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MA MD(71) Applicant: **Spencer Italia S.R.L.****43044 Collecchio (PR) (IT)**(72) Inventor: **PIZZI SPADONI, Luigi Cesare****43044 Collecchio (PR) (IT)**(74) Representative: **Benelli, Cristian et al****Ing. Dallaglio S.R.L.****Via Mazzini N. 2****43121 Parma (IT)**(30) Priority: **07.10.2015 IT UB20154188****(54) DEVICE FOR ACTIVATING THE QUICK RELEASE OF A STRETCHER FOR AMBULANCE**

(57) A quick release device is provided for releasing a stretcher (1) for ambulance from a relative fastening or support surface (2) fixed to the walking surface of the ambulance. In the fastening (2), a releasable system (7) is provided for the stretcher (1) as well as a release mechanism controllable by means of a control device located in a housing (8).

The quick release device (10) according to the invention comprises a curved tube (21), mounted in the lower part of the frame (3), in proximity to the housing (8) and movable between a rest position (R), in which said

driving element (20) remains outside said housing (8), and a release position (S), in which the same abovementioned driving element (20) fits in the housing (8) in order to actuate the control device.

Control means (25) for said driving element (20) are arranged in proximity to the grip (31) of the abovementioned stretcher (1) and can be actuated simultaneously with the controlled unloading of the stretcher, in order to bring said driving element (20) alternately between the rest (R) and release (S) positions.

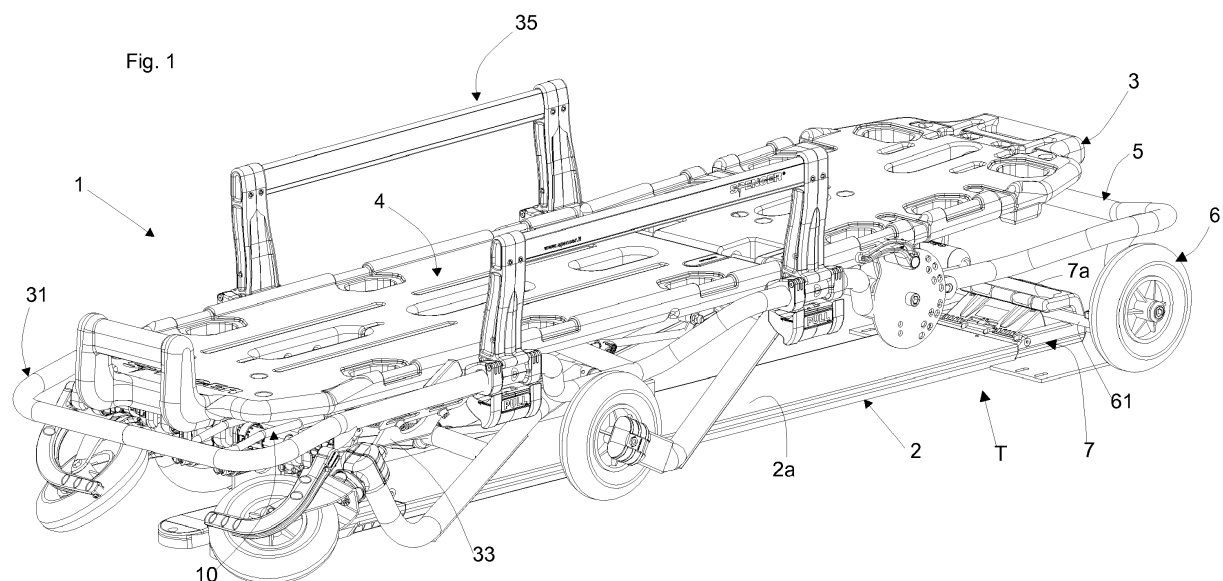


Fig. 1

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Description

[0001] The present invention is inserted in the technical field relative to ambulance transport means for injured or sick people, or for those for which it is necessary or recommended to transport in perfectly-safe immobilization conditions.

[0002] In particular, the transport means are defined as stretchers, self-loading or otherwise, and patient transport wheelchairs.

[0003] In particular, the invention regards a device for safely releasing the aforesaid means, stretchers and/or patient transport wheelchairs, from a corresponding fastening provided on the walking surface of the ambulance; in particular, by using a knob which is situated on the stretcher itself or patient transport wheelchair, rather than on the fastening system.

[0004] For example, for the movement and the transport of people who are unable to autonomously move, but for whom an equipped ambulance must be used, suitably designed and made particular stretchers have been known and used for some time, on which the person to be moved is set in laid-down position, and then suitably immobilized.

[0005] Such stretchers usually comprise a light metal material frame, laterally provided with protection sides that can be pulled down, and on which an anti-shock patient bed is installed, often provided with adjustments for tilting the head and legs of the patient. A mattress is installed on the bed, on which the same patient is laid down; also such mattress is designed and made for making the transport as comfortable as possible, also considering the delicate conditions of the transported patient.

[0006] A trolley is extended from the lower part of the frame, provided with wheels for allowing the stretcher to be pushed between the ambulance and the pick-up or unloading point of the patient. The trolley is usually of retractable type, and thus it is provided with particular mechanisms adapted to make the introduction in the ambulance and its subsequent extraction simple and not tiring for the operators.

