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(54) **Stretcher with a movable headrest, its use and a movable headrest assembly for stretchers or beds**

(57) The stretcher comprises a headrest (1a) movable with respect to a body section (1b) between a plurality of possible positions parallel to one another, and positional adjustment means for adjustably regulating the position adopted by the headrest (1a) with respect to the body section (1b). Its use is for keeping the upper airway of a patient laying face-up on the stretcher (1) clear by tilting his/her head back by means of the corresponding movement of the headrest (1a) with respect to the body

section (1b). The headrest assembly comprises: a support (S) for fixing it to a body section of a stretcher or bed; a headrest (1a) linked to the support (S) in a manner moveable with respect to same between a plurality of possible positions parallel to one another, and positional adjustment means for adjustably regulating the position adopted by the headrest (1a) with respect to the support (S).

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## Description

### Technical Field

**[0001]** In a first aspect, the present invention generally relates to a stretcher with a movable headrest, and particularly to a stretcher the headrest of which is movable with respect to the body section between a plurality of positions parallel to one another, such that when the stretcher is arranged completely in horizontal the movement of the headrest is in a vertical direction.

**[0002]** A second aspect of the invention relates to a use of a stretcher with a movable headrest according to the first aspect for keeping the upper airway of a patient laying face-up on the stretcher clear.

**[0003]** A third aspect of the invention relates to a movable headrest assembly for stretchers or beds, comprising a support with fixing means for fixing it to a body section of a stretcher or bed and a headrest that is movable with respect to the support in the same manner that the headrest of the stretcher of the first aspect is movable with respect to the body section of the stretcher.

### State of the Prior Art

**[0004]** Stretchers and operating tables which have a headrest that is tiltable with respect to an articulation linking it to the rest of the stretcher, i.e., to the body section thereof, and are capable of adopting a plurality of possible positions adjustably regulated by manual or automatic positional adjustment means are known.

**[0005]** Some patent documents describing such stretchers or operating tables with tiltable headrests or the tiltable headrests themselves include: DE10122770, ES2269876T3, ES2311750T3, ES-2261075\_B1, JP1993035128U and US773720(A), the headrests described in some of said documents, particularly in ES2311750T3 and JP1993035128U, even allowing a downward head tilting movement so that the patient laying on the stretcher or table tilts his/her head back.

**[0006]** The most common cause of death and of neurological sequelae after a comatose state, whatever its origin, is hypoxia. Most of the cases has no direct relation with the process of origin causing the coma, but with the breathing problem which it causes when an obstruction of the upper airway occurs during the coma as a result of the typical loss of muscle tone of the face, neck and oral-pharyngeal cavity, causing the downward displacement of the tongue (glossoptosis) and ending up blocking the airway.

**[0007]** This fact explains that the basic resuscitation procedure to perform on a patient in critical condition is that of assuring or recovering upper airway clearance. In fact the "a" (for "airway") of the "a-b-c" action algorithm of all basic or advanced cardiopulmonary resuscitation is the first obligatory step.

**[0008]** This objective is usually achieved by means of specific postural manoeuvres which the resuscitator per-

forms on the neck and head of the patient for correcting the obstructive effect secondary to hypotony. These common manoeuvres are the head tilt-chin lift manoeuvre and the jaw thrust, protrusion or push manoeuvre.

**[0009]** The critical maintenance of upper airway clearance would involve the continuous performance of the postural manoeuvre by a resuscitator, often simultaneous with the artificial breathing (mouth to mouth or with an ambu bag) and other emergency actions which have to be performed on the patient, continuing with the ABC of cardiopulmonary resuscitation (CPR). So as not to neglect the airway during the actions, when a Guedel airway is available, it is placed for keeping the airway clear irrespective of the posture; but one has to be sure of installing a cannula of suitable size and, on the other hand, when the state of unconsciousness is not very deep or it starts to be reverted, this can cause gagging and vomiting with the risk of bronchial aspiration.

**[0010]** It would be desirable to be able to replace such manual manoeuvres performed by a resuscitator with a device performing both functions: that of supporting the head of the patient and the suitable backwards tilting opening the patient's airways.

**[0011]** There are patent documents describing some of such devices. In particular patent US6935340B2 proposes an inflatable shoulder rest and headrest for the intubation of the patient, and application EP1844743A2 proposes an inflatable pillow for apnea which, although not designed for allowing the intubation of the patient, does allow keeping the patients airways open.

