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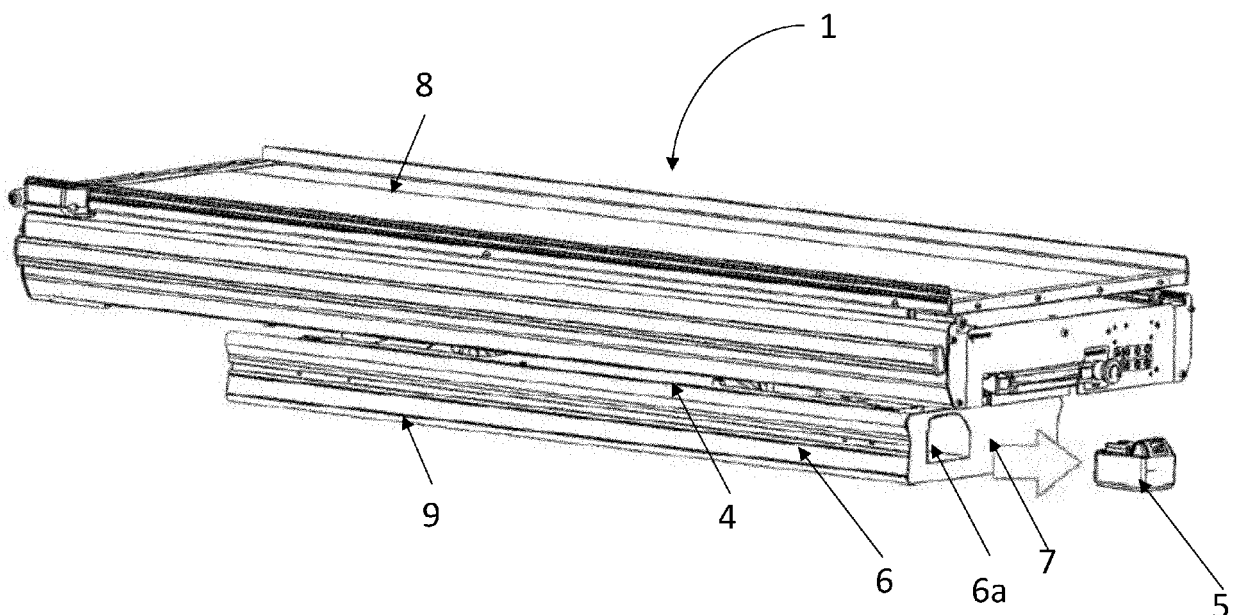
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(54) **STRETCHER SUPPORT TO INSTALL IN A SANITARY COMPARTMENT OF AN AMBULANCE**

(57) The invention concerns a stretcher support (1) to install in a sanitary compartment (2) of a rescue vehicle (10), in particular an ambulance, which comprises an electromechanical movement apparatus (4) for the movement of said stretcher support (1) with respect to

the sanitary compartment (2), characterised in that said electromechanical movement apparatus (4) is electrically powered by an auxiliary battery (5) which is independent of one or more power supply batteries (12) comprised in said ambulance (10).

FIG.2



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Description

[0001] The present invention relates to the field of the equipment for emergency vehicles, such as ambulances, for transporting people who are injured, ill, disabled on a stretcher, accommodating said patients inside a sanitary compartment and taking them to a hospital facility.

BACKGROUND

[0002] As known, ambulances are vehicles used to transport patients who are lying on a stretcher which is in turn positioned inside the sanitary compartment.

[0003] In particular, in order to optimise the steps of loading and unloading the aforesaid self-loading stretchers (beds provided with retractable legs and pivoting wheels) a specific accessory, commonly known as stretcher support, which rests on the walkable floor of the vehicle compartment is used.

[0004] The stretcher supports can be fixed, translatable, tiltable, shock-absorbed and their use makes it possible to:

- Properly load the stretcher,
- Assist the patient more easily and adequately
- Keep the stretcher in place
- Also allow the positioning of the patient in Trendelenburg and Antitrendelenburg position (prone and declivous) and displace him laterally and vertically inside the sanitary compartment, always keeping him lying on the stretcher.

[0005] Lifting means comprised in the stretcher supports are used to allow the aforesaid positioning.

[0006] Lateral displacements are also allowed by using special guides in order to be able to carry out displacements even in the presence of heavy weights.