[0007] When it is introduced inside the ambulance, the stretcher is fixed to the walking surface, or to the support surface thereof which is also translatable, by means of a fastening device integral with the floor.

[0008] The fastening device comprises a kind of slide, arranged longitudinally with respect to the travel direction of the ambulance, provided with semi-automatic locking systems for the stretcher, respectively front and back, which can be made in different ways.

[0009] In one of the most well-known modes, the prior art locking system provides for a crosspiece that forms a housing, adapted to receive the axle of the front wheels of the trolley, and a foldaway locking element provided with a release control mechanism. When the front axle of the trolley is thrust against such locking element, the latter is lowered, loading a contrast spring, and subsequent returns into locking position due to the elastic re-

action of the spring itself.

[0010] The rear locking system of the stretcher usually provides for a fin, which is centrally extended from the lower part of the frame, intended to be inserted in a suitable housing provided in the fastening slide. Also in this case, an automatic coupling system is provided for coupling the fin to the support, releasable upon command.

[0011] The release mechanisms of the front and rear locking systems are made inside the fastening slide, and can be manually actuated by an actuator, usually a button actuator, arranged inside a slot-shaped housing. Such housing is made in the rear part of the fastening slide, in a position accessible by the operator assigned to introduce and extract the stretcher from the ambulance.

[0012] The detailed structure of the front and rear locking systems of the stretcher and of the relative release mechanisms, along with the other devices necessary for the correct operation of the stretcher, are well known the technicians and operators of the field, and are also not pertinent to the present invention. Hence, they will not be further described hereinbelow.

[0013] In the stretchers for ambulance of the above-described type, or conventional stretchers, one particularly serious drawback lamented by the operators who use them regards the system for releasing the stretcher from its fastening. As already mentioned, the locking of the stretcher on the respective support mounted in the walking surface of the ambulance occurs without the intervention of the operator, since both the front axle of the stretcher and its rear fin, below the frame, are automatically coupled when they arrive into the respective locking position, pushed by the operator who introduces the stretcher into the ambulance.

[0014] The activation of the release of the locking systems before the extraction of the stretcher is, instead, controlled by the operator with the actuation of a button usually provided in a slot-shaped opening, made on the surface of the support in proximity to the rear end thereof.

[0015] When the stretcher is locked to the fastening, such slot is not immediately visible, and the operator must search for it, lowering his/her head and extended his/her arm between the stretcher and the support itself, until he/she inserts a finger in the slot in order to find the release button.

[0016] Such operation is however inconvenient, above all considering the emergency situations for the patient in which it is executed, and can also involve some risk for the operator. Indeed, in this manner the hand and arm of the operator come to be situated, at least for some instant, between the support and the frame of the stretcher. An error of evaluation in the handling times of the stretcher itself, perhaps caused by a particular emergency situation, or by a misunderstanding with a colleague who assists the operator in the extraction maneuver, can lead to contact between the stretcher and the arm, the hand or even only a finger of the operator, with consequences that could even be quite serious for the latter.

[0017] In any case, the operation of searching for and

actuating the release button involve time losses and poor control of the stretcher that are preferably avoided in the patient transport operations in emergency situations.

[0018] Object of the present invention is to propose a quick release device of a stretcher for ambulance that allows avoiding the abovementioned drawbacks.

[0019] Another object of the invention consists of proposing a release device entirely comprised in the stretcher itself, which can be actuated without time losses and without removing attention from the patient movement operations, giving the operator the chance to control, with both hands, the unloading of the stretcher.

[0020] These and other objects are fully achieved by means of a quick release device activatable by a stretcher or wheelchair, provided for releasing the stretcher or the wheelchair from a relative fastening integral with the walking surface of the ambulance. The stretcher or the wheelchair comprises a support frame of a bed on which a patient to be transported is laid and a trolley articulated to the frame. In the fastening device, a locking system for the releasable stretcher and a release mechanism controllable by means of a control device located in a housing are provided.

[0021] According to the invention, the quick release device comprises a curved tube, mounted in the lower part of the frame, in proximity to the housing, actuatable by the operator in order to bring said curved tube alternately between a rest position and a release position, in which one end of the curved tube fits in the housing for actuating the control device and disengaging the stretcher.

[0022] According to a first embodiment, the curved tube can be actuated by a control grip arranged in proximity to the grip of the stretcher; between the control grip and the curved tube, a lever is interposed that is adapted to transfer the movement therebetween.

[0023] According to a further embodiment, the movement for releasing the stretcher by means of curved tube pin that operates on a bar of the hook can be impressed mechanically, hydraulically or electrically.

[0024] The characteristics of the invention will be evident from the following description of a preferred but not exclusive embodiment of the extractor device in accordance with that reported in the claims and with the aid of the enclosed drawing tables, in which:

- Fig. 1 illustrates a perspective view of a three-quarter rear perspective view of a stretcher for ambulance bearing the release device, object of the present invention;
- Fig. 2 illustrates a perspective view of the rear part of the stretcher of figure 1, from which the patient surface has been removed, with the release device in non-operative position;
- Fig. 3 illustrates the same view of figure 2, with the release device in operative position;
- Fig. 4 illustrates a top perspective view of the stretch-

er portion of figures 2 and 3, with the release device in non-operative position;

- Fig. 5 illustrates a bottom perspective view of the rear half of the stretcher, with the release device in operative position.

