fixed manner. As can be seen, the first and second auxiliary wheels (3, 4) are aligned in twos for the purpose of allowing them to be introduced into the rails (2) which will be described below.

**[0020]** Centering rollers (5), which are fixed to the connecting elements between the auxiliary wheels (3, 4) and the side bars of the frame (11) in this example, are also seen in Figure 3. The centering rollers (5) have a cylindrical shape and are oriented in the vertical direction. Their position, next to the auxiliary wheels (3, 4) and somewhat ahead of them, allow for their guiding function to make it easier to introduce the auxiliary wheels (3, 4) into the rails (2), as will be described in further detail below.

**[0021]** The locking projection (6a) cooperating with a housing (6b) to lock the position of the stretcher (1) with

respect to the rails (2) can also be seen in Figure 3. It must be observed that this configuration of the locking means (6a, 6b) constitutes only one example, and that other types of mechanisms and other locations would be possible. The operation of the locking means (6a, 6b) will also be described herein in further detail below.

**[0022]** Figures 4 to 6 show a structure which is designed for being fixed to the ambulance floor and includes the rails (2). The rails (2) are separated from one another by a distance equal to the gap between the auxiliary wheels (3, 4), and have an essentially C-shape formed by three segments: a lower horizontal segment (21), an intermediate vertical segment (22), and an upper horizontal segment (23). The distance between the upper surface of the lower horizontal segment (21) and the lower surface of the upper horizontal segment (23) is essentially equal to the diameter of the auxiliary wheels (3, 4). The auxiliary wheels (3, 4) can thereby roll in the longitudinal direction supported on the inner horizontal segment (21), its highest point almost rubbing against the upper horizontal segment (23). Therefore, once an auxiliary wheel (3, 4) is introduced into a corresponding rail, only its forward longitudinal movement (into the ambulance) or backward longitudinal movement (out of the ambulance), is allowed, but any movement in the vertical direction either downward (where it would hit against the lower horizontal segment (21)) or upward (where it would hit against the upper horizontal segment (23)) is prevented.

**[0023]** Figures 7 and 8 show a stretcher (1) with an anchoring system according to the invention at an initial moment of introducing it into an ambulance. First, the first auxiliary wheels (3) are introduced through the end of the rails (2). During this operation, the centering rollers (5) help the paramedic to suitably center the first auxiliary wheels (3) with the open end of the rails, thereby making it easier to introduce it into the rails. The paramedic then pushes the stretcher (1) until also introducing the second auxiliary wheels (4) into the rails (2). Once the second auxiliary wheels (4) are inside the rails (2), the projection (6a) is introduced into the housing (6b) and thereby prevents any longitudinal movement of the stretcher (1). To that end, it can be seen how there is a vertical surface that is sloped with respect to the longitudinal direction arranged right before the housing (6b). As the spring-driven projection (6a) slides along that sloped surface, it is retracted against the force of the spring. As a result, when movement of the stretcher (1) continues and the projection (6a) is arranged opposite the housing (6b), the spring drives the projection (6a) into the housing (6b), the stretcher (1) being locked in place.

**[0024]** In the locking position, it is possible to completely fold up the retractable legs (13d, 13t) of the stretcher (1) without the paramedic having to support its weight. In fact, although the weight of the stretcher (1) and the patient exerts a downward vertical force on a central portion of the overhanging stretcher (1), and as a result, the stretcher tends to tip over supported on the second aux-

iliary wheels (4), the upper horizontal segment (23) of said rails (2) prevents the first auxiliary wheels (3) from raising up. The stretcher remains held firmly in the horizontal position, preventing it from tipping over. The locking means (6a, 6b) furthermore prevent the stretcher (1) from sliding backward and causing the second auxiliary wheels (4) to come out of the rails (2).

