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(71) Applicant: **Nardini, Davide**
50019 Sesto Fiorentino (Firenze) (IT)

(72) Inventor: **Nardini, Davide**
50019 Sesto Fiorentino (Firenze) (IT)

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(74) Representative: **Mincone, Antimo**
Viale Europa 101
IT-50126 Firenze (IT)

(54) **Device for handling a bed structure**

(57) Device for handling a bed structure, comprising a base or frame (R) on which a mattress can be placed and a shaft (1) driven by a motor unit (10) and on which there are anchored a plurality of pairs of belts (2, 3, 4, 5), wherein the two belts (2, 3, 4, 5) of each pair of belts are oriented parallel to a side of the base or frame (R), wherein each of said belts has a first end anchored on said shaft (1) and a second end connected to a corresponding fixed anchorage point (21, 31, 41, 51), i.e. anchored to a point (21, 31, 41, 51) placed at a predetermined height, wherein the said shaft (1) is secured to said base or frame (R), wherein the clockwise or counterclockwise rotation of the shaft (1) about its own axis (y-y) determines the winding of the belts (2, 3, 4, 5) on the same shaft (1) or their unwinding and a first portion of each belt is wound on the shaft (1) while a second portion of each belt is comprised between the first portion wound on the shaft (1) and the respective fixed anchorage point. The belts of each of said pairs of belts (2, 3, 4, 5) have their respective portions wound on the shaft (1) on each other and coaxially to the same shaft (1).

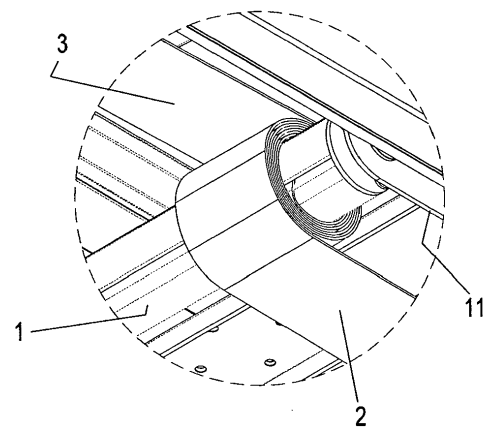


FIG.4

EP 2 888 976 A1

Description

[0001] The present invention relates to a lifting device for bed frames, in particular for passenger compartments or cabins of vehicles such as campers, motor homes, caravans, boats and the like.

[0002] It is known that in vehicles of the type mentioned above there is the need to have a bed in a lowered position of use and respectively in a raised stowage position to occupy the space in the cabin destined to the bed only when necessary.

[0003] The main purpose of the present invention is to propose a lifting device for bed frames, especially for so-called recreational vehicles, which allows to raise and lower the frame of a bed in a simple and safe way, without, however, adversely affect the overall dimensions, weight and cost of the device.

[0004] This result is achieved, according to the present invention, by adopting the idea of providing a device having the characteristics indicated in claim 1. Other features of the invention are the subject of the dependent claims.

[0005] Reaching the intended purpose, the present invention provides a lifting mechanism that is simple both for what regards its structure and for what concerns the use, safe, reliable and inexpensive in relation to the advantages offered. These and other advantages and characteristics of the present invention will be best understood by anyone skilled in the art thanks to the following description and to the attached drawings, provided by way of example but not to be considered in a limiting sense, wherein:

- Fig.1 is a schematic bottom view of a device according to the present invention;
- Fig.2 is a section view along line B.B of Fig.1;
- Fig.3 is a schematic perspective view of the device shown in Fig.1 and Fig.2, wherein there are shown four tracks of a system for keeping the bed vertically guided;
- Fig.4 shows the detail "A" of Fig. 3 in an enlarged view;
- Fig. 5 shows the detail "C" of Fig. 2 in an enlarged view;
- Fig.6 shows due belt portions virtually isolated from the winding/unwinding shaft;
- Fig.7 shows the belt portions of Fig.6 virtually separated from each other;
- Fig.8 shows the detail "D" of Fig.3 in an enlarged view;
- Fig.9 is a schematic perspective view of the shaft (1);
- Fig.10 is a schematic cross-section view of the shaft shown in Fig.9;
- Fig.11 is another enlarged detail of Fig.3;
- Fig.12 shows the detail "E" of Fig. 2 in an enlarged view.

