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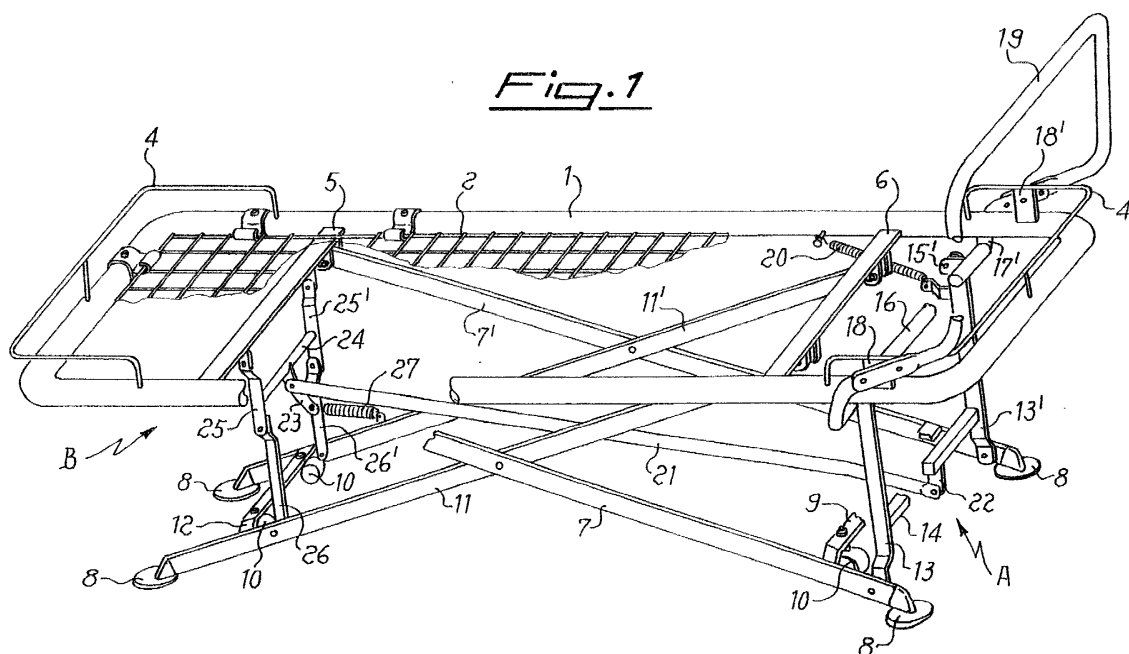
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(54) **Lifting mechanism for beds and the like**

(57) Lifting mechanism for beds and the like, which comprises at least one frame (1) under which two pairs of mutually and crosswise hinged legs (7, 7', 11, 11') are pivoted so that they can extend downwards or retract upwards with a movement which depends on at least

one control lever system (A) comprising one or more levers (13, 13') pivoted to at least one of said legs (7, 7') and to one or more arms (17, 17') pivoted to the frame (1) or to members (18, 18') substantially integral with the latter.



Description

[0001] The present invention relates to a lifting mechanism for beds and the like, and in particular to a lifting mechanism which allows to lift and lower by means of one or more lever systems the frame supporting the bedspring on which the mattress is laid.

[0002] Lifting mechanisms for beds or stretchers are known to comprise a frame under which two pairs of mutually and crosswise hinged legs are pivoted so that they can extend downwards or retract upwards. These known mechanisms, which for example serve for lowering the bed when it is not used, involve the disadvantage of being provided with fixing means for preventing the accidental lowering of the mechanism, which can be engaged or released by manually operating under the frame itself.

[0003] It is therefore an object of the present invention to provide a mechanism free from said disadvantage. This object is achieved with a mechanism, the main features of which are disclosed in the first claim and other features are disclosed in the subsequent claims.

[0004] Thanks to the particular control lever system which is provided with, the mechanism according to the present invention allows to lower and lift in an easy and quick way the frame on which the mattress is arranged. Furthermore, thanks to the handle which it can be provided with, the mechanism according to the present invention presents the advantage of comfortably lifting and lowering the frame by operating onto a member easy to use arranged above the same frame.