**[0025]** Figures 9a and 9b schematically show an actual case in which the stretcher (1) is first introduced into the ambulance according to the process described above until the means (6a, 6b) are activated. First, as shown in Figure 9a, the position of the stretcher (1) is locked with the two pairs of auxiliary wheels (3, 4) introduced into the rails (2). Then, as shown in Figure 9b, the retractable legs (13t, 13d) are folded up. The operation of folding up the retractable legs (13t, 13d) can be carried out by hand or automatically, for example by means of using mechanisms based on springs, hydraulic cylinders, electric motors, or the like. Once the legs (13t, 13d) are completely folded up, the paramedic must simply push the stretcher (1) until completely introducing it into the ambulance.

**[0026]** As can be seen, this mode of use completely eliminates the need for the paramedic to support the weight of the stretcher (1) and the patient during the operation of introducing the stretcher (1) into the ambulance, thereby resolving the problems that have been described.

## Claims

1. An anchoring system for a stretcher (1), wherein the stretcher (1) comprises a rectangular frame (11) supporting a surface (12) for bearing the patient and to which there are fixed two pairs of retractable legs (13d, 13t) equipped with wheels at their free ends, the anchoring system comprising:

- a pair of horizontal rails (2) coupleable to an ambulance floor; and  
- a pair of first auxiliary wheels (3), wherein each first auxiliary wheel (3) is rigidly fixed to a front end portion of a respective side bar of the frame (11) of the stretcher (1), and wherein the first auxiliary wheels (3) are slidably coupleable in the longitudinal direction to said pair of horizontal rails (2),

the anchoring system being characterized

in that it further comprises a pair of second auxiliary wheels (4), wherein each second auxiliary wheel (4) is rigidly fixed to the respective side bar of the frame (11) of the stretcher (1) in a position longitudinally adjacent to, and aligned with, the first auxiliary wheel (3) fixed to the same side bar, such that the pair of second auxiliary wheels (4) is also slidably coupleable in the longitudinal direction to said pair of hori-

zontal rails (2), and  
**in that** the profile of the pair of horizontal rails (2) comprises a lower horizontal segment (21) and an upper horizontal segment (23) separated from one another by a distance essentially equal to the diameter of the auxiliary wheels (3, 4), such that when the auxiliary wheels (3, 4) are introduced into the rails (2), they are confined between the lower horizontal segment (21) and the upper horizontal segment (23) of said rails (2), preventing any vertical movement thereof. 5

2. The anchoring system according to claim 1, wherein the profile of the rails (2) adopts an essentially C-shape formed by the lower horizontal segment (21), an intermediate vertical segment (22), and the upper horizontal segment (23). 15
3. The anchoring system according to any of the preceding claims, wherein the distance between each second auxiliary wheel (4) and the first auxiliary wheel (3) fixed to the same side bar of the frame (11) is between 10 cm and 100 cm. 20
4. The anchoring system according to any of the preceding claims, further comprising centering rollers (5) arranged in a position adjacent to each of the auxiliary wheels (3, 4). 25
5. The anchoring system according to claim 4, wherein the centering rollers (5) are rollers having a vertical axis of rotation which are fixed to a connecting element between the auxiliary wheels (3, 4) and the corresponding side bar of the frame (11) of the stretcher (1). 30 35
6. The anchoring system according to any of the preceding claims, further comprising locking means (6a, 6b) which are automatically activated after the second pair of auxiliary wheels (4) enter the rails (2) to prevent any longitudinal movement of the auxiliary wheels (3, 4) along the rails (2). 40
7. The anchoring system according to claim 6, further comprising means for unlocking the locking means (6a, 6b) that can be operated from a rear end of the stretcher (1). 45
8. The anchoring system according to any of claims 6 to 7, wherein the locking means (6a, 6b) comprise a spring-driven projection (6a) rigidly fixed to the frame (11) of the stretcher (1), and a corresponding housing (6b) rigidly fixed to the pair of horizontal rails (2). 50