**[0012]** Although such devices fulfil the function of supporting the head of a patient and opening his/her airways, their arrangement in independent devices which are not part of a stretcher as well as the need for suitably inflating them with the necessary pressure make performing such operations difficult, and worse still, they do not allow performing them with the speed required due to the urgency of the critical situation demanding them.

**[0013]** Regarding the aforementioned stretchers, even though some of them, those which allow tilting the headrest back, get open to a certain degree the patient's airways in some positions, such tilting movement causes the head of the patient to not be duly supported by the headrest, subjecting the patient's neck to traction, making them unsuitable for fulfilling the mentioned function of replacing the resuscitator for assuring or recovering the upper airway clearance of the patient.

### Disclosure of the Invention

**[0014]** There is a need to offer an alternative to the state of the art which solves the drawbacks thereof and provides a stretcher which allows duly performing the opening of the patient's airway and keeping it open without relying on devices external to the stretcher, for the purpose of assuring the maintenance of airway clearance and with it, reducing the risk of death or of serious neurological sequelae by hypoxia in patients urgently

treated for coma or profound neurological depression whatever its origin (metabolic, epileptic, toxic or narcotic, due to circulatory collapse, polytrauma or serious head trauma, severe acute respiratory failure, etc.).

[0015] To that end, in a first aspect, the present invention relates to a stretcher with a movable headrest comprising a headrest or head section movable with respect to a body section of the stretcher between a plurality of possible positions, and positional adjustment means for adjustably regulating the position adopted by the headrest with respect to the body section.

[0016] Unlike the known stretchers, the stretcher proposed by the first aspect of the invention is **characterized in that** the positional adjustment means which it comprises move the headrest with respect to the body section between a plurality of positions parallel to one another, such that when the stretcher is arranged completely in horizontal the movement of the headrest is in a vertical direction, maintaining the horizontalness of the support plane which it offers to the head of the patient.

[0017] According to one embodiment, the support plane of the headrest is a plane parallel to the support plane of the body section or the same plane for all the positions adoptable by the headrest, i.e., the headrest can adopt a position aligned with the body section or above or below it.

[0018] Said plurality of positions includes positions which are located below the support plane of the body section when the stretcher is arranged on a horizontal surface.

[0019] The headrest is intended for cervical-occipital support and the position of the headrest is tightly adjustable to the anatomy of each patient depending on each case.

[0020] The stretcher proposed by the invention is designed to enable determining the cervical-occipital support safety position for comatose patient or patient with profound neurological depression, as a result of the vertical lowering adjustability of the level of its head section with respect to the support plane of the rest of the body, which allows exerting a natural hyperextension of the neck (adjustable for each case), automatically reproducing the first posture which every emergency professional resuscitator must perform manually to date - and supporting - any comatose patient when starting the resuscitation which is usually assured by means of the famous "head tilt-chin lift" manoeuvre or the jaw thrust manoeuvre.

[0021] In terms of the positional adjustment means, they can be manually or automatically operated and comprise any system or mechanism which allows performing such function, taking into account the type of stretcher to which they are applied, since depending on the embodiment, the present invention is applied to any type of stretcher either a transport stretcher, from the more simple stretchers with a light structure having a base usually made of simple canvas type cloth and handles for being supported manually, to those formed by a base with a

padded structure and usually supported by a complex structure on wheels and/or with other possible articulation mechanisms, and are used for transporting or for a fixed location for assisting life threatening emergencies in an Emergency Unit, and even to stationary stretchers or operating tables.

[0022] Examples of such systems comprised by the positional adjustment means are, depending on the embodiment, a hydraulic or pneumatic system, or a mechanical gear system.

[0023] For one embodiment, the positional adjustment means comprise brake means for stopping the headrest in any of said plurality of positions.

[0024] For other embodiments, the headrest, in addition to being vertically movable, is also movable according to another type of movement such as tilting movement and/or horizontal movement, and/or the body section or a portion thereof is movable according to one or more types of movement such as vertical movement, horizontal movement or tilting movement.

[0025] A second aspect of the invention relates to a use of a stretcher with a movable headrest according to the first aspect of the invention for keeping the upper airway of a patient laying face-up on the stretcher clear by tilting his/her head back by means of the corresponding movement of the headrest with respect to the body section.

[0026] Applying the present invention to transport stretchers and out-of-hospital first aid stretchers offers greater assurance that the airway is not neglected during physical movements (a vital time at which the continuous intervention of a resuscitator is made difficult) and that its inadequate handling due to inexperience in that situation or lack of skill of the person responsible is prevented.

[0027] Likewise, the use of the stretcher proposed by the first aspect of the invention simplifies its manual decoupling manoeuvres and reduces the risk of unsuitable auxiliary breathing due to postural neglect when breathing with a mask.