[0005] Another advantage of the mechanism according to the present invention consists in that it can comprise a control lever system and an auxiliary lever system mechanically connected to each other, so as to make the mechanism stability in the lifted position easy, without compromising the easiness of its change to the lowered position, and vice versa.

[0006] A further advantage of the mechanism according to the present invention consists in that, while in the lowered position it can stably rest on a plurality of support feet, in the lowered position it can automatically rest on a plurality of wheels which make its displacement easy, for instance under another bed.

[0007] According to a particular aspect of the invention, the mechanism can be provided with a plurality of pulling springs which facilitate the change from the lifted position to the lowered one, and vice versa.

[0008] Further advantages and features of the mechanism according to the present invention will be clear to those skilled in the art from the following detailed and non-limiting description of an embodiment thereof with reference to the attached drawings, wherein:

- figure 1 shows a partial perspective view of a mechanism according to the present invention in the lifted position;
- figure 2 shows a lateral view in a longitudinal cross-

section of the mechanism of figure 1;

- figure 3 shows a partially cross-sectioned lateral view of the mechanism of figure 1 slightly lowered; and
- figure 4 shows a partially cross-sectioned lateral view of the mechanism of figure 1 completely lowered.

[0009] Referring to figure 1, it is seen that the mechanism according to the present embodiment of the invention comprises in a known way at least one rectangular frame 1 in which means 2, for instance a bedspring, suitable for supporting a mattress 3 (shown with a thin line) are fixed. A pair of railings 4, 4' for containing mattress 3 is arranged at the front and rear ends of frame 1. A front crossbar 5 and a rear crossbar 6, arranged about halfway between the center and the front and rear ends, respectively, of frame 1, are further fixed to the same frame. An end of a pair of outer legs 7, 7' provided with support feet 8 at the opposite end is pivoted in a horizontal eyelet made in a pair of hinges fixed under the front crossbar 5. A crossbar 9 connecting legs 7, 7' and supporting a pair of pivoting wheels 10 slightly raised with respect to feet 8 is also arranged near the latter free end of the same legs. An end of a pair of inner legs 11, 11' provided with support feet 8 at the opposite end is further pivoted in a horizontal eyelet made in a pair of hinges fixed under the rear crossbar 6. A crossbar 12 connecting legs 11, 11' and supporting a pair of pivoting wheels 10 slightly raised with respect to feet 8 is further arranged near the latter free end of the same legs. Each of the outer legs 7, 7' is mutually pivoted to one of the inner legs 11, 11' so that all the four legs 7, 7', 11 and 11' can extend downwards or retract upwards. The two pairs of legs 7, 11 and 7', 11' therefore are mutually hinged crosswise so as to form two pairs of X.

[0010] The movement of legs 7, 7', 11 and 11' suitably depends on at least one control lever system A comprising a pair of levers 13, 13' which are connected by a crossbar 14 and have one end pivoted to one of the outer legs 7, 7' near the support feet 8 and the opposite end pivoted to a pair of tongues 15, 15' soldered to a transverse bar 16 which, hitting under frame 1, prevents the mechanism from lowering under a determinate level. Bar 16 is fixed between a pair of curved arms 17, 17' pivoted to a pair of plates 18, 18' soldered between frame 1 and the rear railing 4'. The ends of a tubular handle 19 transversely arranged astride frame 1 are fixed in a removable way with two pairs of bolts to arms 17, 17' so that a user, by lifting or lowering handle 19, can rotate bar 16, levers 13, 13' and therefore lift or lower legs 7, 7', 11 and 11'. The lifting of legs 7, 7', 11 and 11' can be facilitated by a pulling spring 20 fixed between frame 1 and lever 13'.