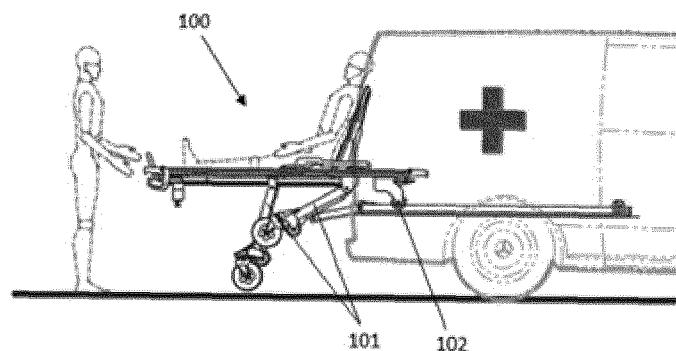


FIG. 1a  
PRIOR ART

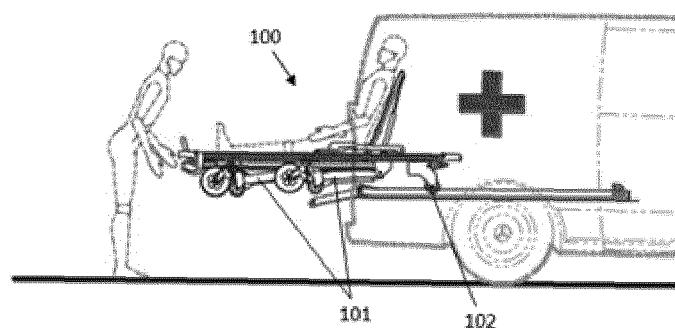


FIG. 1b  
PRIOR ART

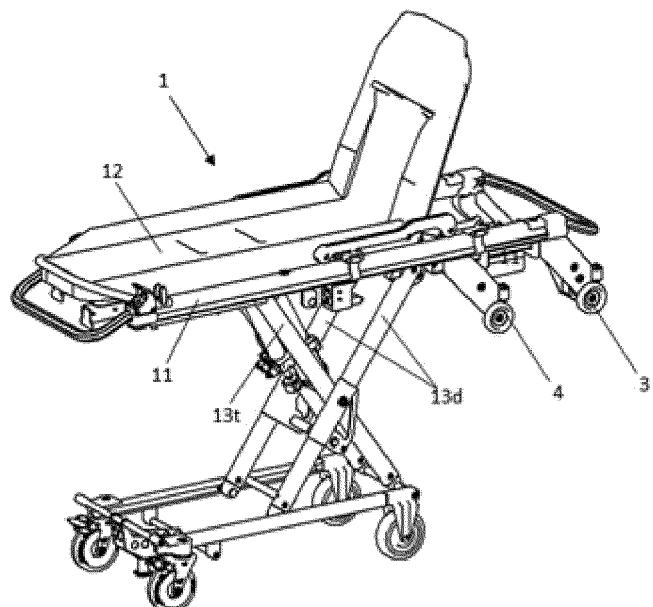


FIG. 2

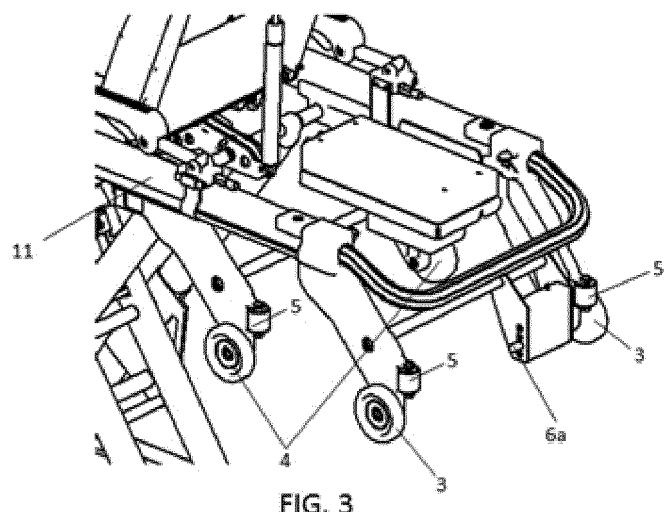


FIG. 3

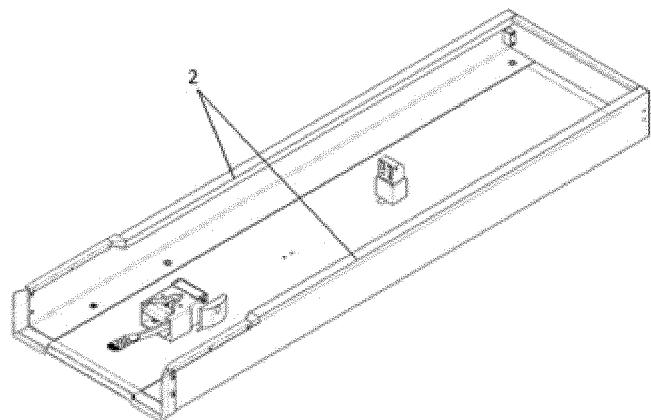


FIG. 4

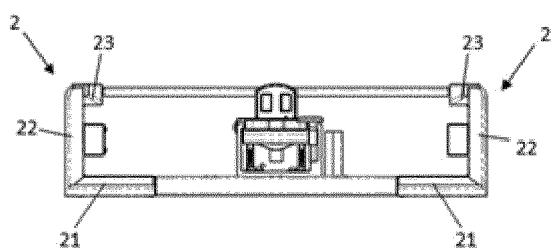


FIG. 5

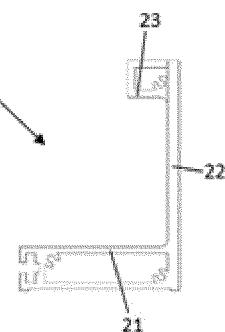


FIG. 6

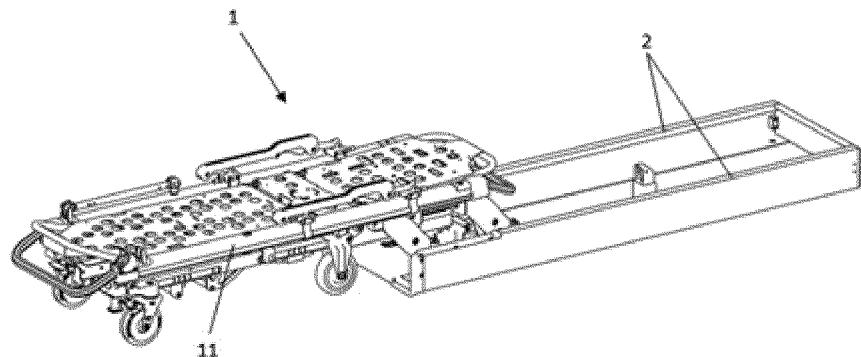


FIG. 7

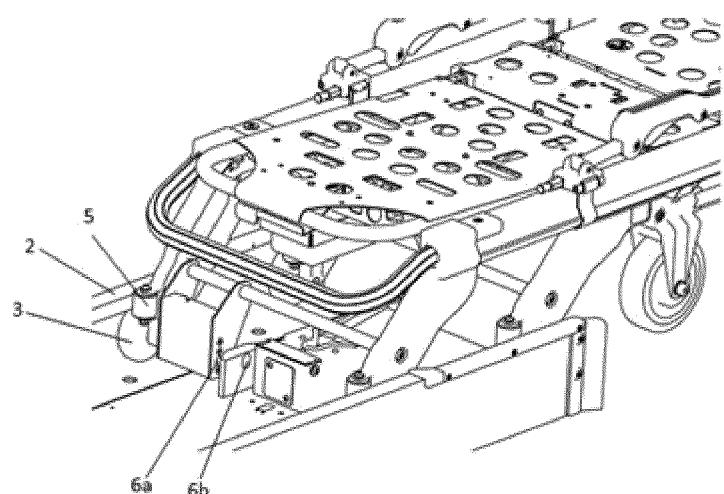


FIG. 8

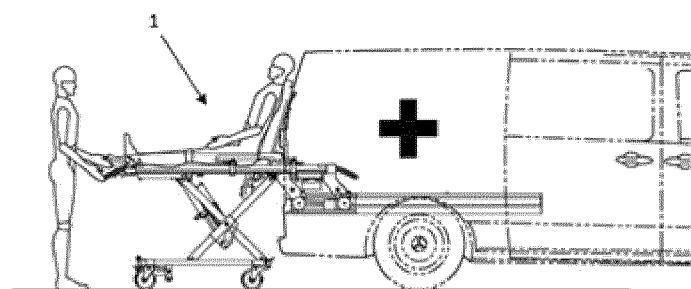


FIG. 9a

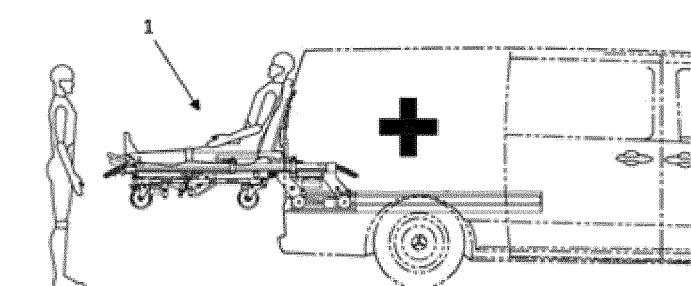


FIG. 9b

<b>INTERNATIONAL SEARCH REPORT</b>		International application No. PCT/ES2018/070333	
5	A. CLASSIFICATION OF SUBJECT MATTER		
	<i>A61G3/08</i> (2006.01)		
	According to International Patent Classification (IPC) or to both national classification and IPC		
10	B. FIELDS SEARCHED		
	Minimum documentation searched (classification system followed by classification symbols) A61G		
	Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