[0028] The stretcher proposed by the first aspect of the invention also minimizes the need of using the Guedel airway (once a good maintenance of O<sub>2</sub> saturation is confirmed) and the risks associated with its use in semi-conscious patients or in patients in the transition from unconsciousness with gag reflex recovery.

[0029] A third aspect of the invention relates to a movable headrest assembly for stretchers or beds comprising:

- a support with fixing means for fixing it to a body section of a stretcher or bed;
- a headrest or head section linked to said support in a manner movable with respect to same between a plurality of possible positions, and
- positional adjustment means for adjustably regulating the position adopted by said headrest with respect to the support.

**[0030]** Unlike the known headrest assemblies, in the assembly proposed by the third aspect of the invention, the positional adjustment means move the headrest with respect to the support between a plurality of positions parallel to one another.

**[0031]** The different embodiments described in relation to the stretcher of the first aspect serve to describe corresponding embodiments of the headrest assembly of the third aspect of the invention.

#### Brief Description of the Drawings

**[0032]** The foregoing and other advantages and features will be better understood from the following detailed description of several exemplary embodiments with reference to the attached drawings, which must be understood as being illustrative and non-limiting, in which:

Fig. 1a is a perspective view of the stretcher proposed by the first aspect of the invention, for one exemplary embodiment consisting of a transport stretcher made of cloth with handles for being supported manually, comprising two pieces of cloth: one forming the headrest and another forming the body section;

Fig. 1b illustrates the headrest of the stretcher of Fig. 1a showing the positional adjustment means arranged in the piece of cloth itself forming the headrest;

Fig. 2 is a perspective view of the stretcher proposed by the first aspect of the invention, for another exemplary embodiment similar to that of Fig. 1a as regards the type of stretcher but with different positional adjustment means;

Fig. 3a is a perspective view of the stretcher proposed by the first aspect of the invention, for another exemplary embodiment for which it is formed by a base with a padded structure supported by a structure with wheels, and having positional adjustment means including a mechanical gear system, the headrest being illustrated in a position in the same plane as the body section;

Fig. 3b illustrates the headrest of the stretcher of Fig. 3a and a part of the head section adjacent thereto, showing in this case the headrest in a position which is on a plane below the plane of the body section;

Fig. 4a shows a perspective view of the stretcher proposed by the first aspect of the invention, for another exemplary embodiment similar to that of Fig. 3a as regards the type of stretcher, but with alternative positional adjustment means which, in this case, comprise a hydraulic or pneumatic system; and

Fig. 4b is a view similar to that of Fig. 3b but for the stretcher of Fig. 4a including the mentioned hydraulic or pneumatic system.

#### Detailed Description of the Embodiments

**[0033]** A simplified version of the stretcher proposed by the first aspect of the invention is illustrated in Figs. 1a and 1b, referring to an embodiment for which the stretcher 1 is a transport stretcher made of flexible material such as cloth, with handles for being supported manually, comprising two pieces of cloth: one forming the headrest 1a and another forming the body section 1b, both pieces being fixed to two respective bars b1, b2 running along the entire length of the stretcher 1 longitudinally demarcating it.

**[0034]** For said embodiment of Figs. 1a and 1b the positional adjustment means comprise releasable fixing means V arranged in at least one end portion 1a1 of the headrest 1a made of flexible sheet material, as illustrated in Fig. 1b for the portion surrounding bar b1, for being selectively fixed in one or another middle area 1a2 of the headrest 1a (in this case on the back or lower part of the middle area 1a2 illustrated) for the purpose of tensing it more or less between the two bars b1, b2, depending on the height desired for the headrest 1a, such that by loosening the piece forming the headrest 1a, i.e., leaving a greater length of cloth between the bars b1 and b2, the headrest is lowered with respect to the plane of the body section 1b.

**[0035]** For one embodiment, said fixing means V comprise a plurality of hooks and loops (i.e., the system known under the commercial name Velcro) arranged respectively in the end portion 1a1 and in the middle area 1a2 of the headrest 1a made of flexible sheet material, or vice versa, and can be releasably coupled to one another, although for another embodiment the fixing means V can be of another kind, formed by a layer of non-permanent adhesive, for example.