[0011] The control lever system A is further preferably connected to an auxiliary lever system B through a longitudinal rod 21 having one end pivoted to a tongue 22 soldered to crossbar 14 and the other end pivoted about

in the middle of a tongue 23 soldered to a crossbar 24 fixed between a pair of levers 25, 25' pivoted under the front crossbar 5. The free end of a further pair of levers 26, 26' pivoted to the inner legs 11, 11' near crossbar 12 is pivoted to the free end of the pair of levers 25, 25'. Levers 26, 26', once they pass a dead-point consisting of the alignment with levers 25, 25', hit against crossbar 12 and prevent the lowering of the mechanism. A pulling spring 27 can be fixed between the free end of tongue 23 and the longitudinal rod 21 for dampening the final lowering movement of legs 7, 7', 11 and 11'.

[0012] With reference also to figure 2, it is seen that during the use, for changing the mechanism according to the present invention from the lifted position to the lowered one, it is sufficient to rotate downwards handle 19 in the direction indicated by arrow 28, so as to rotate bar 16 in the direction indicated by arrow 29 and levers 13, 13' in the direction indicated by arrow 30. The rotation of levers 13, 13' causes the moving back of rod 21, the consequent mutual folding of levers 25, 25', 26 and 26' in the direction indicated by arrow 31, and then the lowering of frame 1 in the direction indicated by arrow 32.

[0013] Figure 3 shows the mechanism according to the present invention during the lowering. It is to be noted in particular how levers 25, 25', 26 and 26', operated by rod 21, have passed in this position the dead-point consisting of the mutual alignment and do not impede anymore the lowering of the mechanism.

[0014] Figure 4 shows the mechanism according to the present invention completely lowered. It is to be noted in particular how support feet 8 in this position are slightly raised with respect to wheels 10, which therefore allow the easy displacement of the mechanism when it is in the lowered position. It is further to be noted how handle 19 rests on mattress 3, so as to reduce to the minimum the overall height of the lowered mechanism. If mattress 3 is not present, for instance during the transport, it is possible to dismount handle 19 from arms 17, 17' for further reducing the overall height of the mechanism according to the present invention.

[0015] Obviously, for lifting the mechanism according to the present invention it is sufficient to rotate upwards handle 19, so as to operate in an inverse manner the lever systems A and B.

[0016] Modification and/or additions may be made by those skilled in the art to the above described and illustrated embodiment remaining within the scope of the same invention.

Claims

1. Lifting mechanism for beds and the like, which comprises at least one frame (1) under which two pairs of mutually and crosswise hinged legs (7, 7', 11, 11') are pivoted so that they can extend downwards or retract upwards, **characterized in that** the move-

ment of the legs (7, 7', 11, 11') depends on at least one control lever system (A) comprising one or more levers (13, 13') pivoted to at least one of said legs (7, 7') and to one or more arms (17, 17') pivoted to the frame (1) or to members (18, 18') substantially integral with the latter.

2. Mechanism according to the previous claim, **characterized in that** a handle (19) transversely arranged astride, the frame (1) is fixed, in particular in a removable way, to the arms (17, 17') of the control lever system (A).

3. Mechanism according to one of the previous claims, **characterized in that** the control lever system (A) comprises a pair of levers (13, 13') which have one end pivoted to one of the legs (7, 7') near their free end and the opposite end pivoted to a transverse bar (16) fixed between a pair of arms (17, 17') pivoted to the frame (1) or to members (18, 18') integral with the latter.

4. Mechanism according to the previous claim, **characterized in that** the transverse bar (16) is suitable for hitting under the frame (1) when the mechanism is in the lifted position.

5. Mechanism according to claim 3 or 4, **characterized in that** the levers (13, 13') of the control lever system (A) are pivoted to a pair of tongues (15, 15') integral with the transverse bar (16).

6. Mechanism according to one of the previous claims, **characterized in that** the control lever system (A) comprises a pulling spring (20) fixed between the frame (1) and one (13') of said levers (13, 13').

7. Mechanism according to one of the previous claims, **characterized in that** the control lever system (A) is connected to an auxiliary lever system (B) through at least one rod (21) pivoted to both lever systems (A, B).

8. Mechanism according to the previous claim, **characterized in that** said rod (21) is pivoted to at least one of the levers (13, 13') of the control lever system (A) or to one or more members (14, 22) integral with these levers (13, 13'), as well as is pivoted to one or more levers (25, 25') of the auxiliary lever system (B) or to one or more members (23, 24) integral with the latter levers (25, 25').