[0007] In addition to this, the stretcher supports provide housings for one or more stretchers (spoon-like, spinal boards, etc...) that can be inserted from the foot side, by lifting a special flap.

[0008] Normally these stretcher supports have substantially a parallelepiped geometry, with two flanks greater than the head sides. The base of the support rests on the floor of the vehicle and the upper plane allows the housing for stretchers or spinal boards or other.

[0009] Fixing systems and/or straps are provided so as to retain the stretcher and/or the patient.

[0010] The stretcher supports are usually moved in an electromechanical way, being electrically powered by the power supply battery of the ambulance in particular by the power supply battery of the sanitary compartment of the rescue vehicle.

[0011] With a view to an electric conversion of the rescue vehicle fleet, the fact that an essential tool, such as the stretcher support is powered solely by the battery of the sanitary compartment of the vehicle, could be limiting and dangerous.

[0012] The electric dependence of the stretcher support on the battery of the sanitary compartment of the ambulance, in the case of electric vehicles, further limits the autonomy, already low in terms of kilometres, of the vehicle. In fact, if the battery of the sanitary compartment is empty, the battery of the vehicle recharges the one of the sanitary compartment, recovering its own autonomy.

[0013] In the case of electric vehicles, should the power supply battery of the vehicle be empty, it would not be possible to recharge it quickly through the combustion engine of the vehicle and therefore the stretcher support would not be working, preventing the patient from being easily and safely loaded.

[0014] A further disadvantage of having the stretcher support electrically connected to the power supply battery of the vehicle/sanitary compartment is given by surges of voltages and currents, caused by the non-optimised recharging of the power supply battery of the vehicle/sanitary compartment, which do not ensure the power supply required by the device.

[0015] This recharging mode can damage the electronics of the stretcher support, causing periodic failures and reducing its useful life.

[0016] Therefore, from the prior art it has been found that there are no stretcher supports with electric power supply independent of the power supply battery of the sanitary compartment or of the power supply battery of the vehicle, making the use of said stretcher support limited and difficult, especially in view of a full electric rescue vehicle fleet.

EXPOSURE AND ADVANTAGES OF THE INVENTION

[0017] The technical problem underlying the present invention is to provide a stretcher support that allows to obviate the drawback mentioned with reference to the known art.

[0018] Therefore, the object of the present invention is to provide a stretcher support that achieves the above, within the framework of a rational solution and at a low cost and advantageously integrated into the support itself.

[0019] This object is achieved thanks to a stretcher support to install in sanitary compartments of rescue vehicles, in particular ambulances, which comprises an electromechanical movement apparatus characterised in that said electromechanical movement apparatus is electrically powered by an auxiliary battery which is independent of one or more power supply batteries of said ambulance.

[0020] The dependent claims outline preferred and/or advantageous aspects of the invention.

[0021] In particular, an embodiment of the present invention makes available a stretcher support, to install in sanitary compartments of ambulances, wherein said auxiliary battery is of a rechargeable and preferably replaceable type.

[0022] Furthermore, according to some preferred em-

bodiments, the stretcher support comprises an electrical connection for receiving power supply from one of said power supply batteries in said ambulance, preferably to the power supply battery of the sanitary compartment of the ambulance.

[0023] Thanks to this solution, there are different configurations of use that envisage, for example, being powered by the auxiliary battery while it is charged and, if necessary, switching to power supply by means of one of the power supply batteries of said ambulance.

[0024] Preferably, in fact, the stretcher support also comprises a control unit adapted to switch the stretcher support from the power supply with the auxiliary battery to the one with the power supply battery of the vehicle and vice versa so as to ensure continuity in the electric power supply of said support.

[0025] In this way, it is advantageously possible to ensure continuity in the electric power supply to the support, burdening only in emergency cases the power supply battery of the sanitary compartment and to receive the main power supply from the secondary battery.

[0026] By way of example, said auxiliary battery is mechanically installed on the stretcher support, preferably it is installed on a base of said stretcher support, said base being fixed to the sanitary compartment of the ambulance.

[0027] Preferably, said compartment of the base is arranged on the stretcher unloading side, so as to be easily accessible to an operator and said auxiliary battery is configured so as to be preferably removable by coupling means, in particular of the manual hook type.

[0028] According to other preferred embodiments of the invention the stretcher support also comprises a backup auxiliary battery usable alternatively to the auxiliary battery.