[0025] With reference to figures 1 and 5, reference number 1 indicates a stretcher for ambulance, in particular of self-loading type, intended to receive a patient in laid-down position and to be subsequently locked to a fastening or support 2, integral with the walking surface of the ambulance itself (not illustrated for the sake of simplicity). Hereinbelow, reference will be made to front and rear parts of the stretcher 1, respectively for indicating the parts on which the head and the feet of the patient are set. The rear part of the stretcher 1 is that which, when loaded on the ambulance, is closer to the load door thereof.

[0026] The stretcher 1 comprises a frame 3, made with a tubular structure, laterally provided with protection sides 35 that can be pulled down and on which an anti-shock bed 4 is installed, provided with adjustments for tilting the head and legs of the patient. A mattress is installed on the bed, not shown in the figures in order to render the invention more visible. The frame 3 is also provided, in proximity to the rear end thereof, with an extension 33, constituted by a shaped plate which is extended towards the lower part of the frame 3 itself. Fixed to the latter, and to other portions of the frame 3, are pairs of loading wheels 34, intended to facilitate the introduction and extraction of the stretcher 1.

[0027] In the rear part thereof, the frame 3 also forms a grip 31, like a grab bar, in order to allow an operator to easily handle the stretcher 1 during its movement.

[0028] From the lower part of the frame 3, a trolley 5 is extended that can be lifted and retracted, provided with wheels 6 for allowing the stretcher 1 to be pushed between the ambulance and the patient pick-up or unloading site. For such purpose, the trolley 5 is provided with suitable known mechanisms adapted to render the introduction thereof in the ambulance and the subsequent extraction thereof simple and not tiring for the operators.

[0029] The fastening 2, in the non-limiting embodiment illustrated in the figures, is constituted by a plate having elongated form, against whose surface 2a the loading wheels 34 of the stretcher 1 are intended to abut during the operations of introduction and extraction thereof into/from the ambulance. The fastening 2 is also provided, in an entirely known manner, with devices suitable for facilitating the introduction and extraction of the stretcher 1, and with a releasable locking system 7, for locking the stretcher 1 itself in a transport position T.

[0030] The locking system 7 is only partially illustrated in the figures, since its structure is not directly pertinent to the invention, and comprises a front locking device 7a, adapted to lock an axle 61 of the wheels 6, and a rear locking device 7b, adapted to receive a fin 36 (see figure 5) centrally mounted in the lower part of the shaped plate

33. The locking device 7 provides for an activation mechanism, controllable by means of a control device, both arranged within the support 2 and not visible in the figures.

[0031] The device for controlling the locking device 7 is located within a housing 8, accessible from the outside through a longitudinal slot 8a made on the surface of the support 2 itself. Also the control device is not directly illustrated in the figures, and is in substance constituted by a button actuatable via pressure. According to the conventional use modes, in order to carry out the release operation, the operator inserts a finger in the slot 8a, enters into the housing 8 and presses the button of the control device, after which he/she frees the stretcher 1, dragging it towards the exit opening of the ambulance.

[0032] The device 10 for the quick release of the stretcher 1 obtained according to the invention is fully comprised in the stretcher 1 itself, and comprises (see figures 2, 3, 4 and 5) a driving element 20, mounted in the lower part of the frame 2 in a manner such that, when the stretcher 1 is situated locked to the support 2 in the transport position T thereof, it is positioned immediately above the slot 8a of the housing 8 (figure 2).

[0033] The driving element 20 comprises, in particular, a curved tube 21, centrally pivoted to the frame 3 by means of a fork 29 fixed to the shaped plate 33 of the frame 3, and connected at an end thereof 21a to movement transfer members 28.

[0034] In this manner, the tube 21 can oscillate between a rest position R (figure 2), in which it is raised to the height of the plate 33 and does not interfere with the movements of the stretcher 1, and a release position S (figure 3), in which the opposite non-constrained end 21b thereof is moved inside the housing 8 in order to actuate the button of the control device, and thus free the stretcher 1 from the support 2.

[0035] At the latter end 21b, the curved tube 21 provides for a contact pin 22, which projects from the convex side of the tube 21 and is intended to engage the button of the control device during the operation of disengagement of the stretcher 1 from the support 2.

[0036] The release device 10 also comprises control means 25 for the driving element 20, arranged in proximity to the grip 31 of the stretcher 1. In the preferred embodiment illustrated in figures 1 to 5, the control means 25 comprise a handle 26, arranged inside the same grip 31, in a position immediately accessible by a hand of the operator and manually actuatable by the same.

[0037] The handle 26 is slidably mounted on a block 32 provided in the frame 3, with an end thereof connected to the abovementioned movement transfer members 28. In substance, the handle 26 is situated in the stable position thereof, corresponding to the rest position R of the curved tube 21, in which it is distant from the grip 31, and can be pulled by the operator in moving closer thereto, in order to actuate the tube 21 itself and bring it into the release position S.

[0038] The handle 26 is maintained in rest position by

elastic return members 27, constituted by a helical spring axially mounted on one branch of the handle 26.