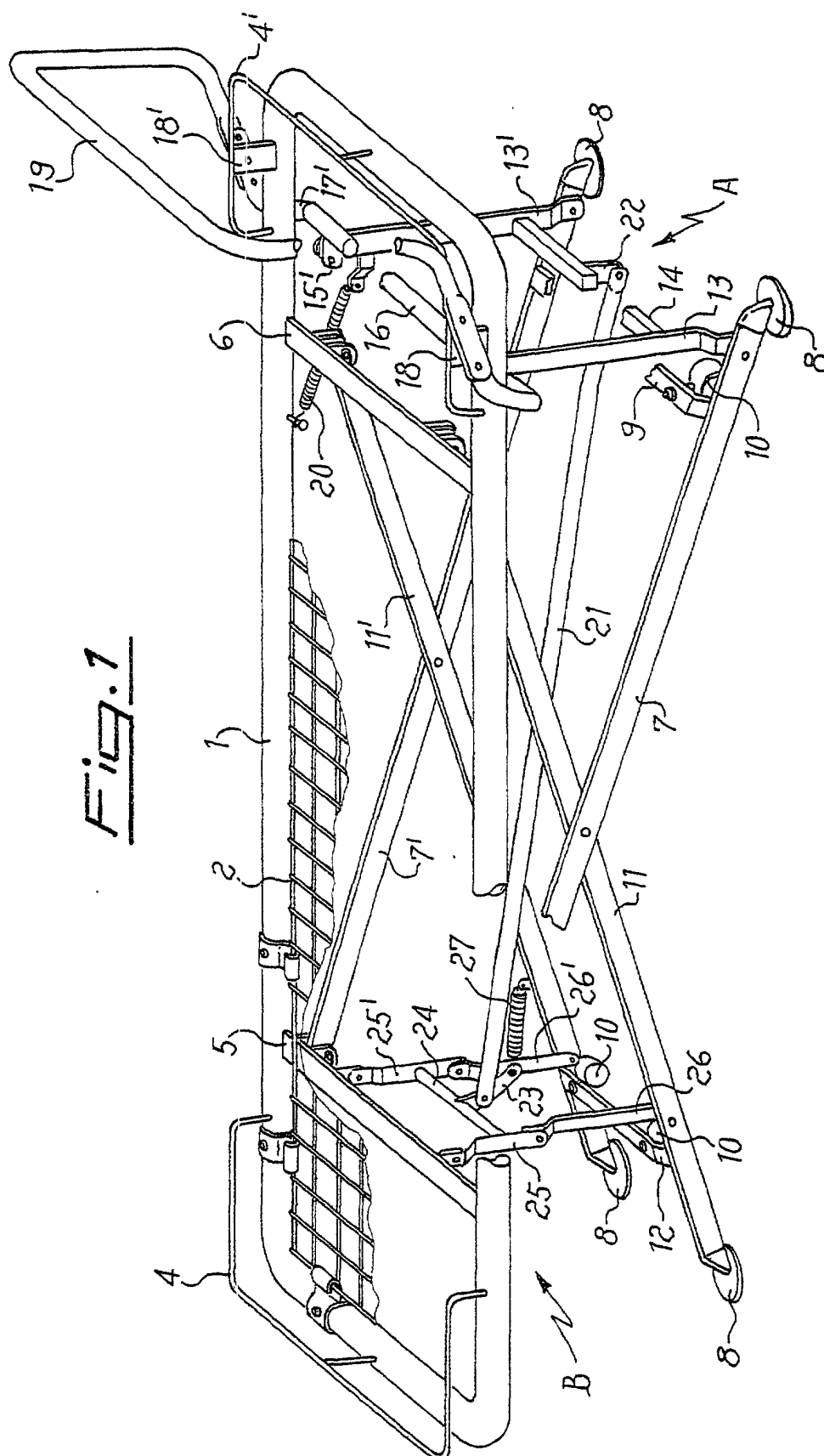
9. Mechanism according to the previous claim, **characterized in that** said levers (25, 25') of the auxiliary lever system (B) have one end pivoted under the frame (1) and the other end pivoted to one or more further levers (26, 26') pivoted to at least one of the legs (11, 11') near the free ends of the latter.

