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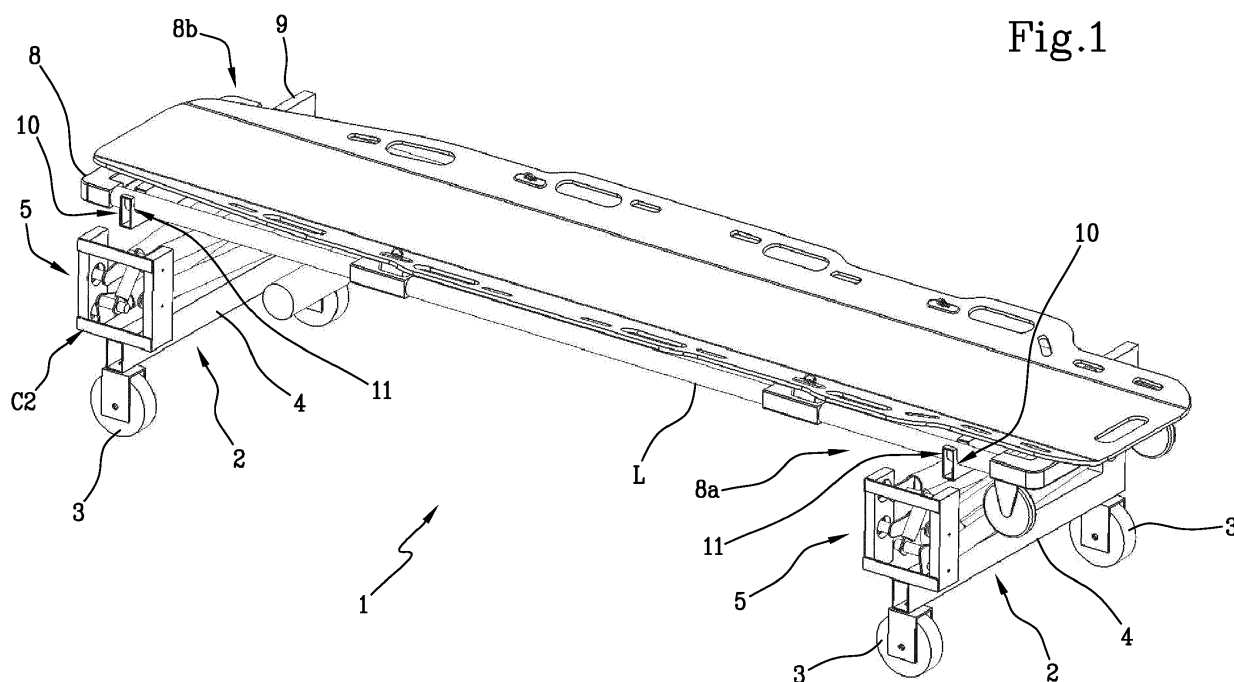
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(54) **A FRAME FOR TRANSPORTING A STRETCHER**

(57) The frame (1) for transporting a stretcher comprising at least one movement module (2) equipped with wheels (3) and configured for moving on a surface; a supporting platform (8) configured for receiving in coupling a table of a stretcher (B); supporting means (5) in-

terposed between the movement module (2) and the supporting platform (8). The frame (1) also comprises damping means (11) designed to limit the stresses induced on the stretcher (B) during a step of moving the frame (1).



Description

[0001] The present invention relates to a frame for transporting a stretcher.

[0002] The term stretcher, or litter, refers to a device for supporting a person, configured to allow the suitable movement of the same. Stretchers are widely used in the medical and paramedical professions in order to allow the transfer of a patient from the location in which she/he is located to a location suitable for the administration of adequate medical support.

[0003] In particular, stretchers are part of the basic equipment with which a common ambulance is equipped in order to allow paramedic staff to provide the necessary aid to people in need, for example at the location of a road accident or at the location where a person has fallen ill.

[0004] In these situations, the person is placed lying down on the stretcher, in a position suitable for limiting the occurrence of complications, in order to be able to transport the person onto the ambulance, and thanks to it also to transport the patient to a facility designed to provide suitable health care, for example a hospital.

[0005] Stretchers are also widely used inside the hospital, allowing the hospital nursing staff to transport patients who cannot walk inside the facility, allowing the patients to have the necessary therapies they must undergo performed.