[0039] The abovementioned movement transfer members 28, in the illustrated embodiment, are constituted by a suitably articulated lever, whose end arms are respectively connected to one arm of the handle 26 and to one end of the tube 21. These are intended to transfer the action of the operator exerted on the handle 26 to the tube 21, in order to bring it from the rest position R to the release position S and vice versa.

[0040] According to one embodiment of the invention, not illustrated but readily inferable, the tube 21 can be actuated by an electromagnetic actuator, fixed to the plate 33 of the frame 3. In this case, the control means 25 comprise an electric button switch, and the transfer members 28 a simple pair of electric cables. In this case, naturally, a suitable rechargeable storage cell must be provided for supplying electrical energy to the electromagnetic actuator.

[0041] A further embodiment variant provide that the tube 21 be actuated by a pneumatic actuator, it too fixed to the plate 33, fed by a suitable container of rechargeable compressed air. In this case, the control means 25 comprise a pneumatic switch, possibly drivable by a handle mechanism similar to that already described for the preferred embodiment of the invention.

[0042] The operation of the release device 10 is simple and quite intuitive. With the stretcher outside the ambulance, or inside the in transport position T (figures 1 and 2), the handle 25 is situated in its stable position, and maintains the tube 21 in its rest position R by means of the lever 28. In such position, when the stretcher 1 is in transport position T, the tube 21 is situated distant from the housing 8, and does not engage the button for activating the release mechanism of the stretcher 1.

[0043] When the operator wishes to extract the stretcher 1 from the ambulance, he/she grips the handle 26 and pulls it towards himself/herself, moving closer to the grip 31. In this manner, he/she operates on the lever 28 and imparts an oscillation to the tube 21, of about 90°, bringing it into release position (figure 3).

[0044] In this position, the foot 22 mounted at the end 21b of the tube 21 engages the button for activating the release mechanism, and releases the front axle 61 and the fin 36 of the stretcher 1 from the respective front 7a and rear 7b locking devices.

[0045] The operator can then begin to extract the stretcher 1 from the ambulance, and simultaneously releases the handle 26, which is brought back into its stable position by the return spring 27. The tube 21 is then brought back into the rest position R thereof by the lever 28.

[0046] A clear advantage that the invention allows obtaining is that of preventing the operator from inserting his/her hand between the stretcher 1 and the support, and his/her finger inside the housing 8, in order to actuate the release button.

[0047] With this device, the operator can with two

hands control the stretcher and thus prevents the operation - generally carried out without looking, or in any case in a rush situation due to emergency, and hence particularly risky - from damaging the operator itself.

[0048] The operation of releasing the stretcher 1 carried out by means of the release device of the invention also allows, in any case, a time savings for the ambulance operators, which may prove precious in situations of particular urgency.

[0049] In any case, it is intended that that described above is exemplifying and non-limiting, thus possible detail variations that may be necessary for technical and/or functional reasons are considered to fall within the same protective scope defined by the below-reported claims.

[0050] In the embodiment, reference was made to a device 10 for the release of stretchers, self-loading or otherwise; nevertheless, it is intended that the device 10, as stated from the start, is also applicable for operating autonomously and releasing patient transport wheelchairs; the same expedients are necessary for the positioning of the release device 10, along with its drive and control means; in such a manner, also a wheelchair can be released from the fastening, controlling it with both hands.

[0051] In conclusion, the device 10 for the release from at least one relative fastening 2 of a stretcher 1 for ambulance or of a wheelchair comprises:

- a driving element 20, mounted in the lower part of the frame 3 of the wheelchair or of the stretcher, in proximity to a housing 8 thereof and movable between a rest position R, in which said driving element 20 remains outside said housing 8, and a release position S, in which the same abovementioned driving element 20 fits into the abovementioned housing 8 in order to actuate the abovementioned control device;
- control means 25 for said driving element 20, arranged in proximity to the grip 31 of the abovementioned stretcher 1, actuatable for moving said driving element 20 alternately between the rest R and release positions S.

Claims

1. Release device (10) for a stretcher (1) for ambulance or a patient transport wheelchair from at least one relative fastening (2); said fastening (2) integral with the floor or with a movable support surface of an ambulance for locking said stretcher (1) or said wheelchair in a transport position (T) during the transport of the same; said fastening (2) being provided with at least one releasable locking system (7) for said wheelchair or stretcher (1) and activation means for said at least one releasable locking system (7), controllable by means of a control device located in a housing (8) provided in said fastening

(2); said quick release device (10) being **characterized in that** it comprises: a driving element (20), mounted on the frame (3) of the wheelchair or stretcher, in proximity to said housing (8) and movable between a rest position (R), in which said driving element (20) remains outside said housing (8), and a release position (S), in which the same said driving element (20) fits into said housing (8) for actuating said control device; control means (25) for said driving element (20), arranged in proximity to the grip (31) of said stretcher (1), actuatable for moving said driving element (20) alternately between the rest (R) and release (S) positions.