[0029] Advantageously, the presence of a backup auxiliary battery allows to replace the auxiliary battery should the battery get empty, without risking remaining without electric power supply.

[0030] The main advantage of the present invention is the possibility of making the stretcher support energetically independent of the power supply battery of the sanitary compartment, without burdening the energy reserve of the rescue vehicle, especially if it is a fully electric vehicle.

[0031] This allows the stretcher support to be detached from the power supply of the ambulance in most cases, eliminating damages due to voltage and current surges linked to improper charging and discharging cycles.

[0032] Preferably, said batteries are auxiliary lithium ion batteries.

[0033] According to another aspect, the invention concerns a method for electrically powering a stretcher support that is movable with respect to a sanitary compartment of a rescue vehicle, on which said stretcher support is installed. Said method envisages powering said stretcher support with at least one auxiliary battery which is independent of said one or more power supply batteries

of said ambulance.

[0034] Preferably, said method comprises recharging said auxiliary battery.

[0035] Alternatively, said method envisages powering the stretcher support with said one or more power supply batteries comprised in said ambulance, preferably to the power supply battery of the sanitary compartment of the ambulance preferably when the auxiliary battery is empty or momentarily not installed.

[0036] According to some preferred embodiments, the method envisages interrupting the power supply by means of the auxiliary battery, in particular when it is empty or not installed, and switching to the one by means of one of said power supply batteries of said ambulance and vice versa so as to ensure continuity in the electric power supply of the support.

[0037] Said switch takes place through the intervention of a control unit, comprised in said support, adapted to switch from the power supply by means of the auxiliary battery to the one by means of one of said power supply batteries of said ambulance and vice versa in order to ensure continuity in the electric power supply of the support.

[0038] According to some embodiments, when the auxiliary battery gets empty or is not installed, the method envisages replacing said auxiliary battery with a backup auxiliary battery comprised in said support and also of a rechargeable and preferably replaceable type.

[0039] Preferably, the method provides that during the rest phase of the ambulance, the empty batteries are recharged and housed back in the support.

[0040] Further features and advantages of the invention will be more apparent after reading the following description provided by way of a nonlimiting example, with the aid of the figures illustrated in the accompanying tables, wherein:

- Figure 1: illustrates a stretcher support comprising a rechargeable and replaceable battery housed in a respective compartment according to the invention;
- Figure 2: illustrates a stretcher support comprising a rechargeable and replaceable battery placed outside the compartment in which it is housed according to the invention;
- Figure 3: illustrates five possible power supply configurations of the stretcher support according to the invention;
- Figure 4: illustrates a portion of the rescue compartment in which a stretcher support according to the invention and a self-loading stretcher portion are housed.

[0041] With particular reference to the figures, 1 denotes as a whole, a stretcher support 1 to install in sanitary compartments of ambulances.

[0042] The ambulance 10 is not depicted here in its entirety because of prior art; only a portion identifiable by the reference 10 is illustrated which identifies the rear

walkable floor 11, i.e. the back of the vehicle 10 where the rescue workers operate and where the stretcher is introduced.

[0043] The support 1 has a geometry shaped substantially like a parallelepiped, that is with two of its parallel flank sides greater than the other two head ones.

[0044] The support 1 has an upper surface 8 and a lower surface 9, which are substantially parallel.

[0045] The upper surface 8 is adapted to preferably support a stretcher of any type or, by extension, to support a patient. It is provided with coupling means and/or straps, suitable to retain the stretcher placed on the support 1 itself.

[0046] The lower surface 9 faces, in operating configuration, towards the floor 11.

[0047] The stretcher support 1 comprises an electromechanical movement apparatus 4.

[0048] Specifically, the electromechanical movement apparatus 4 preferably arranged between said upper surface 8 and said lower surface 9 which rests on the floor 11 of the sanitary compartment, comprises means for varying and adjusting the distance support-floor which are moved by a plurality of electromechanical actuators.

[0049] In order to be able to electrically power said electromechanical movement apparatus 4, the support 1 depicted in Figure 1 comprises an auxiliary battery 5 which is independent of one or more power supply batteries 12 of said ambulance 10.

[0050] Said auxiliary battery 5 is of a rechargeable and preferably replaceable type.