[0006] Stretchers are generally connected to suitable transport frames configured to allow the support thereof and facilitate their movement.

[0007] In particular, the aforementioned structures have movement modules equipped with wheels which allow the responsible staff to move the stretcher by exerting force on the frame.

[0008] Furthermore, these frames can comprise articulated members which allow an adjustment of the positioning of the stretcher with respect to the ground.

[0009] Particular care must be taken while moving the stretcher during the transport of the patient so that the vibrations induced on the person from the interface with the ground on which the transport frame is moved have limited impact on the body of the patient.

[0010] As often happens, especially in first aid situations, the stretcher must be moved over uneven road surfaces that very often have potholes or bumps. Disadvantageously, the movement of the transport frame on this type of surface causes a continuous variation of the position in which the patient has been arranged in order to preserve his/her clinical conditions.

[0011] Disadvantageously, moreover, the due care that is used to limit the possibility of inducing inappropriate stresses on the patient causes an increase in the transport times and a consequent delay in the delivery of medical care to the patient.

[0012] Disadvantageously, these stresses become considerably pronounced during the procedures for loading the stretcher on the ambulance.

[0013] Moreover, during the transport of the patient on the ambulance, the stresses that are transmitted to the stretcher reach particularly accentuated levels.

[0014] This drawback is particularly disadvantageous in so far as it can cause an increase in the state of suffering of the patient or a deterioration of his/her clinical conditions.

[0015] The object of the present invention is therefore to provide a frame for transporting a stretcher capable of improving the safety of the patient during transport.

[0016] The stated technical task and specified object are substantially achieved by a frame for transporting a stretcher comprising the features disclosed in one or more of the claims.

[0017] The dependent claims correspond to possible embodiments of the invention.

[0018] Further characteristics and advantages of the present invention will become more apparent from the indicative and thus non-limiting description of an embodiment of a frame for transporting a stretcher.

[0019] This description will be set out below with reference to the appended drawings, which are provided solely for indicative and therefore non-limiting purposes, in which:

- figure 1 is a schematic view of a frame for transporting a stretcher according to one embodiment in accordance with the present invention;
- figure 2 is a detailed view of a portion of the frame of figure 1 according to a particular embodiment.

[0020] With reference to the accompanying drawings, the reference number 1 has been used to generally designate a supporting frame, hereinafter indicated as frame 1, and a stretcher "B" arranged on the frame 1.

[0021] As can be seen in the embodiment shown in the appended figures, the frame 1 comprises two movement modules 2. Each of these movement modules 2 comprises two wheels 3 respectively connected to the ends of a supporting crosspiece 4. In particular, the supporting crosspiece 4 is connected to supporting means 5 through a first connection portion "C1".

[0022] For each movement module 2, these supporting means 5 comprise a first four-bar linkage mechanism 6 mounted on the movement module 2 and a second four-bar linkage mechanism 7 interposed between the first four-bar linkage mechanism 6 and a supporting platform 8 for a stretcher "B".

[0023] The relative movement of the aforementioned four-bar linkage mechanisms 6, 7 allows an adjustment of the positioning of the stretcher "B", connected thereto by means of the supporting platform 8, along a substantially vertical direction.

[0024] In particular, the first linkage mechanism 6 is connected to the second linkage mechanism 7 through a second connection portion C2. A third connection portion C3 also connects the second linkage mechanism 7 to a crosspiece 9 designed to allow the connection with

the supporting platform 8.

[0025] The coordinated adjustment of the supporting means 5 of the movement modules 2 connected respectively to the front portion 8a and rear portion 8b of the platform 8 allows compensating for the unevenness of the surface on which the frame 1 is moved.

[0026] In this way the differentiated adjustment of the supporting means 5 allows, during an operational movement of the frame 1, varying the angle of orientation of the supporting platform 8 corresponding to an angle of inclination with respect to a transverse direction of the stretcher "B".

[0027] In accordance with a further embodiment not shown in the appended figures, the four-bar linkage mechanisms 6, 7 can be absent and the supporting means 5 can comprise a robotic arm having a first portion connected to the movement module 2 and a second portion connected to the supporting platform 8.

[0028] According to this embodiment, the supporting crosspiece 4 of the movement module 2 can also be realised in the form of a drive shaft on which the wheels 3 are directly placed.