2. Device according to claim 1, **characterized in that** said driving element (20) comprises a curved tube (21), centrally pivoted to said frame (3) and connected at one end (21a) to transfer members (28), the opposite non-constrained end (21b) of said tube (21) being provided for moving, with said tube (21) in release position (S), within said housing (8) in order to actuate said control device and thereby release the stretcher (1) or the wheelchair from the fastening (2).
3. Device according to claim 2, **characterized in that** a contact pin (22) is provided at the non-constrained end (21b) of said curved tube (21), intended to engage said control device during the disengagement operation for the stretcher (1) or wheelchair.
4. Device according to claim 1, **characterized in that** said control means (25) comprise a handle (26), slidably mounted on a block (32) provided in said frame (3), of the stretcher or patient transport wheelchair, with an end thereof connected to said transfer members (28) and manually actuatable between said rest (R) and release (S) positions, elastic return means (27) being provided for keeping said handle (26) in the rest position (R) in the absence of stress.
5. Device according to claim 1 or claim 2, **characterized in that** said transfer members (28) consist of a lever, suitably articulated for transferring the action of said control means (25) to said driving means (20).
6. Device according to claim 1 or claim 5, **characterized in that** said transfer members (28) comprise an electromagnetic actuator, mounted in the lower part of said frame (3), and **in that** said control means (25) comprise an electric button switch adapted to activate said electromagnetic actuator, an electric storage cell being provided in said stretcher (1) for supplying energy to said electromagnetic actuator.
7. Device according to claim 1 or claim 5, **characterized in that** said transfer members (28) comprise a pneumatic actuator, mounted in the lower part of said frame (3), and **in that** said control means (25) com-

prise a pneumatic switch adapted to activate said pneumatic actuator, a container of compressed air being provided in said stretcher (1) or wheelchair in order to supply energy to said pneumatic actuator.