[0051] Said embodiment also comprises an electrical connection preferably by cable for receiving the electric power supply from a power supply battery 12 of the vehicle 10 preferably to the power supply battery 12 of the sanitary compartment 2.

[0052] In fact, the ambulances generally comprise two batteries, one for powering the vehicle and one specific for powering the sanitary compartment, which for example is provided with a 12V socket.

[0053] According to the figures, said auxiliary battery 5 is mechanically installed in the stretcher support 1, preferably in the base 6 of said stretcher support 1, fixed to the sanitary compartment 2 of the ambulance 10.

[0054] The base 6 is the part of the stretcher support 1 that remains fixed and does not move with respect to the sanitary compartment 2.

[0055] In particular, said auxiliary battery 5 is housed in a recess 6a of the base 6.

[0056] This allows to protect the auxiliary battery 5 from any impacts during the manoeuvres for moving the stretcher support 1.

[0057] The auxiliary battery 5 is advantageously arranged on the stretcher unloading side 7 to be easily accessible to an operator.

[0058] Furthermore, said auxiliary battery 5 can be configured so as to be removable preferably by coupling means, in particular of the manual hook type.

[0059] Said auxiliary battery 5 is preferably a lithium

ion battery.

[0060] Said stretcher support 1 can be powered with said auxiliary battery 5.

[0061] When the auxiliary battery 5 gets empty, it is possible to switch to an electric power supply, preferably by cable, by means of the supply battery 12 of the vehicle 10, through the intervention of a control unit, comprised in said support 1.

[0062] In particular, said control unit is adapted to switch from the power supply by means of the auxiliary battery 5 to the one by means of a power supply battery 12 of the vehicle 10 and vice versa so as to ensure continuity in the electric power supply of the support 1.

[0063] Finally, during the rest phase of the rescue vehicle 10, the empty auxiliary battery 5 can be recharged and it is housed back in the support 1.

[0064] If the stretcher support 1 includes the backup auxiliary battery 5a, when the auxiliary battery 5 gets empty or is not installed, it is possible to replace said auxiliary battery 5 with a backup auxiliary battery 5a comprised in said support 1 and it also being of a rechargeable and preferably replaceable type.

[0065] Figure 3 depicts 5 different methods of using the present invention according to the different working conditions that can occur when the stretcher support 1 comprises the auxiliary battery 5 and preferably an electric power supply, supplied by the power supply battery 12 of the ambulance:

case a) if the auxiliary battery 5 is charged (Figure 3,A), said stretcher support 1 is powered by the auxiliary battery 5;

case b) if the auxiliary battery 5 is empty (Figure 3, B), it is switched to the electric power supply supplied by the power supply battery 12 of the ambulance through the intervention of a control unit, comprised in said stretcher support 1;

case c) when the stretcher support 1 comprises only an auxiliary battery 5, (Figure 3,C) the electric power supply of the stretcher support 1 will be independent of the power supply batteries 12 of the rescue vehicle, but the autonomy of the stretcher support 1 will be completely dependent on the auxiliary battery 5;

case d) when the auxiliary battery is disconnected from the stretcher support 1 (Figure 3,D), this is powered only by the electric power supply supplied by the power supply batteries 12 of the rescue vehicle;

case e) if the auxiliary battery 5 is empty or disconnected (Figure 3,E) and the stretcher support 1 comprises the backup auxiliary battery 5a, it is possible to power the stretcher support 1 with the backup auxiliary battery 5a.

[0066] A person skilled in the art, in order to satisfy further and contingent needs, may make numerous further modifications and variations to the above described stretcher support 1 and the relative method of use, all of which are included in the scope of protection of the

present invention, as defined by the attached claims.