[0029] In particular, the movement module 2 can comprise a different number of wheels 3 and the aforementioned wheels 3 can have a different arrangement from the previously mentioned arrangement without altering the inventive concept of the present invention.

[0030] In this case the supporting means 5 are designed to allow the adjustment of the height and at least one angle of orientation of the aforementioned supporting platform 8 during an operational movement of the frame 1, allowing to compensate for irregularities and/or inclinations of the surface on which the frame 1 is moved while maintaining a predetermined spatial orientation of the supporting platform 8, for example a horizontal orientation with respect to an absolute reference system.

[0031] Preferably the supporting means 5 are actuated through the use of at least one electromechanical actuator (not shown in the appended figures).

[0032] These actuators, preferably, are at least partially connected to the movement module 2 and cause the movement of the supporting means 5 connected to the supporting platform 8.

[0033] The stretcher "B" is connected to the supporting platform 8 through reversible connection means (not shown in the appended figures) which allow a reversible coupling between the supporting platform and the aforementioned stretcher "B".

[0034] Preferably, these reversible connection means comprise shape couplings of the male-female type and/or couplings of the screw-bolt type.

[0035] As shown in figure 1 and in accordance with a preferred embodiment of the present invention, the supporting platform 8 is connected to the movement means 5 through the crosspiece 9.

[0036] In particular, the crosspiece 9 is equipped with coupling seats 10 designed to allow a coupling, preferably a shape coupling, between the supporting means 5

and the longitudinal members "L" of the supporting platform 8.

[0037] Preferably the aforementioned coupling seats 10 are formed substantially near the two opposite ends of the crosspiece 9.

[0038] As can be seen in figure 2, the frame 1 comprises damping means 11 designed to limit the stresses induced on the stretcher "B" during a step for moving the frame 1. Preferably, the damping means 11 are arranged in the aforementioned coupling seats 10 of the crosspiece 9.

[0039] In accordance with alternative embodiments, the damping means 11 can be arranged in a different placement without altering the inventive concept of the present invention.

[0040] These damping means 11 can comprise at least one layer 12 of an expanded material, preferably rubber, capable of absorbing the vibrations.

[0041] In accordance with the preferred embodiment of the present invention, the coupling seats 10 have a substantially tubular shape and the damping means 11 comprise a layer of expanded material 12 circumferentially positioned circumferentially along an annular surface of the coupling seat 10.

[0042] In particular, this layer of expanded material has a first portion 12a positioned on a lower portion of the lateral surface of the coupling seat and a second portion 12b positioned on an upper portion of the lateral surface of the coupling seat. Moreover, the first portion 12a and the second portion 12b have, for example, respective densities or physical-mechanical characteristics which are different from each other.

[0043] Advantageously, the different mechanical properties of the first portion 12a and the second portion 12b give the damping means 11 high absorption capacity of the mechanical vibrations induced on the supporting platform 8.

[0044] In accordance with a different embodiment of the present invention the coupling seats 10 have an open configuration upwards, preferably U-shaped, and the damping means comprise a layer of expanded material positioned along a receiving surface (concave upwards) of the coupling seat 10.

[0045] The damping means 11 make the step of transport more comfortable for the person lying on a stretcher "B" by limiting the vibrations induced by the movement of the frame 1.

[0046] It can therefore be seen that the present invention achieves the intended objects thanks to a frame for transporting a stretcher capable of ensuring the transport of a patient under optimum conditions thanks to the presence of damping means which allow limiting the vibrations imparted to the stretcher during the patient's transport.

[0047] In particular, the use of two different expanded materials or more generally of two materials with different physical and mechanical characteristics gives the damping means high efficiency, allowing them to eliminate the

vibrations relating to a wide spectrum of frequencies.

[0048] Advantageously, the transport frame ensures an accurate positioning of the transported person regardless of the morphological conditions of the ground on which the frame is moved.

[0049] Advantageously, moreover, the patient is ensured a high level of safety during the steps of transport by limiting the stresses which the frame transmits to the patient.

Claims

1. A frame (1) for transporting a stretcher comprising:

- at least one movement module (2) equipped with wheels (3) and configured for moving on a surface;
- a supporting platform (8) configured for receiving in coupling a table of a stretcher (B);
- supporting means (5) interposed between the at least one movement module (2) and the supporting platform (8);

characterised in that it comprises damping means (11) designed to limit the stresses induced on the stretcher (B) during a step for moving the frame (1).