10. Mechanism according to the previous claim, **characterized in that** said further levers (26, 26') are suitable for hitting against a crossbar (12) arranged between two legs (11, 11') when the mechanism is in the lifted position. 5
11. Mechanism according to one of claims 7 to 10, **characterized in that** said rod (21), at the side of the auxiliary lever system (B), is pivoted to one tongue (23) integral with a crossbar (24) arranged between a pair of levers (25, 25') pivoted under the frame (1). 10
12. Mechanism according to the previous claim, **characterized in that** the auxiliary lever system (B) comprises a pulling spring (27) fixed between said tongue (23) and said rod (21). 15
13. Mechanism according to one of the previous claims, **characterized in that** wheels (10) slightly raised with respect to the free ends of the legs (7, 7', 11, 11') when the mechanism is in the lifted position are arranged near these ends. 20
14. Mechanism according to the previous claim, **characterized in that** support feet (8) slightly raised with respect to said wheels (10) when the mechanism is in the lowered position are arranged at the free ends of the legs (7, 7', 11, 11'). 25
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15. Mechanism according to one of the previous claims, **characterized in that** the legs (7, 7', 11, 11') are pivoted under the frame (1) by means of hinges provided with a horizontal eyelet and fixed under crossbars (5, 6) integral with the frame (1). 35
16. Mechanism according to the previous claim, **characterized in that** said crossbars (5, 6) are arranged about halfway between the center and the ends of the frame (1). 40

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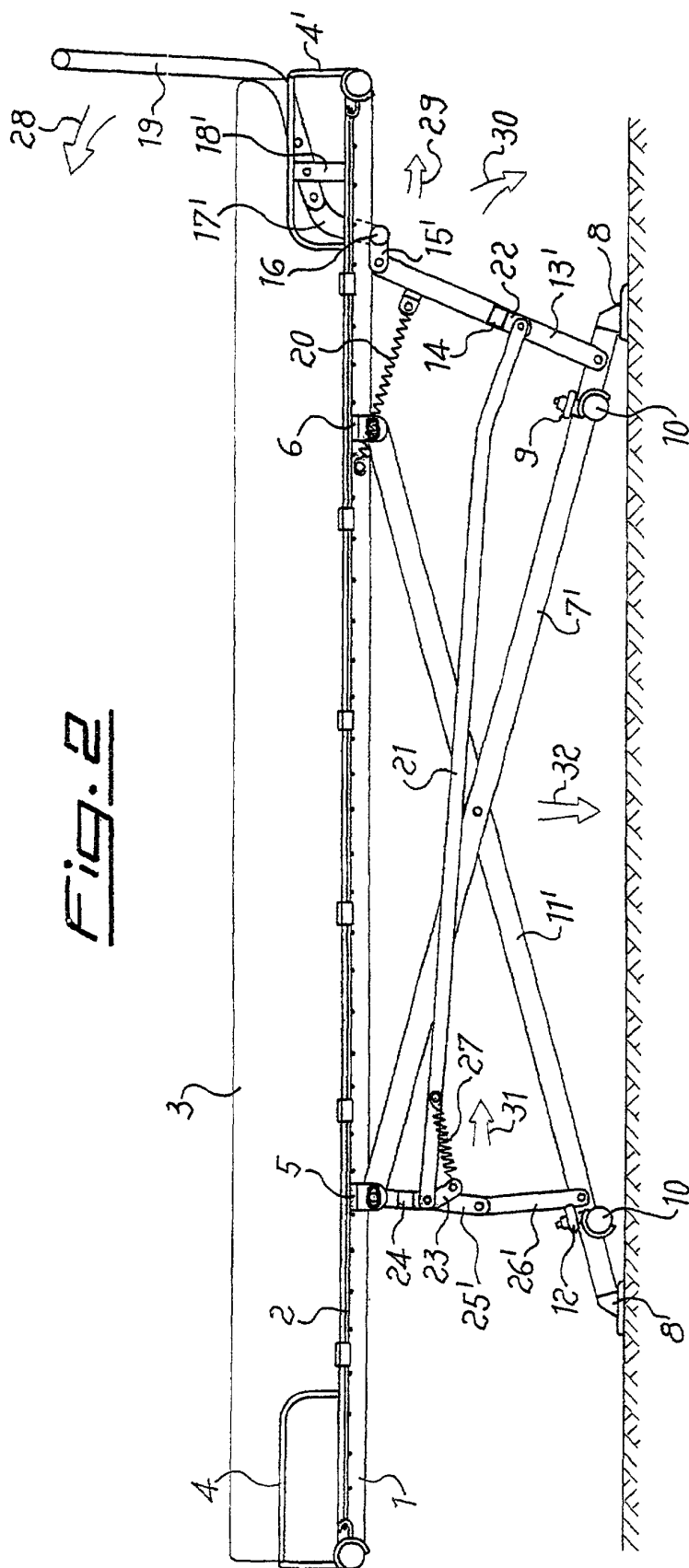