**[0036]** Another simplified version of the stretcher proposed by the first aspect of the invention is illustrated in Figs. 2a and 2b, with reference to an embodiment for which the stretcher 1 is also a transport stretcher made of flexible material like that of Figs. 1a and 1b, but for which the stretcher comprises, in an area surrounding the headrest 1a, rods p1-p4 extending downwards from the bars b1, b2 in a position of use of the stretcher 1, and positional adjustment means comprising a plurality of first engaging elements A arranged at different heights in each rod p1-p4 and corresponding second engaging elements G arranged at different points of the contour of the headrest 1a (in this case four, one per corner of the piece of cloth forming the headrest 1a) for its selective and manual coupling to part of the first engaging elements A depending on the height desired for the headrest 1a.

**[0037]** The embodiment illustrated in Figs. 3a and 3b relates to a more complex version of the stretcher proposed by the first aspect of the invention, wherein the stretcher is formed by a base supported by a structure with wheels, and the positional adjustment means of which include a mechanical gear system formed, in this

case, by four racks D which run in a guided manner along four square parts C arranged at the corners of a support platform S fixed to the framework of the stretcher 1, and which move vertically, and with them the headrest 1a, by corresponding cogwheels R arranged about the two shafts E1, E2 kinematically linked by a mechanical transmission T when a handle M arranged at one end of one of the shafts E1 is operated manually.

**[0038]** For other not illustrated embodiments, the positional adjustment means comprises mechanical system of another type different from that illustrated.

**[0039]** Figs. 4a and 4b illustrate an alternative embodiment for a stretcher 1 like that of Figs. 3a and 3b, but wherein the alternative positional adjustment means comprise a hydraulic or pneumatic system, in this case formed by two hydraulic or pneumatic cylinders N1, N2 (or any other number which is considered convenient) fixed between the support platform S and the lower part of the headrest 1a, such that when they will be manually or automatically operated in unison, for example, they are extended or retracted by means of the push-buttons G illustrated raising or lowering the headrest 1a, as well as stopping in the desired position.

**[0040]** For the embodiment of Figs. 4a and 4b, the headrest 1a is guided in the square parts C arranged at the corners of the support platform S through respective pins F, although other arrangements both guiding arrangement and location arrangement and type of hydraulic or pneumatic elements are also possible for other not illustrated embodiments.

**[0041]** Other actuation elements different from those illustrated are also possible, whatever the system comprised by the positional adjustment means is, such as those formed by a pedal to enable controlling the movements of the headrest 1a and therefore the head of the patient (to prevent using the hands) with the foot.

**[0042]** The headrest assembly illustrated in Figs. 3a, 3b, 4a and 4b also depicts different embodiments of the headrest assembly of the third aspect of the invention, including the headrest 1a, the support S and the positional adjustment means.

**[0043]** A person skilled in the art could introduce changes and modifications in the embodiments described without departing from the scope of the invention as defined in the attached claims, such as for example in the case in which the invention of the first and second aspect is not implemented in a stretcher but in a bed, the protection of said bed also being covered by the attached claims.

## Claims

1. A stretcher with a movable headrest of the type comprising a headrest or head section (1a) movable with respect to a body section (1b) of the stretcher (1) between a plurality of possible positions, and positional adjustment means for adjustably regulating

the position adopted by said headrest (1a) with respect to the body section (1b), said stretcher being **characterized in that** said positional adjustment means move the headrest (1a) with respect to the body section (1b) between a plurality of positions parallel to one another.

2. The stretcher according to claim 1, **characterized in that** the support plane of said headrest (1a) is a plane parallel to the support plane of the body section (1b) or the same plane for all the positions adoptable by the headrest.

3. The stretcher according to claim 1 or 2, **characterized in that** said plurality of positions include positions which are located below the support plane of the body section (1b) when the stretcher (1) is arranged on a horizontal surface.

4. The stretcher according to claim 1, 2 or 3, **characterized in that** said positional adjustment means comprise a hydraulic or pneumatic system (N1, N2).

5. The stretcher according to claim 1, 2 or 3, **characterized in that** said positional adjustment means comprise a mechanical gear system (D, R).

6. The stretcher according to claim 1, 2 or 3, **characterized in that** said stretcher comprises, in an area surrounding the headrest (1a), rods (p1-p4) extending downwards in a position of use of the stretcher (1), and **in that** said positional adjustment means comprise a plurality of first engaging elements (A) arranged at different heights in each rod (p1-p4) and corresponding second engaging elements (G) arranged at different points of the contour of the headrest for their selective coupling to part of the first engaging elements (A) depending on the height desired for the headrest (1a).