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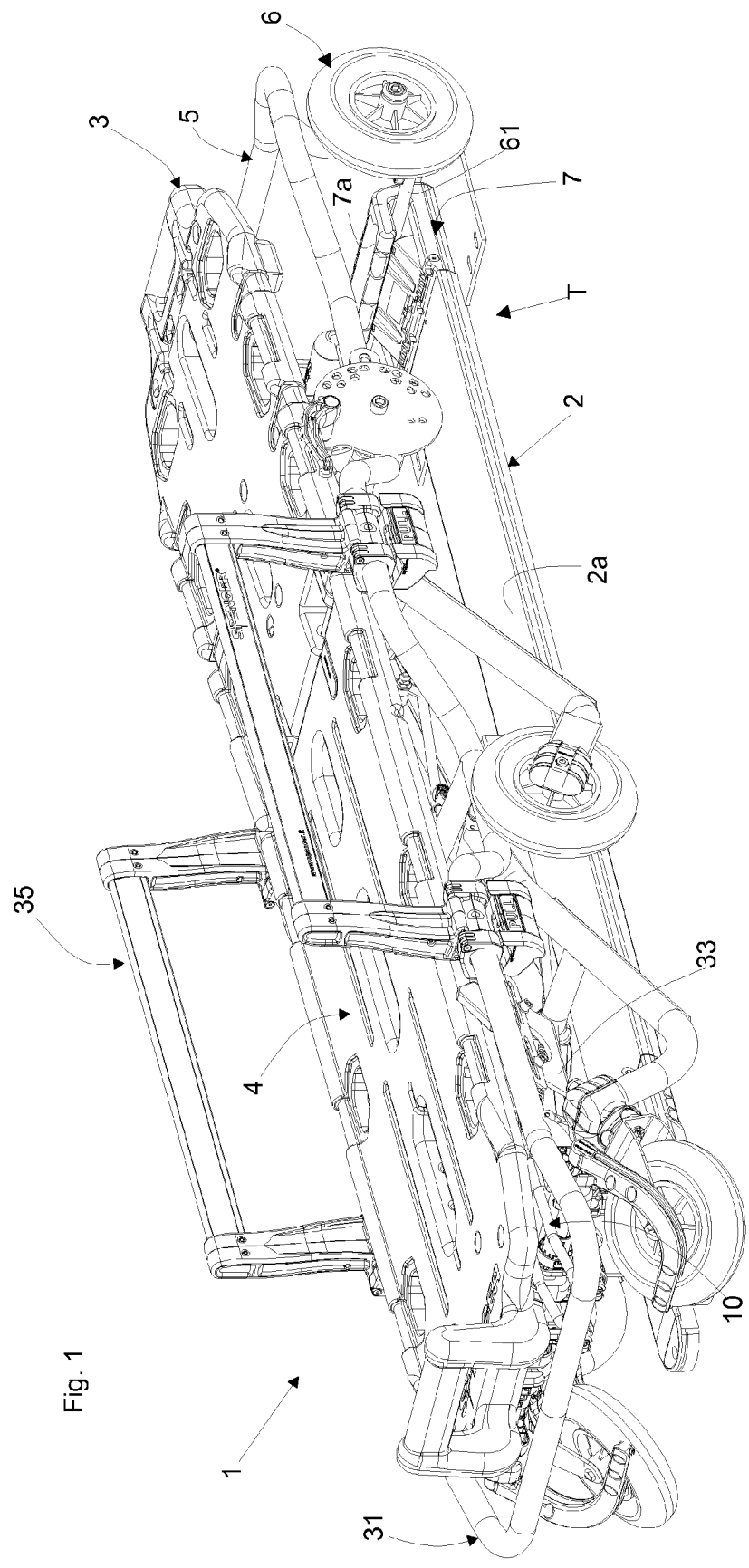
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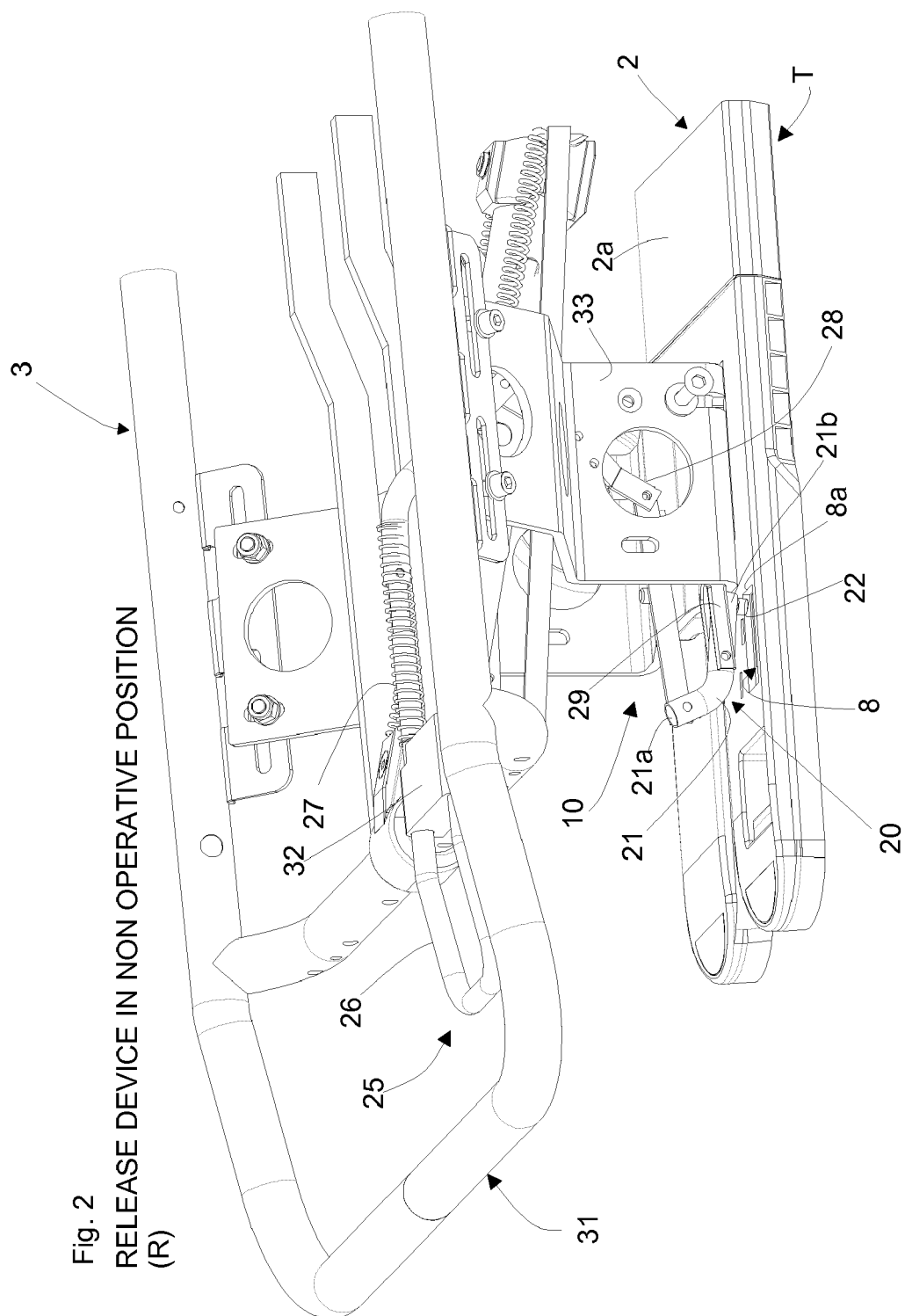