2. The frame according to claim 1, wherein the damping means (11) are interposed between the supporting platform (8) and the supporting means (5).

3. The frame according to any one of the preceding claims, wherein the damping means (11) comprise at least one layer (12) of an expanded material, preferably rubber.

4. The frame according to claim 3, wherein the layer (12) of expanded material has a first portion (12a) and a second portion (12b), the first portion (12a) and the second portion (12b) having respective densities different from each other.

5. The frame according to any one of the preceding claims, wherein the supporting means (5) comprise at least one crosspiece (9) having at least one coupling seat (10) configured to receive the supporting platform (8) in coupling, and wherein the damping means (11) are housed on the crosspiece (9), preferably in the coupling seat (10).

6. The frame according to claim 5, wherein the coupling seat (10) has an open configuration upwards, preferably U-shaped, and the damping means (11) comprise a layer (12) of expanded material positioned along a receiving surface of the coupling seat (10).

7. The frame according to claim 5, wherein the coupling

seat (10) is tubular in shape and the damping means (11) comprise a layer (12) of expanded material positioned circumferentially along an annular surface of the coupling seat (10).

8. The frame according to claim 7, wherein the layer of expanded material has a first portion (12a) positioned on a lower portion of the lateral surface of the coupling seat and a second portion (12b) positioned on an upper portion of the lateral surface of the coupling seat, the first portion (12a) and the second portion (12b) having respectively a predetermined first and a predetermined second density different from each other.