[0006] As said above, a device in accordance with the present invention can be used for lifting and lowering a

bed, i.e. the bed base or frame (R) forming the base of the bed on which a mattress (not shown in the drawings) is supported inside the cabin of a recreational vehicle (not shown in the drawings).

[0007] Reduced to its basic structure and with reference to the attached drawings, a device according to the present invention comprises a shaft (1) that is driven by an electric gearmotor (10), four belts (2, 3, 4, 5), i.e. two pairs of belts (2, 3; 4, 5) being anchored to said shaft. The gearmotor (10) is connected with suitable actuation push-buttons (not shown in the drawings).

[0008] Each of said belts has an end (first end) anchored on the shaft (1) and another end anchored at a corresponding fixed point of the vehicle cabin (21, 31, 41, 51), that is a point located at a predetermined height.

[0009] With reference to Figs. 6 and 7, the ends of the belts (2) and (3) destined to be anchored to the shaft (1) are denoted by reference numerals "20" and "30" respectively.

[0010] The ends of the shaft (1) are in corresponding seats (11) provided on the inner face of the longer sides of the frame (R).

[0011] The said fixed points (21, 31, 41, 51) correspond to the vertices of an ideal quadrilateral which extends transversely to the cabin of the vehicle and consist of four identical brackets, fixed to the corresponding inner walls of the vehicle cab. Each of said brackets (21, 31, 41, 51) has a vertical surface (U) and two side arms (X). The vertical surface (U) is placed against the respective wall of the cab when the device is assembled. Between the arms (X) of each bracket there is a transverse pin (P) on which it is invested a slot (Q) formed by the end (second end) of the respective belt (2, 3, 4, 5) opposite to the end anchored on the shaft (1). In this way, the second end of each belt (2, 3, 4, 5) is fixed to the respective bracket (21, 31, 41, 51), while the first end is fixed on the shaft (1). In practice, the second end of each belt is folded on itself and sewn to form the above-mentioned slot (Q).

[0012] On the short sides (CR) of the frame (R) there are two appendixes (12), oriented parallel to the long sides (LR) of the same frame and intended to slide in two corresponding vertical guides (6) also fixed to the cabin of the vehicle. In this way, it is possible to stabilize the movement of the frame (R) when the latter is lowered or lifted.

[0013] On each belt (2, 3, 4, 5) there is an "L"-shaped bracket (23, 33, 43, 53) having a wing (W) that supports the frame (R). Each bracket (23, 33, 43, 53) has a slot (T) allowing the passage of the respective belt (2, 3, 4, 5). In practice, each belt (2, 3, 4, 5) can slide in the slot (T) of the respective bracket when it is wound on the shaft (1), or unwound, as further disclosed below.

[0014] The shaft (1) has two longitudinal grooves (13) on diametrically opposite positions in which the first ends of the belts (2, 3, 4, 5) can be inserted. Each groove (13) is shaped as a pocket with a front opening (14) that facilitates the insertion of the first ends of the belts (2, 3, 4, 5) and an inner part (15) having a wider cross section

so as to form a seat that is closed on three sides and is in communication with the opening (14). According to the example shown in the drawings, the grooves (13) are two in number and are diametrically opposite to each other, with the front opening (14) of a groove turned upwards and the opening (14) of the other groove turned downwards, such that said pockets are oriented along two opposite directions.

[0015] Furthermore, the shaft (1) has a central bore (16) allowing its coaxial coupling with the output shaft of the gearmotor (10). However, the shaft (1) can be moved in any other suitable way.

[0016] By operating the gearmotor (10), that is, by rotating the shaft (1) in the clockwise or anticlockwise direction about the respective longitudinal axis (y-y), the belts (2, 3, 4, 5) are subject to winding on the shaft (1), or unwinding, and, therefore, the brackets (23, 33, 43, 53) and the frame (R) are lifted or lowered. As previously said, the four belts (2, 3, 4, 5) are arranged so as to form two pairs (2, 3) and (4, 5), in which the belts (2, 3; 4, 5) of each pair are oriented parallel to a side (LR) of the frame (R). Each pair of belts (2, 3; 4, 5) is connected with a respective first end on the shaft (1) and with a respective second end to a corresponding fixed point (21, 31; 41, 51). A first portion of each belt is wound on the shaft (1) while a second portion of each belt is comprised between the first portion (portion wound on the shaft 1) and the respective fixed anchorage point. In accordance with the present invention, the belts of each of said pairs of belts (2, 3; 4, 5) have their respective portions wound on the shaft (1) on each other and coaxially to the same shaft (1).