15	Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) EPODOC, INVENES, WPI.		
	C. DOCUMENTS CONSIDERED TO BE RELEVANT		
20	Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
	A	US 2012237326 A1 (VAN NESS DORIS) 20/09/2012, page 2, paragraph [0015] - page 11, paragraph [0128]; figures 1 - 10.	1-8
25	A	US 2006181100 A1 (LAMBARTH CLIFFORD E ET AL.) 17/08/2006, page 1, paragraph [0003] - page 5, paragraph [0061]; figures 1 - 35.	1-8
30	A	US 4921295 A (STOLLENWERK JOACHIM) 01/05/1990, column 1, line 47 - column 9, line 7; figures 1 - 6.	1-8
35	A	US 2010293712 A1 (PIZZI SPADONI LUIGI CESARE) 25/11/2010, page 1, paragraph [0001] – page 2, paragraph [0039]; figures 1 - 13.	1-8
40	<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> See patent family annex.		
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45	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family		
50	Date of the actual completion of the international search 05/09/2018		Date of mailing of the international search report <b>(06/09/2018)</b>
55	Name and mailing address of the ISA/ OFICINA ESPAÑOLA DE PATENTES Y MARCAS Paseo de la Castellana, 75 - 28071 Madrid (España) Facsimile No.: 91 349 53 04		Authorized officer E. Álvarez Valdés  Telephone No. 91 3498419

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## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/ES2018/070333

5	C (continuation).	
	DOCUMENTS CONSIDERED TO BE RELEVANT	
10	Category *	Citation of documents, with indication, where appropriate, of the relevant passages
	A	US 2011266821 A1 (GOTO KAZUYUKI ET AL.) 03/11/2011, page 1, paragraph [0013] - page 10, paragraph [0132]; figures 1 - 14.
15	A	WO 9804228 A1 (HUNTLIGH TECHNOLOGY PLC) 05/02/1998, page 1, line 3 - page 8, line 4; figures 1 - 6.
20	A	US 5092722 A (REAZER III GEORGE M ET AL.) 03/03/1992, column 2, line 40 - column 10, line 66; figures 1 - 11.
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INTERNATIONAL SEARCH REPORT		International application No.	
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