7. The stretcher according to claim 1, 2 or 3, **characterized in that** at least the headrest (1a) of said stretcher (1) is made of a flexible sheet material which is fixed to two respective bars (b1, b2) running along the entire length of the stretcher (1) longitudinally demarcating it, and **in that** said positional adjustment means comprise releasable fixing means (V) arranged in at least one end portion (1a1) of the headrest (1a) made of flexible sheet material to be selectively fixed in one or another middle area (1a2) of the headrest (1a) for the purpose of tensing it more or less between the two bars (b1, b2) depending on the height desired for the headrest (1a).

8. The stretcher according to claim 7, **characterized in that** said fixing means (V) comprise a plurality of hooks and loops arranged respectively in said end portion (1a1) and said middle area (1a2) of the head-

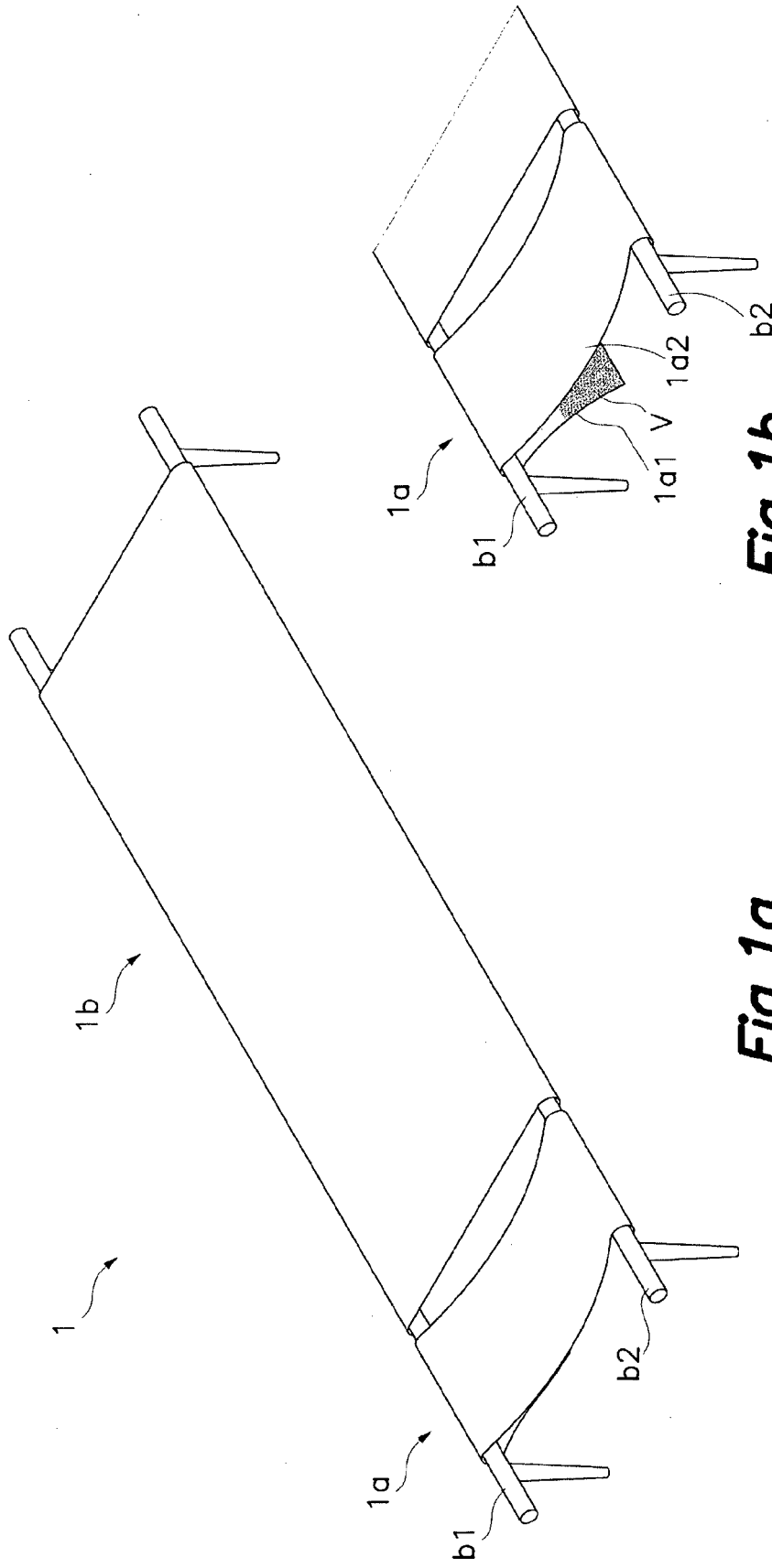
rest (1a) made of flexible sheet material, or vice versa, and can be releasably coupled to one another.