[0017] With reference to the example shown in the accompanying drawings, in which the device comprises two pairs of belts (2, 3; 4, 5), there are two pairs of coaxial portions of belts wound on the shaft (1). In Fig. 7 the coaxial portions of the belts (2) and (3) are indicated by the references (21) and (31) respectively.

[0018] This arrangement of the belts used for moving the frame (R) ensures a greater compactness in the transverse direction and allows to have the belts of each pair along a same direction instead of being arranged side by side as in conventional devices. In addition, it is ensured a greater flexibility in the positioning of the stabilizing guides.

[0019] In practice the details of execution may vary in any equivalent way as for what concerns the shape, arrangement and number of the individual elements described, without departing from the scope of the claimed solution and thus remaining within the limits of the protection granted by this patent.

(2, 3, 4, 5), wherein the two belts (2, 3, 4, 5) of each pair of belts are oriented parallel to a side of the base or frame (R), wherein each of said belts has a first end anchored on said shaft (1) and a second end connected to a corresponding fixed anchorage point (21, 31, 41, 51), i.e. anchored to a point (21, 31, 41, 51) placed at a predetermined height, wherein the said shaft (1) is secured to said base or frame (R), wherein the clockwise or counterclockwise rotation of the shaft (1) about its own axis (y-y) determines the winding of the belts (2, 3, 4, 5) on the same shaft (1) or their unwinding and a first portion of each belt is wound on the shaft (1) while a second portion of each belt is comprised between the first portion wound on the shaft (1) and the respective fixed anchorage point, device **characterized by** the fact that the belts of each of said pairs of belts (2, 3, 4, 5) have their respective portions wound on the shaft (1) on each other and coaxially to the same shaft (1).

2. Device according to claim 1, **characterized in that** said shaft (1) is provided with longitudinal grooves (13) inside which the first end of each belt (2, 3, 4, 5) is secured.
3. Device according to claim 2, **characterized in that** said longitudinal grooves (13) are two in number and are provided on diametrically opposite positions.
4. Device according to claim 1, **characterized in that** on the second end of each of said belts (2, 3, 4, 5) is formed a slot (Q) inserted on a respective pin (P) in the corresponding fixed point (21, 31, 41, 51).
5. Device according to one or more of the preceding claims, **characterized in that** said belts (2, 3, 4, 5) are four in number and they form two pairs of belts (2, 3; 4, 5).

Claims

1. Device for handling a bed structure, comprising a base or frame (R) on which a mattress can be placed and a shaft (1) driven by a motor unit (10) and on which there are anchored a plurality of pairs of belts