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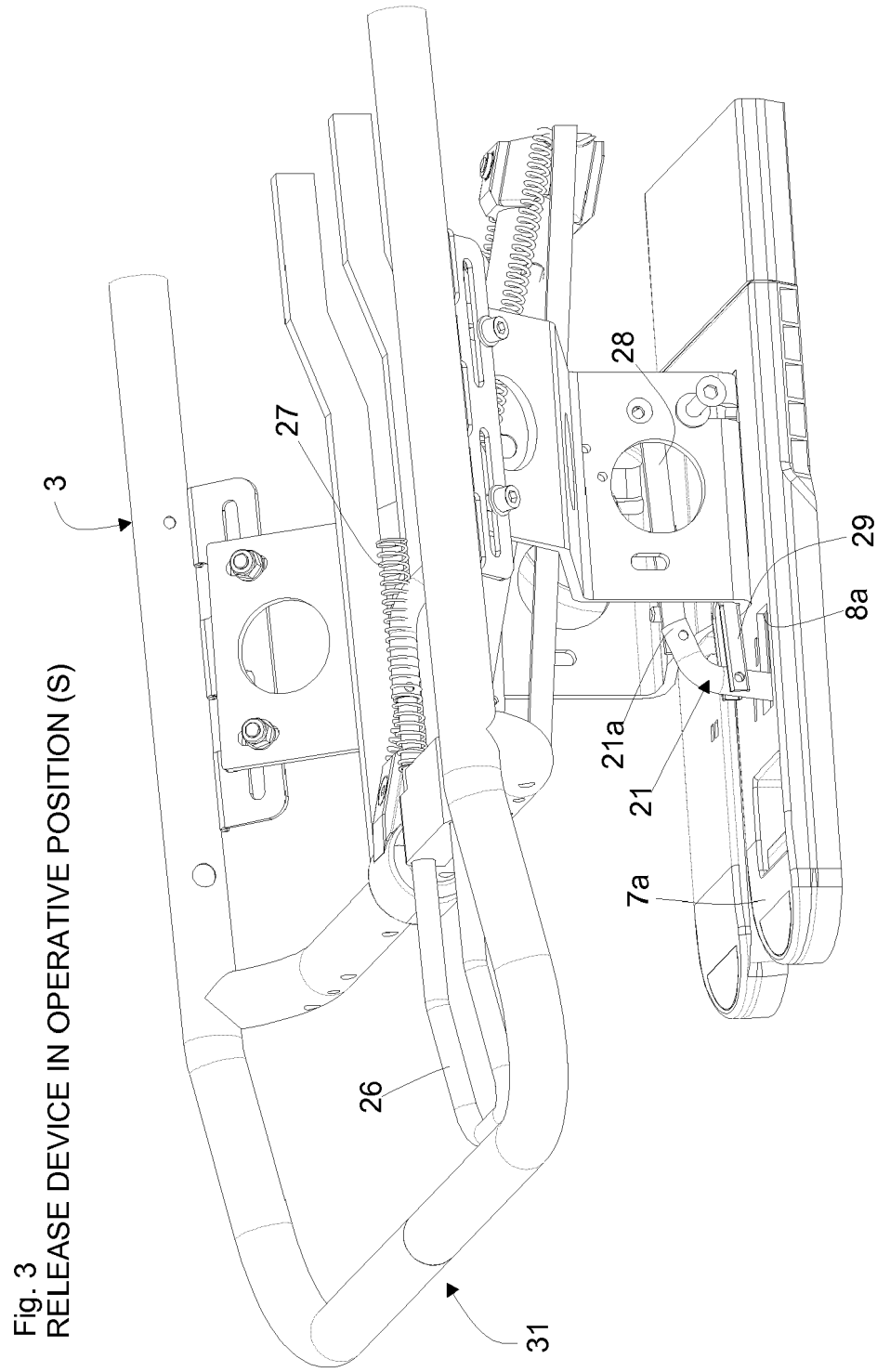
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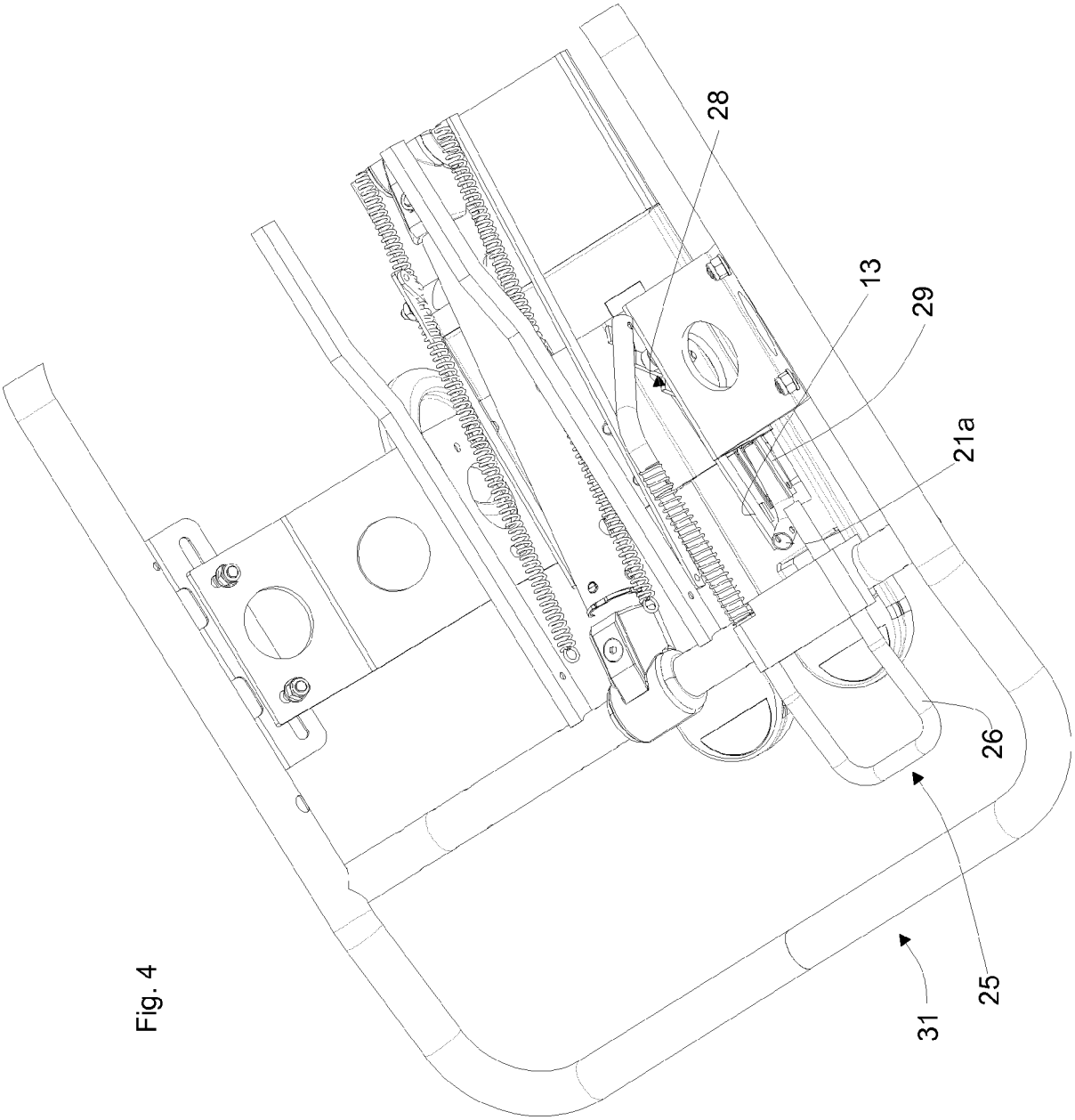