9. The stretcher according to any one of the preceding claims, **characterized in that** said positional adjustment means can be manually or automatically operated. 5
10. The stretcher according to any one of the preceding claims, **characterized in that** said positional adjustment means comprise brake means for stopping the headrest (1a) in any of said plurality of positions. 10
11. The stretcher according to any one of the preceding claims, **characterized in that** said headrest (1a) is intended for cervical-occipital support. 15
12. Use of a stretcher with a movable headrest according to any one of the preceding claims for keeping the upper airway of a patient laying face-up on the stretcher (1) clear by tilting his/her head back by means of the corresponding movement of the headrest (1a) with respect to the body section (1b). 20
13. A movable headrest assembly for stretchers or beds of the type comprising: 25
- a support (S) with fixing means for fixing it to a body section of a stretcher or bed;
  - a headrest or head section (1a) linked to said support (S) in a manner movable with respect to same between a plurality of possible positions, and 30
  - positional adjustment means for adjustably regulating the position adopted by said headrest (1a) with respect to the support (S), 35
- said headrest assembly being **characterized in that** said positional adjustment means move the headrest (1a) with respect to the support (S) between a plurality of positions parallel to one another. 40

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**Fig. 1b**

**Fig. 1a**

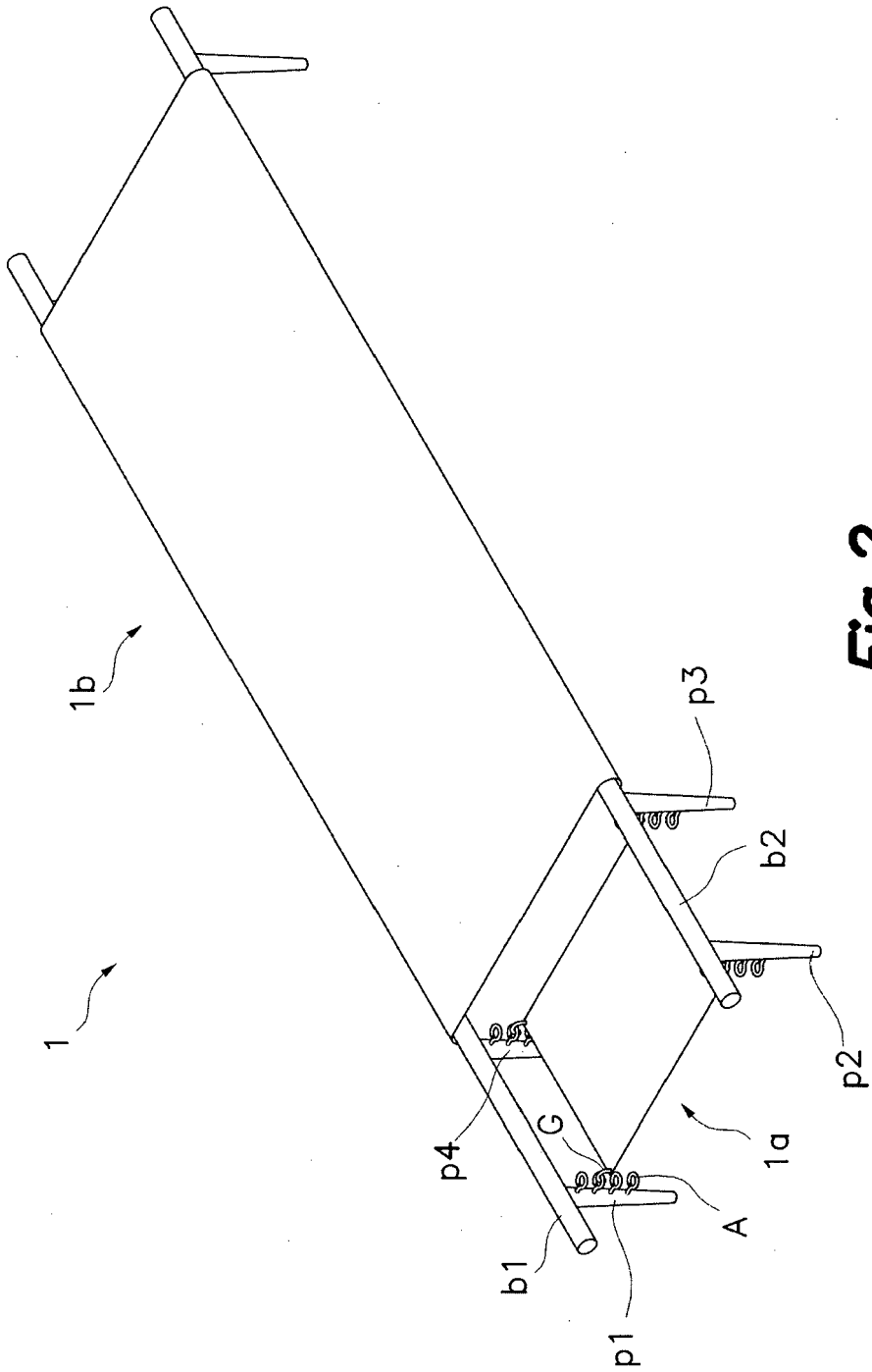
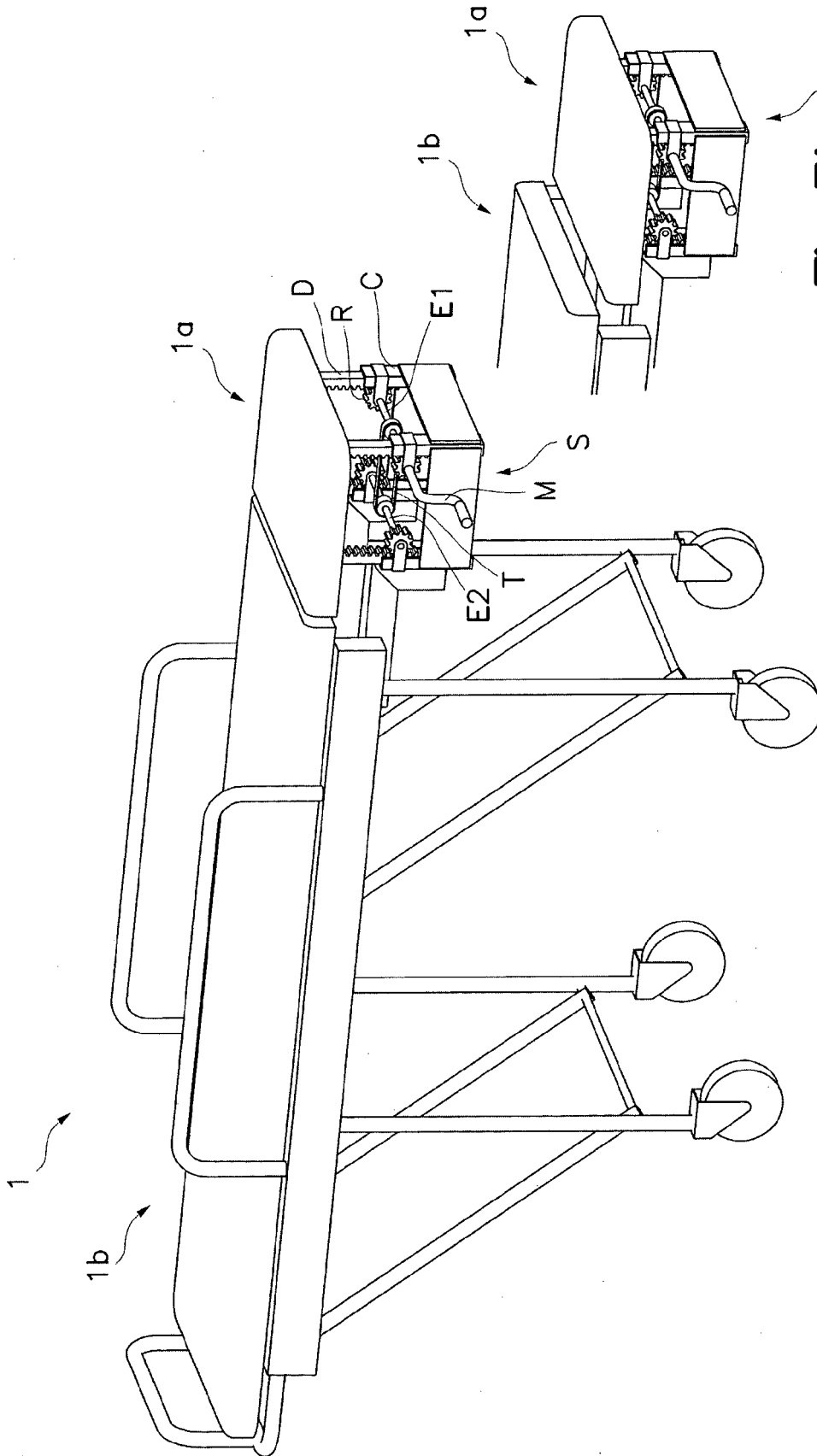