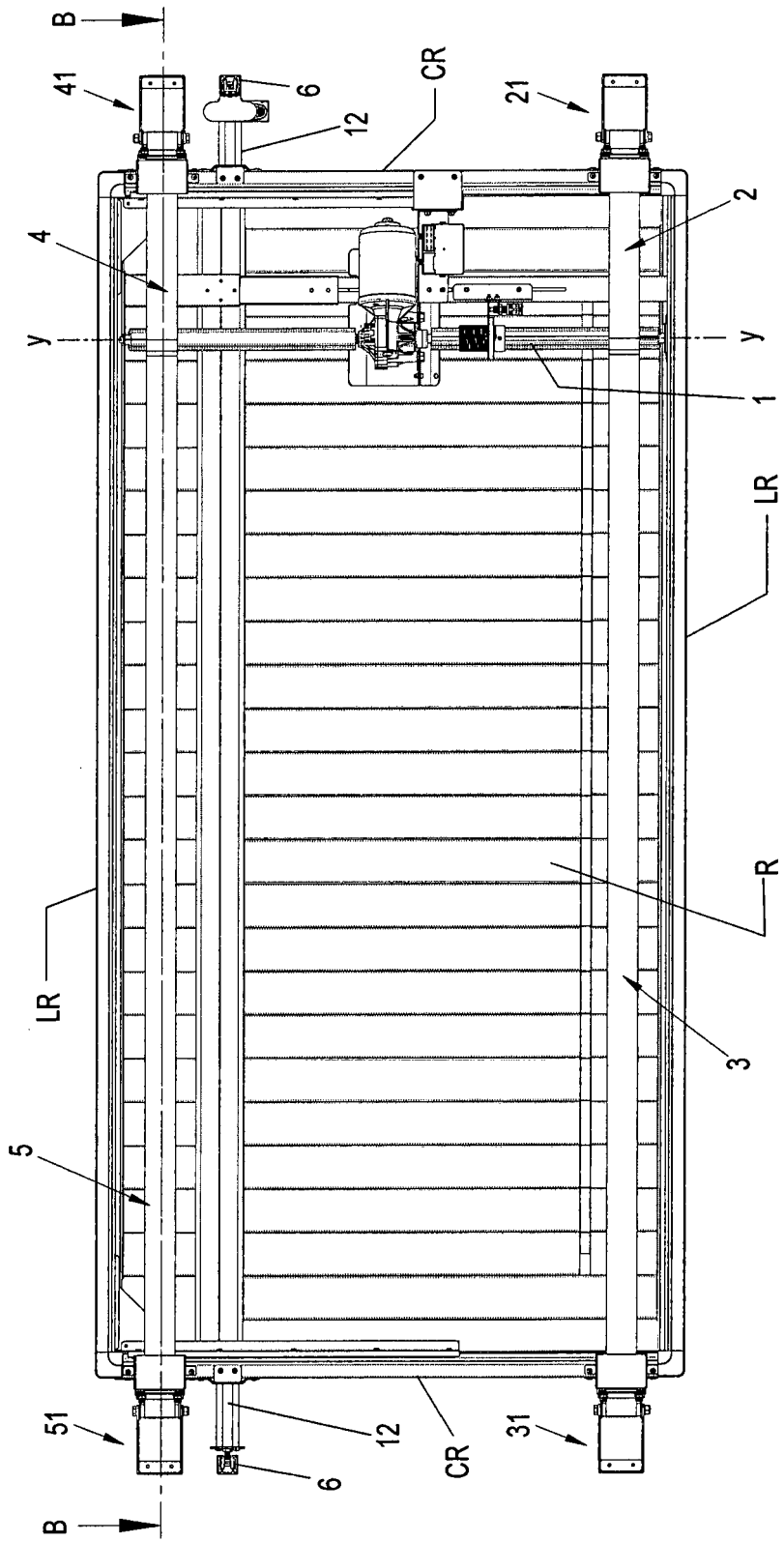


FIG.1

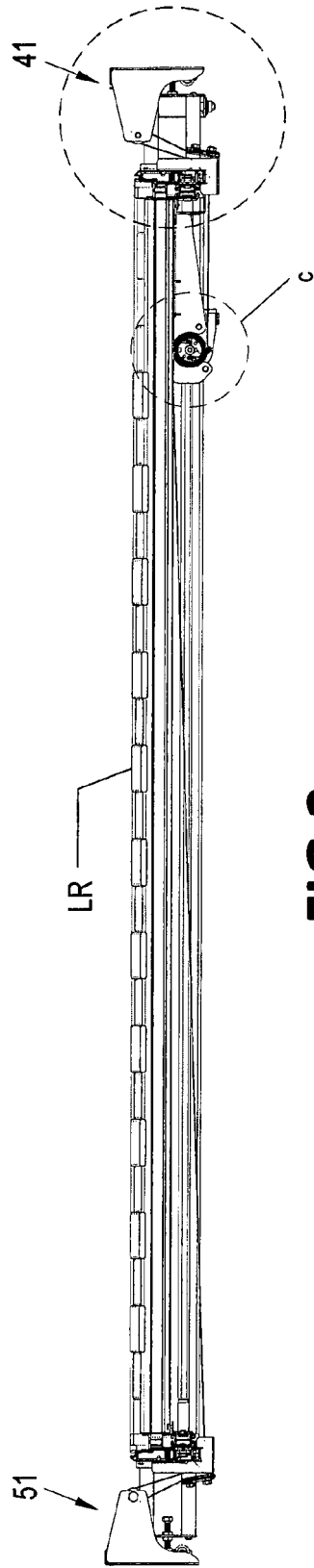


FIG. 2

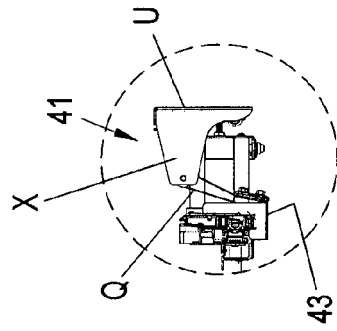


FIG. 12

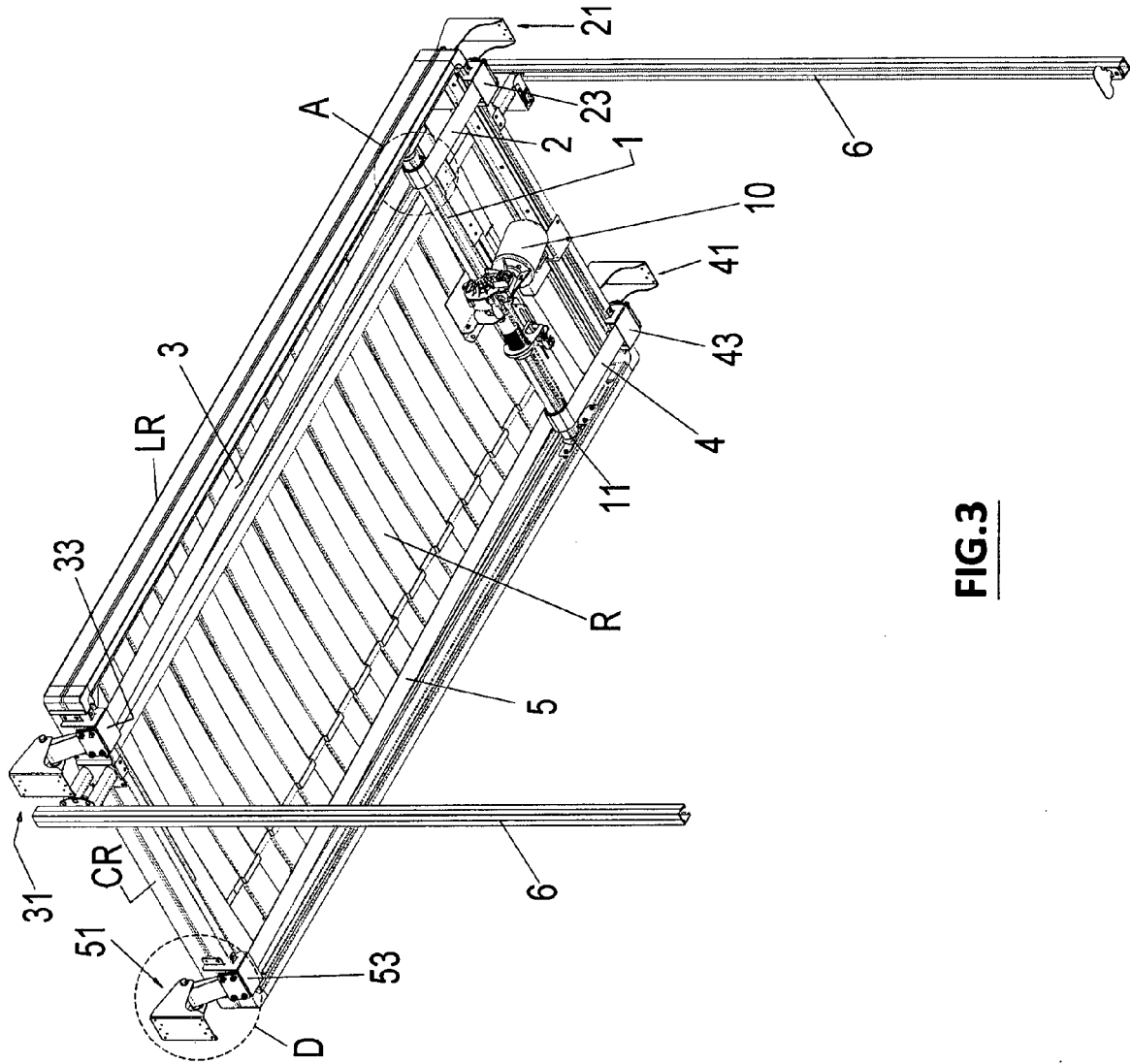


FIG.3

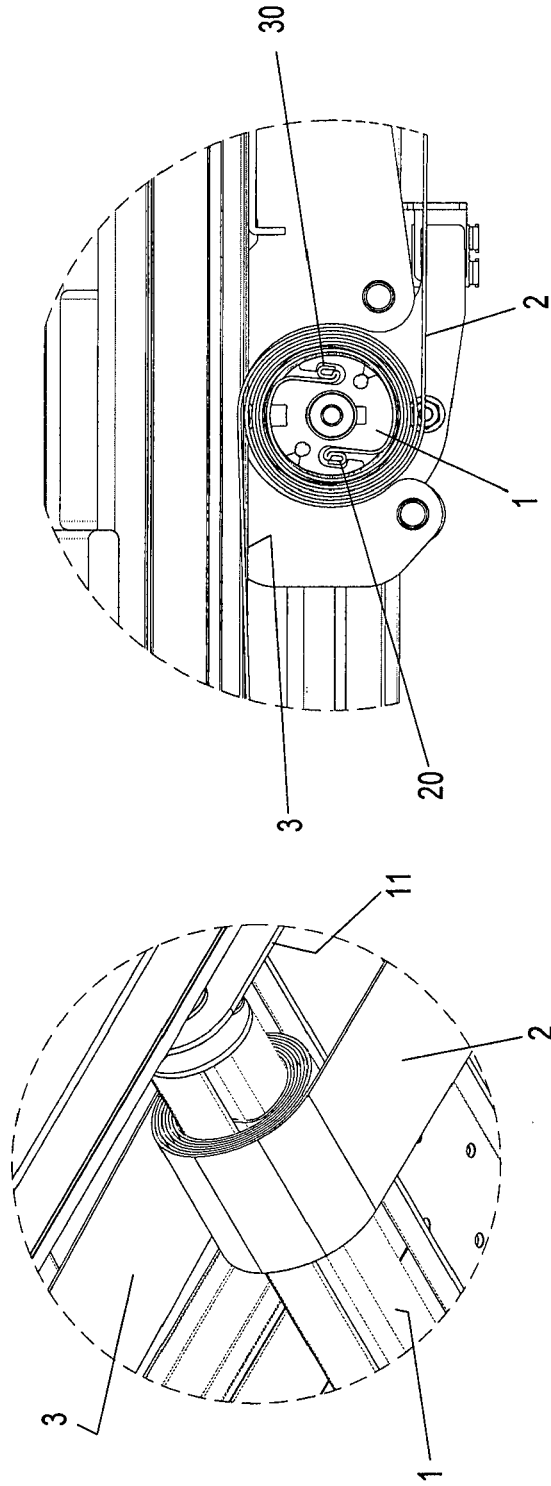


FIG. 4