Fig. 3

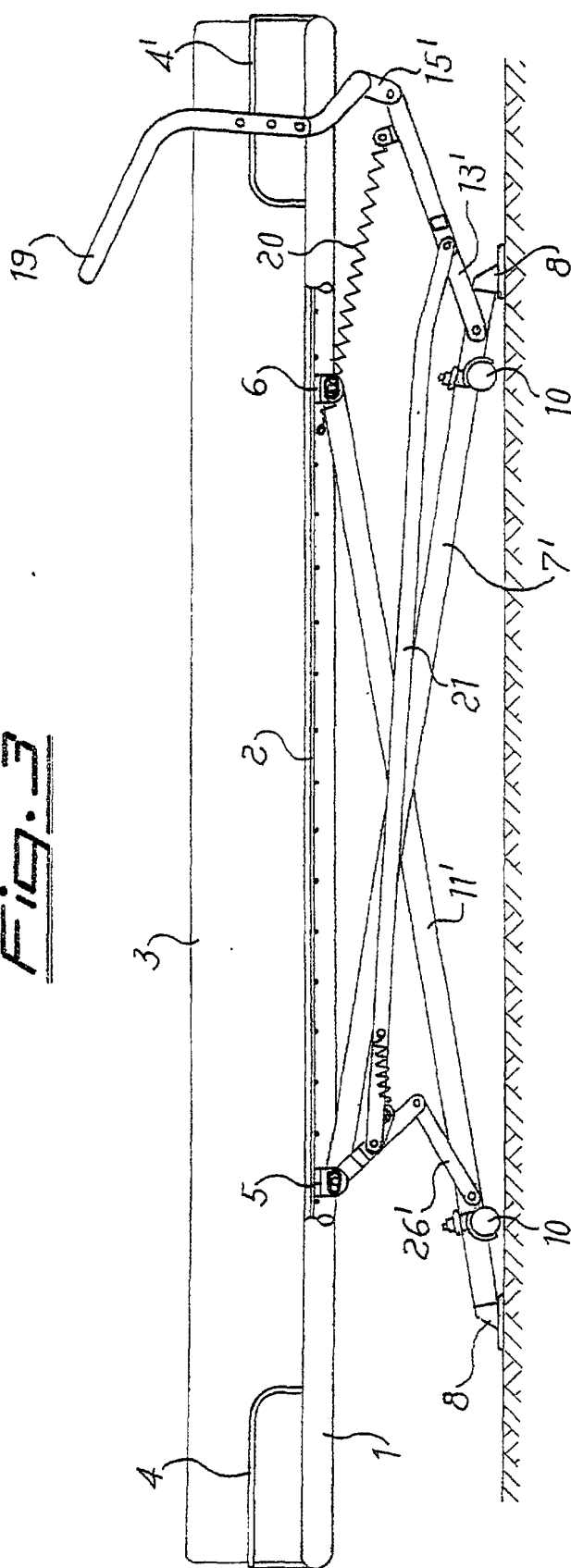


Fig. 4