Claims

1. Stretcher support (1) to install in a sanitary compartment (2) of a rescue vehicle (10), in particular an ambulance, which comprises an electromechanical movement apparatus (4) for the movement of said stretcher support (1) with respect to the sanitary compartment (2), **characterised in that** said electromechanical movement apparatus (4) is electrically powered by an auxiliary battery (5) which is independent of one or more power supply batteries (12) comprised in said ambulance (10). 10
2. Stretcher support (1) according to claim 1, **characterised in that** said auxiliary battery (5) is of a rechargeable and/or preferably replaceable type. 20
3. Support (1) according to any one of the preceding claims, **characterised in that** said electromechanical movement apparatus (4) comprises an electrical connection for receiving the power supply from said one or more power supply batteries (12) of said ambulance (10), preferably the power supply battery (12) of the sanitary compartment (2) of said ambulance (10). 25
4. Support (1) according to any one of the preceding claims, wherein said auxiliary battery (5) is mechanically installed on the stretcher support (1). Support (1) according to any one of the preceding claims, wherein said auxiliary battery (5) is installed on a base (6) of said stretcher support (1), said base (6) being fixed to the sanitary compartment (2) of the ambulance (10). 30 35
5. Support (1) according to claim 5, wherein said auxiliary battery (5) is housed in a recess (6a) of the base (6) and preferably said auxiliary battery (5) is configured to be removable by coupling means, in particular of the manual hook type. 40
6. Support (1) according to any one of the preceding claims, wherein said auxiliary battery (5) is arranged on the stretcher unloading side (7) to be easily accessible to an operator. 45
7. Support (1) according to any one of the preceding claims, which comprises a control unit adapted to switch from power supply by means of the auxiliary battery (5) to that of one of said power supply batteries (12) of said ambulance (10) and vice versa so as to ensure continuity in the electric power supply of the support (1). 50 55
8. Support (1) according to any one of the preceding

claims, wherein said auxiliary battery (5) is a lithium ion battery.

9. Method for electrically powering a stretcher support (1) that is movable with respect to a sanitary compartment (2) of a rescue vehicle (10) on which said stretcher support (1) is installed, said method being **characterised in that** it envisages electrically powering said stretcher support (1) with at least one auxiliary battery (5) which is independent of said one or more power supply batteries (12) comprised in said ambulance (10). 5
10. Method according to claim 10, **characterised in that** it envisages recharging said auxiliary battery (5). 10 15
11. Method according to one or more of claims 10 to 11, **characterised in that** it envisages powering the stretcher support (1) with said one or more power supply batteries (12) comprised in said ambulance (10), preferably with the power supply battery (12) of the sanitary compartment (2) of the ambulance (10). 20
12. Method according to one or more of claims 10 to 12, which envisages switching to power supply by means of one of said power supply batteries (12) of said ambulance (10), when the auxiliary battery (5) is empty or not installed, and vice versa so as to ensure continuity in the electric power supply of the support (1). 25 30 35 40 45 50 55