Fig.1

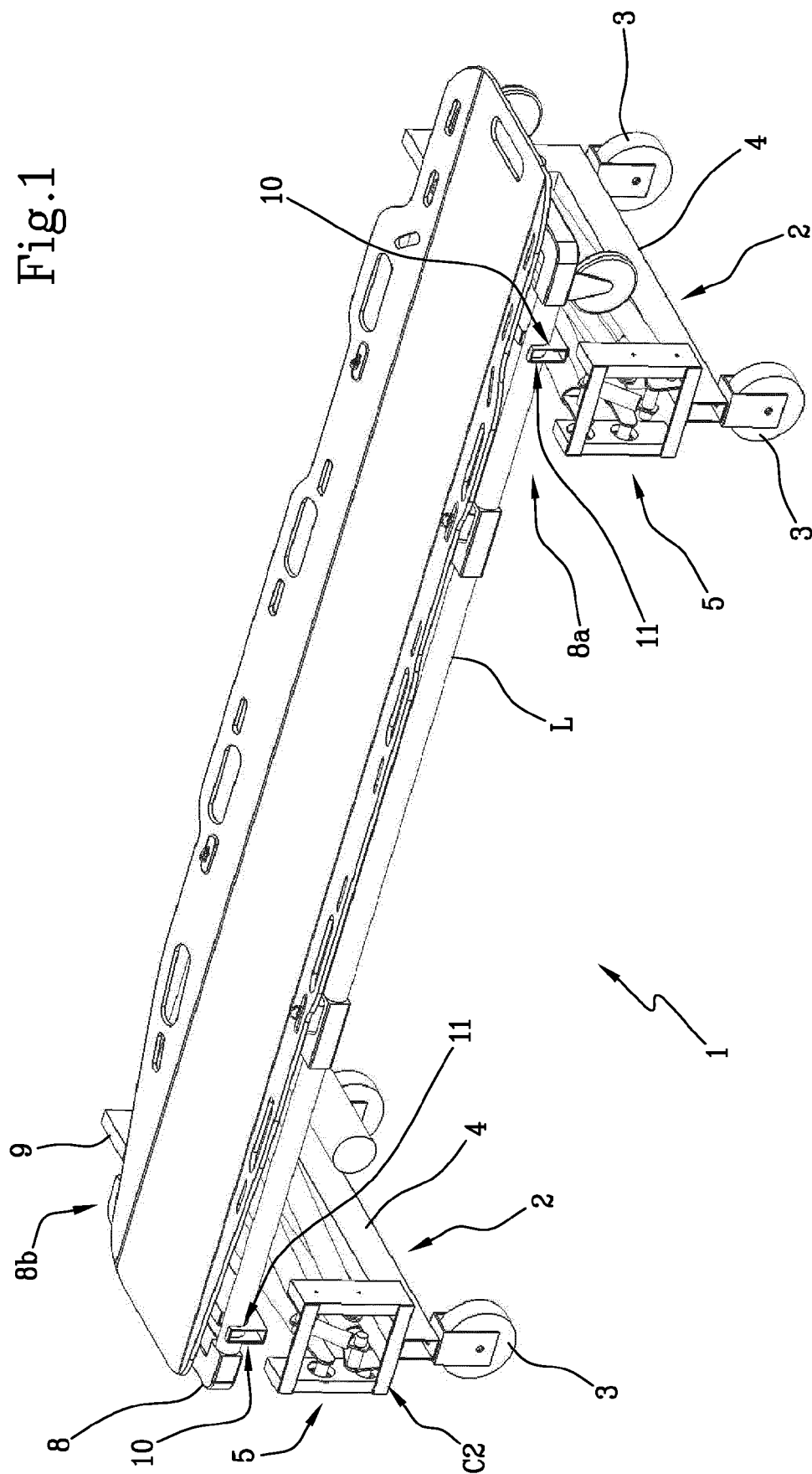
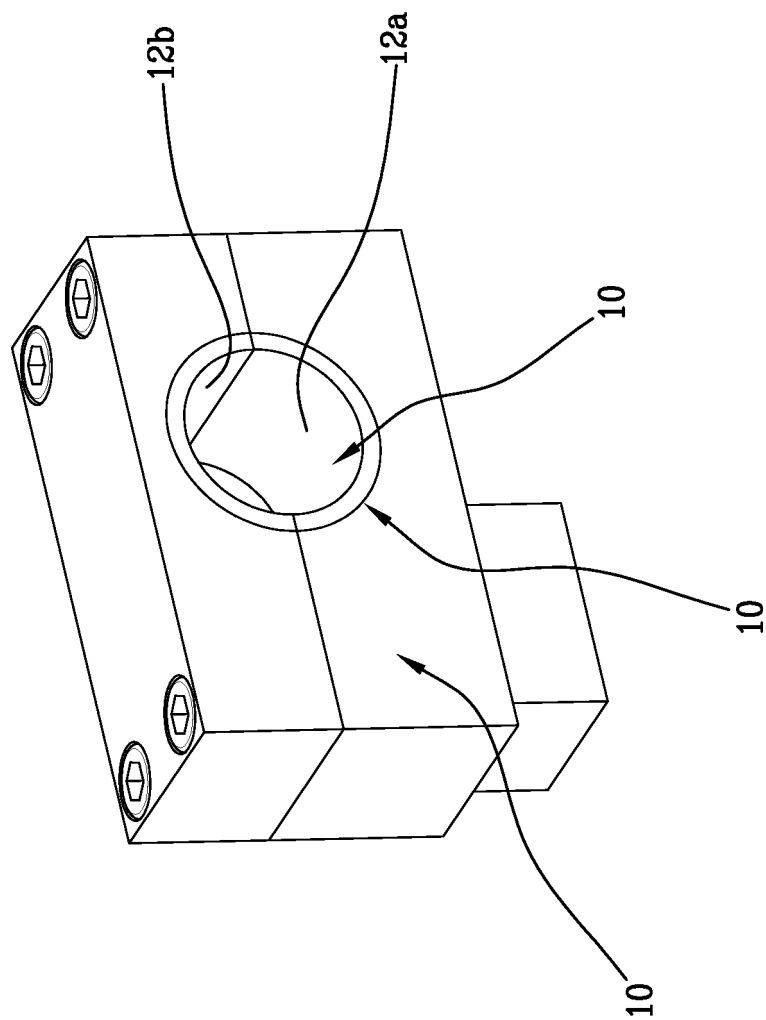


Fig.2





EUROPEAN SEARCH REPORT

Application Number
EP 19 17 8705

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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A	* paragraph [0018]; figure 6 * -----	6-8	
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The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC)
			A61G
Place of search		Date of completion of the search	Examiner
The Hague		6 August 2019	Birlanga Pérez, J
CATEGORY OF CITED DOCUMENTS 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 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			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82