Fig. 4

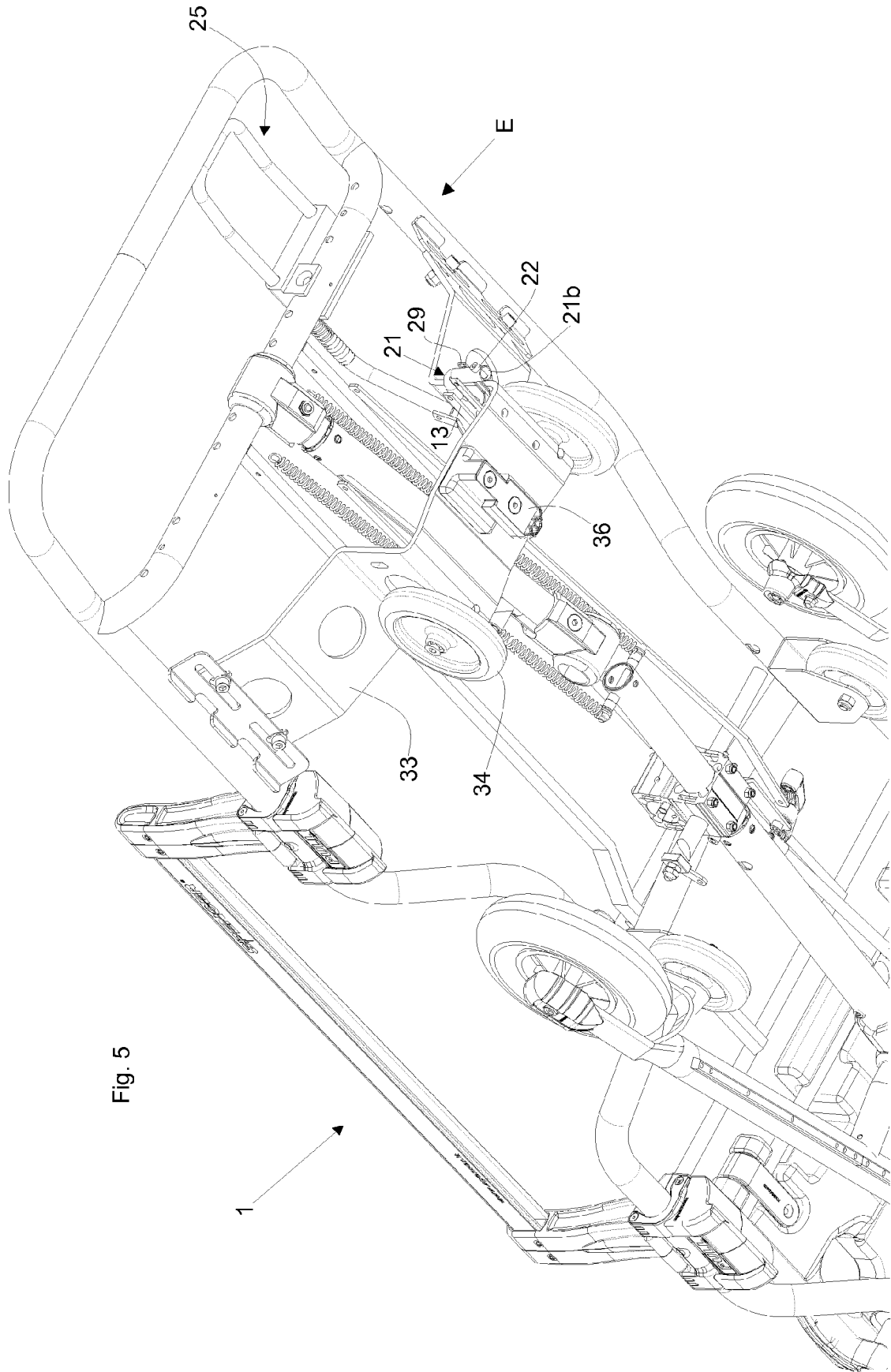


Fig. 5



EUROPEAN SEARCH REPORT

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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 24 October 2016	Examiner Edlauer, Martin
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EPO FORM 1503 03/02 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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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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