FIG.1

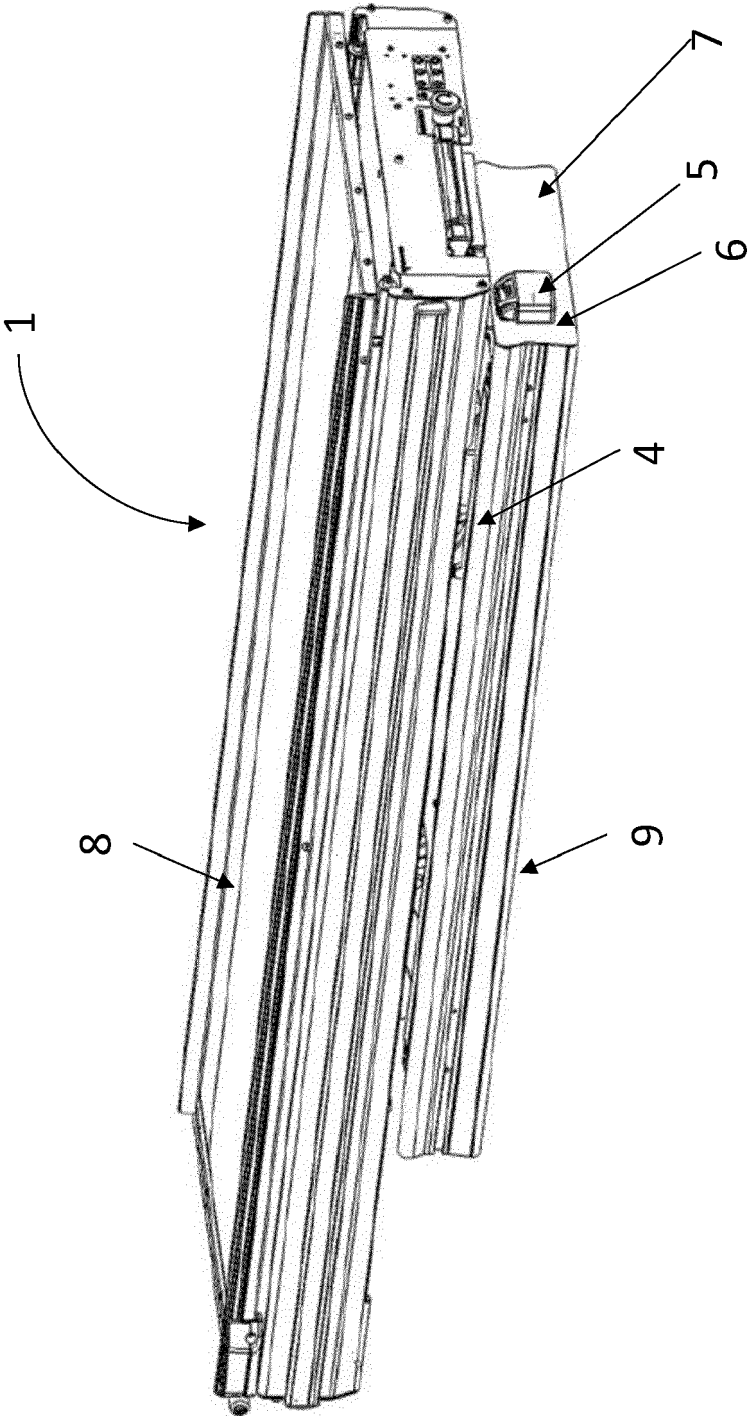


FIG.2

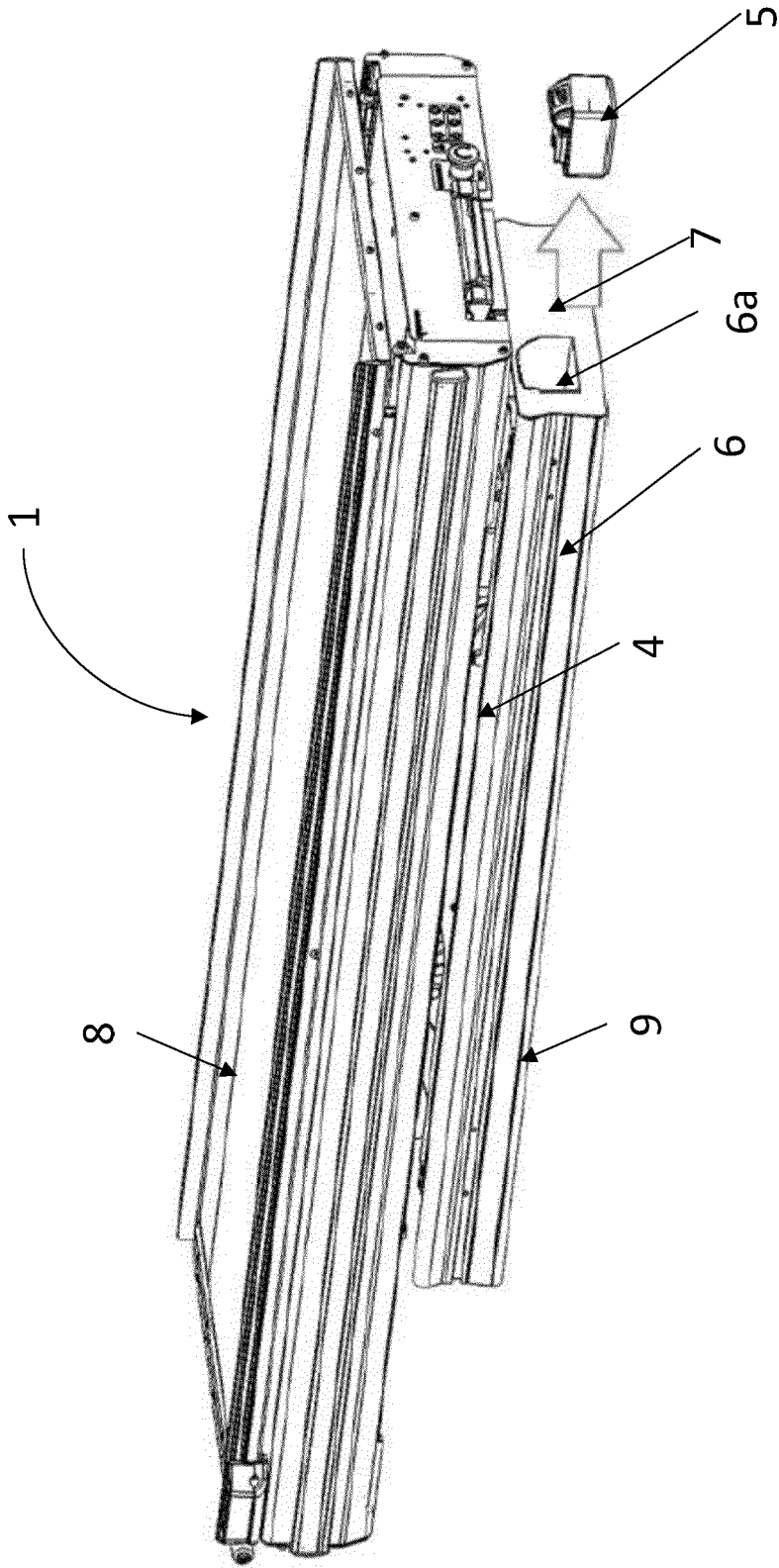


FIG.3

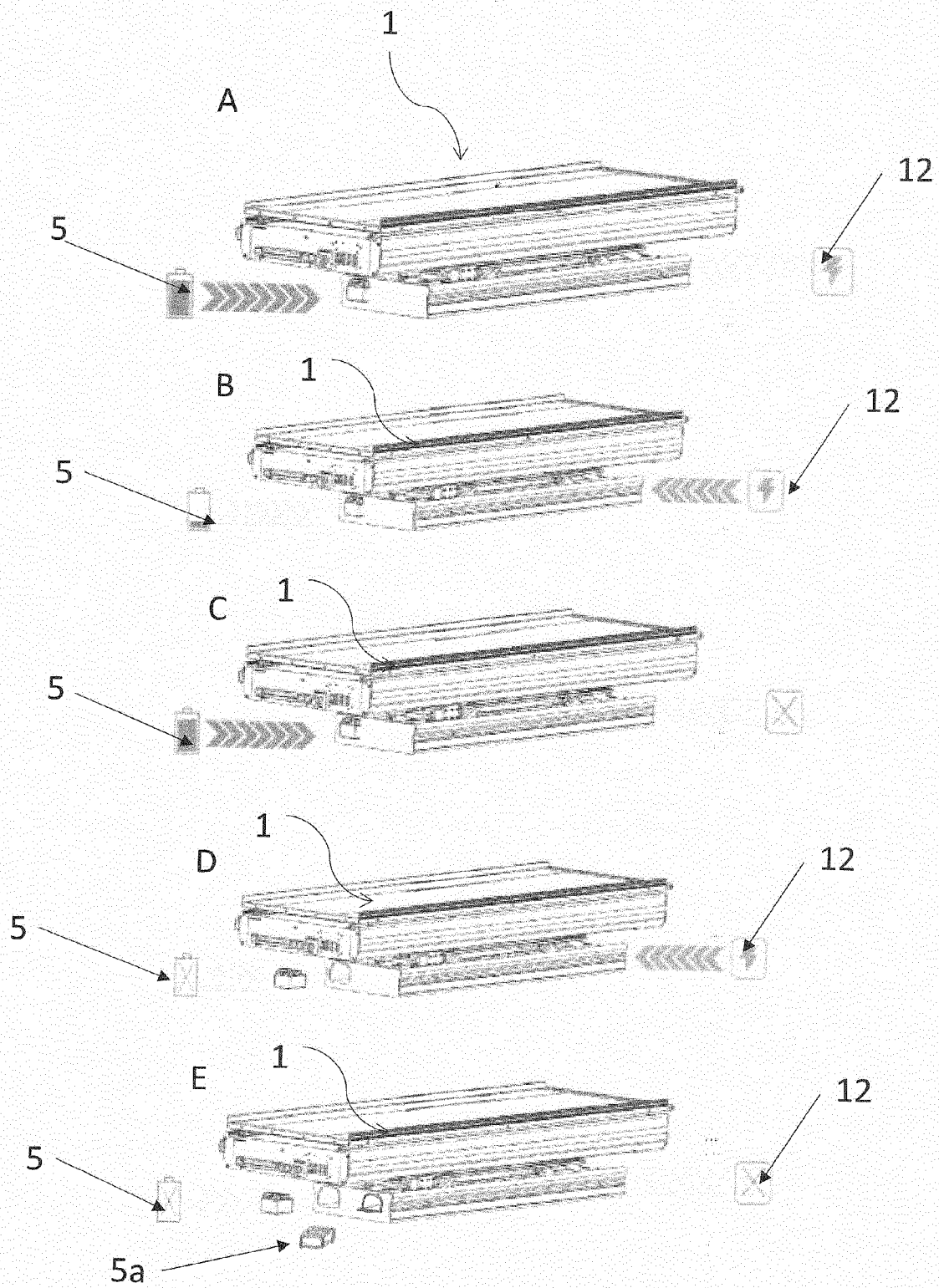
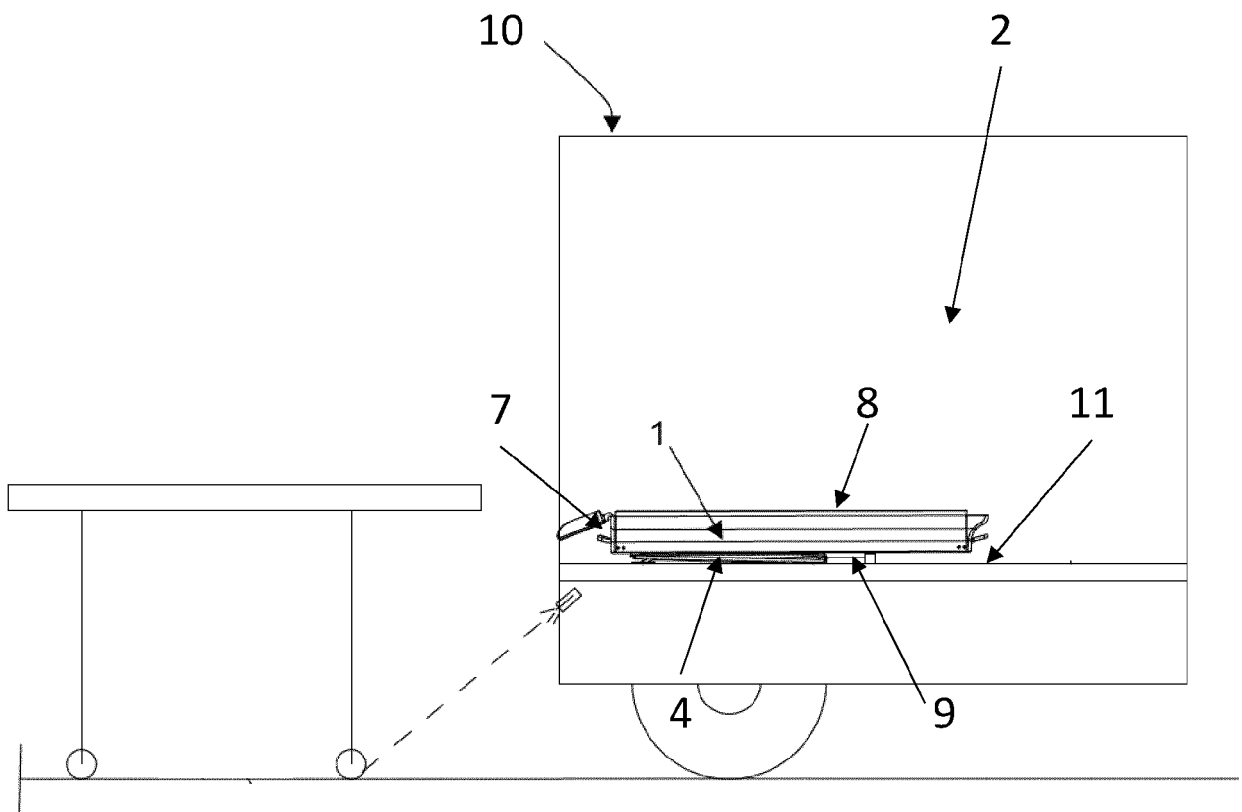


FIG.4





EUROPEAN SEARCH REPORT

Application Number

EP 22 21 6188

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EPO FORM 1503 03.82 (P04C01)

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			TECHNICAL FIELDS SEARCHED (IPC)
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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 10 May 2023	Examiner Gkama, Alexandra
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	

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

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5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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