FIG. 5

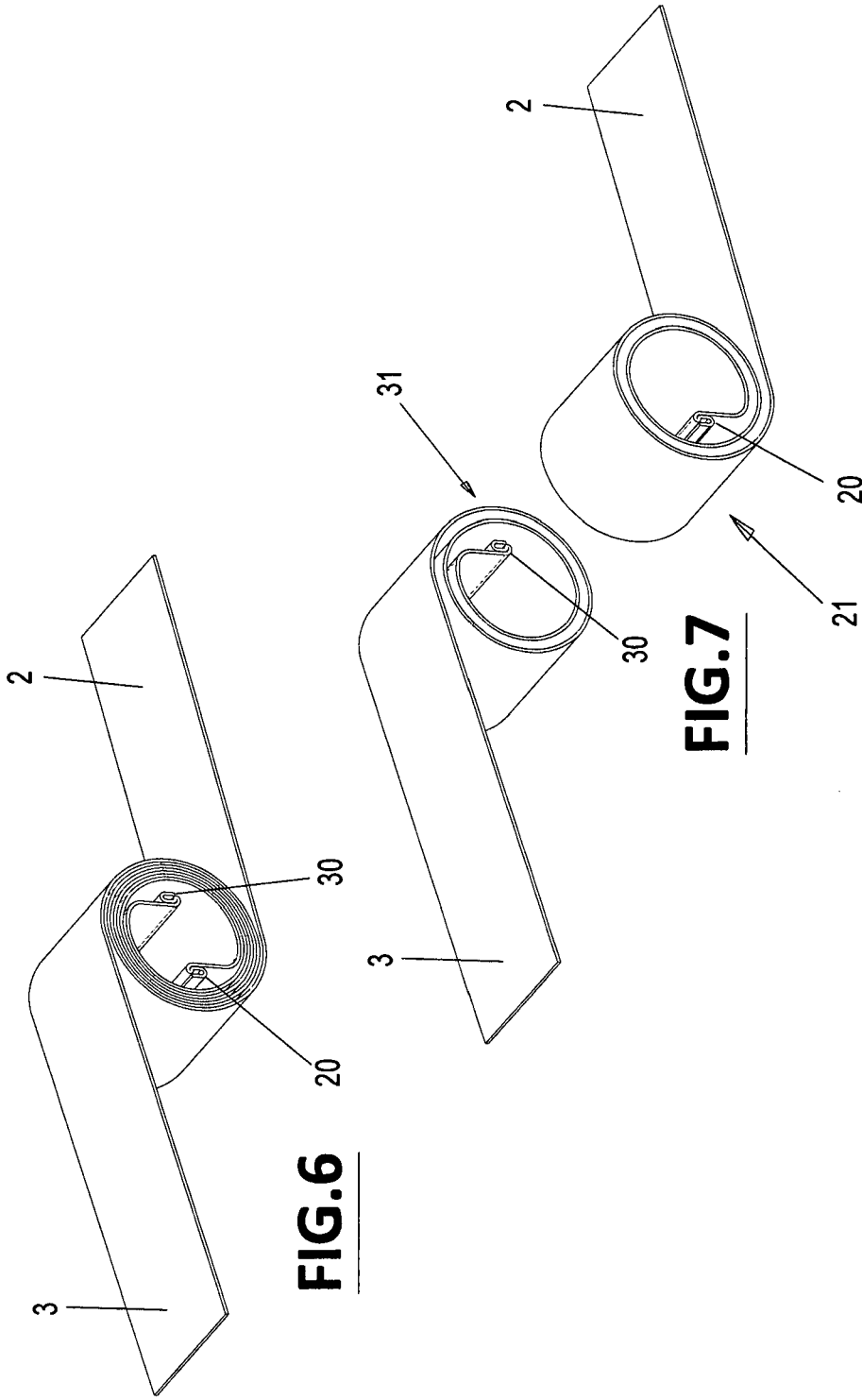


FIG. 6

FIG. 7

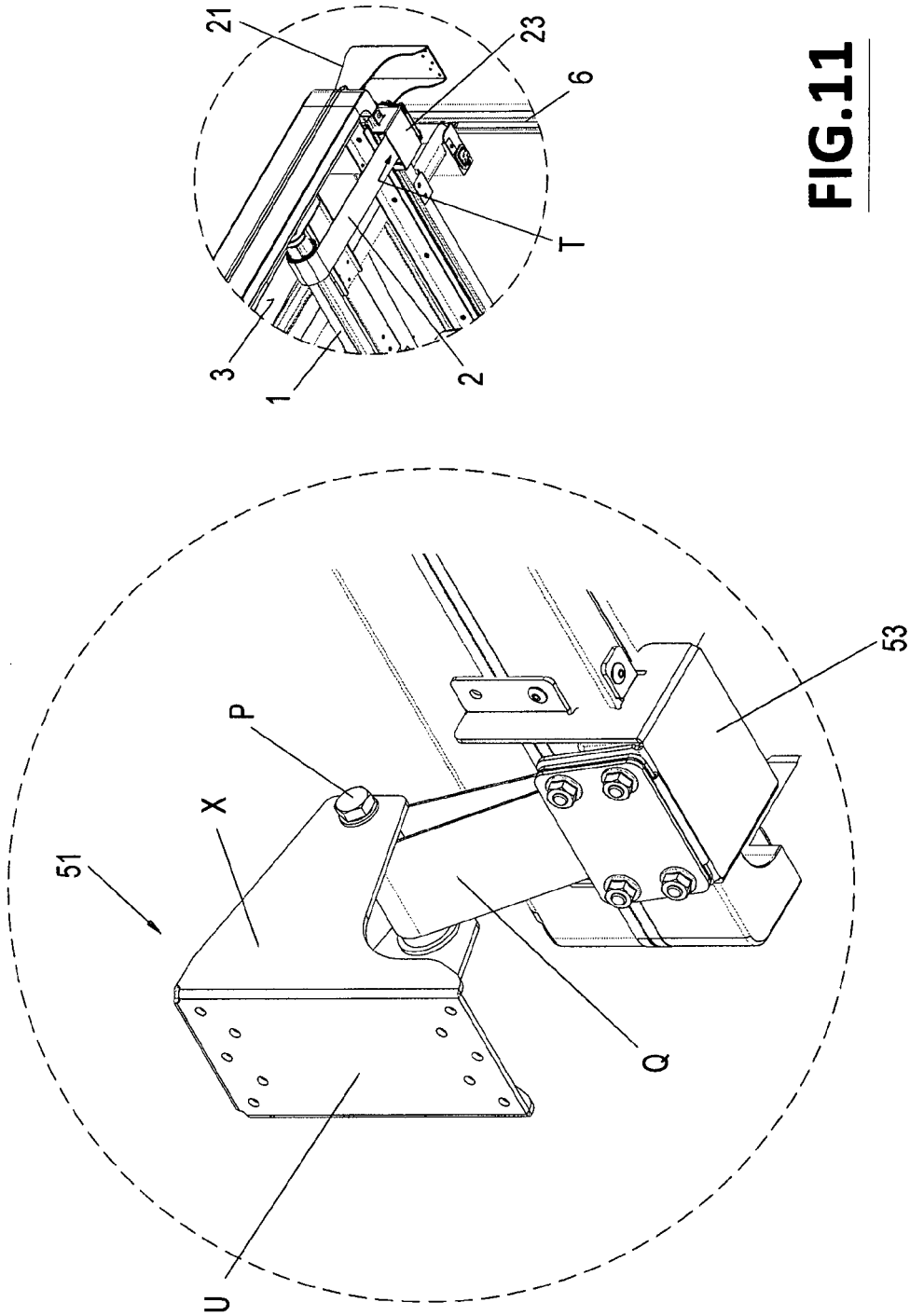


FIG.11

FIG.8

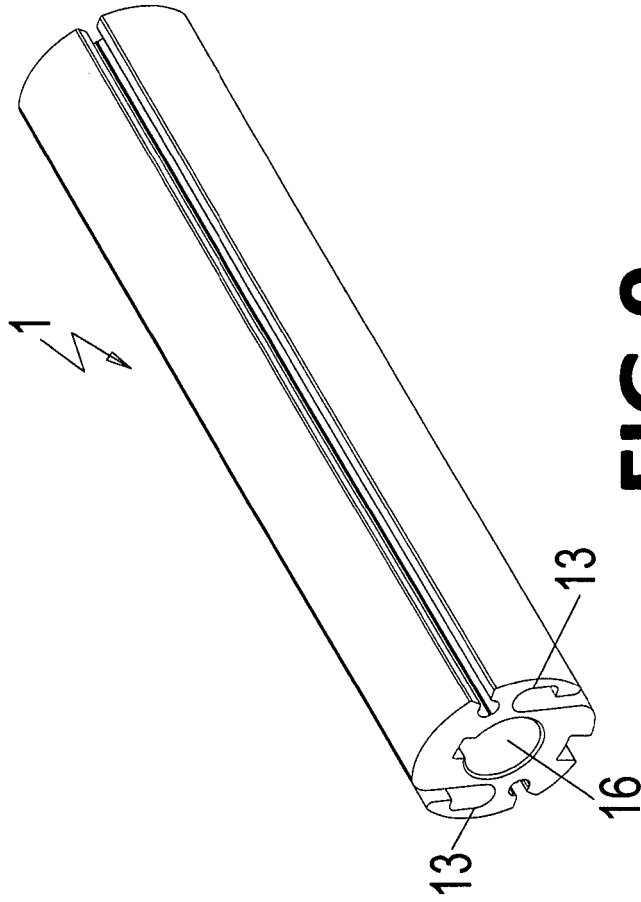


FIG. 9

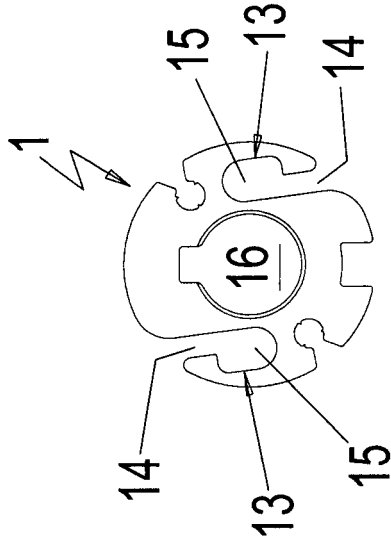


FIG. 10



EUROPEAN SEARCH REPORT

Application Number
EP 14 00 4085

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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) |
| A | WO 2010/092607 A1 (NARDINI DAVIDE [IT]) 19 August 2010 (2010-08-19) * the whole document * ----- | 1-5 | INV. A47C17/84 A47C17/80 B66D1/30 B66D1/34 B66D1/48 |
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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 30 March 2015 | Examiner Amghar, Norddin |
| <p>CATEGORY OF CITED DOCUMENTS</p> <p>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</p> <p>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</p> | | | |

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 14 00 4085

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