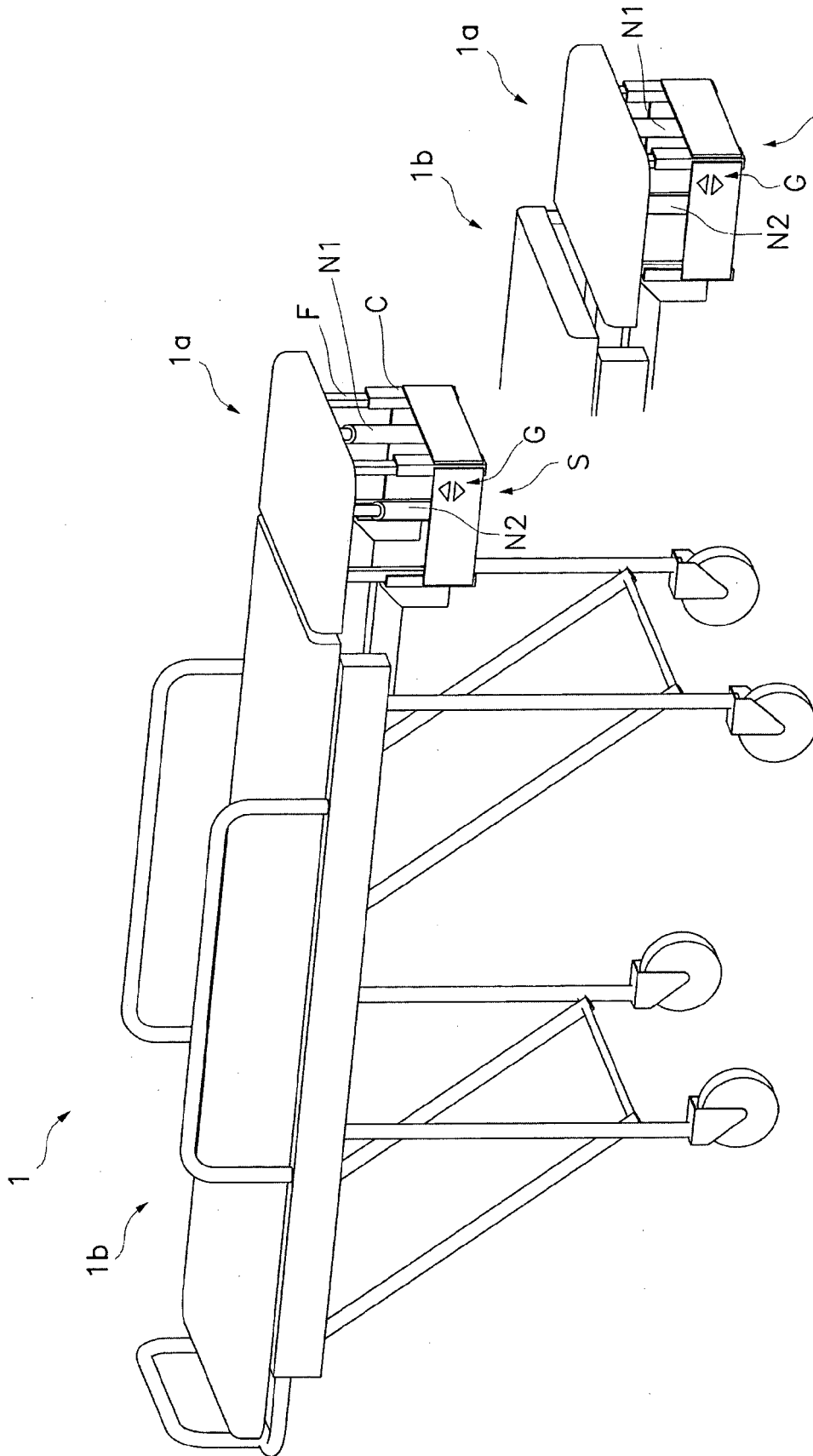
Fig.2





**Fig. 3b**

**Fig. 3a**



**Fig. 4b**

**Fig. 4a**



EUROPEAN SEARCH REPORT

Application Number  
EP 12 38 0038

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Place of search		Date of completion of the search	Examiner
The Hague		7 December 2012	Petzold, Jan
CATEGORY OF CITED DOCUMENTS		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ..... & : member of the same patent family, corresponding document	
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document			

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**ANNEX TO THE EUROPEAN SEARCH REPORT  
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