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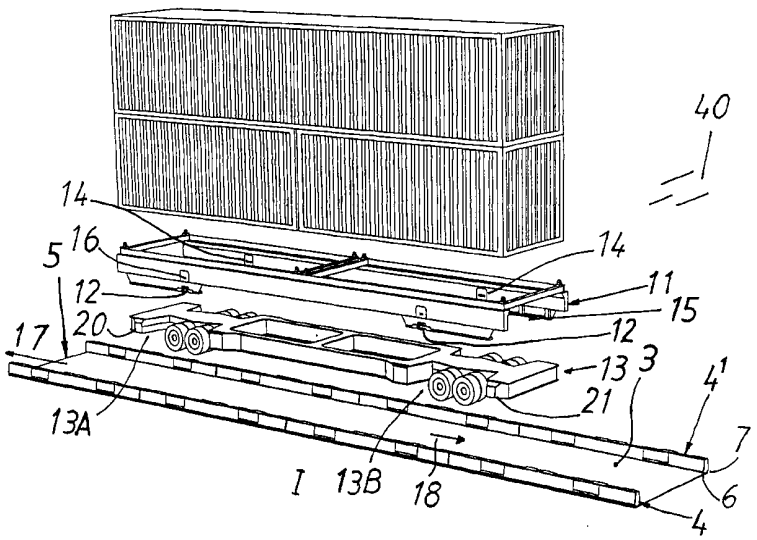

(57) Abstract

The invention relates to an arrangement (1) for locking cargo (2) to a deck (3) on board a ship (40). Lateral dividing profiles (4, 4¹), which are capable of being laid out on the deck (3) and secured to it, and which are so arranged as to form loading lanes (5) between pairs of rows, exhibit lock-accommodating openings (6, 7) to accept rotatable and/or movable locking devices (12; 151) from trailer supports and/or cargo cassettes capable of being parked in the cargo lane (5). Present on the trailer supports and/or load cassettes (11) in question is a mechanism (14) which is connected to the aforementioned locking device (12) for the purpose of releasing it or locking it, in conjunction with which a cargo vehicle (13), which can be driven along and between the dividers (4, 4¹) is so arranged as to actuate the mechanism when the cargo vehicle in question passes the mechanism.

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Device for a loading deck

The present invention relates to an arrangement for locking cargo to a deck on board a ship.

Previously disclosed arrangements for locking a cargo to a deck are, for example, straps, lines and similar tensioning devices, in conjunction with which use is made of existing cargo fittings in the deck of the ship.

Securing of cargo carriers, for example cargo cassettes, is performed only at each end of a positioned row of cargo carriers with the help of counter-pressure components, while cargo trailers have previously been secured to existing cargo openings with the help of straps, for example, in accordance with the above. These previously disclosed devices did not, however, permit so-called automatic activation of the locking devices, and this has had to be performed manually, which has been dangerous and time-consuming for the personnel responsible for securing the cargo. The aforementioned previously disclosed means also did not effectively permit the close packing of freight.

The principal object of the present invention is thus, in the first instance, to solve the aforementioned problems by simple and efficiently functioning means.

The aforementioned object is achieved by means of an arrangement in accordance with the present invention, which is characterized essentially in that lateral dividing profiles, which are capable of being laid out on the deck and secured to it, and which are so arranged as to form loading lanes between pairs of rows, exhibit either lock-accommodating openings to accept rotatable and/or movable locking devices from trailer supports and/or cargo cassettes capable of being parked in the cargo lane or locking devices capable of lateral displacement from lateral dividing profiles, which are so arranged as to interact with trailer supports, cargo vehicles, cargo cassettes and/or some other cargo capable of being parked in the cargo lane, and in that

present on the trailer support and/or load cassette or lateral dividing profiles in question is a mechanism which is connected to the aforementioned locking device for the purpose of releasing it or locking it, in conjunction with which a cargo vehicle, which can be driven along and between the dividers, is so arranged as to actuate the mechanism when the cargo vehicle in question passes the mechanism.

The invention is described below as a number of preferred illustrative embodiments, in conjunction with which reference is made to the accompanying drawings, in which:

Fig. 1 shows a first example with the cargo supported on a load carrier of the cassette type and in a position in which it is loaded and locked to the deck;

Fig. 2 shows an exploded view of the entire cargo arrangement illustrating the lateral dividing profiles laid out and secured to the deck;

Fig. 3 shows a partial view of a locking mechanism on a cargo cassette;

Fig. 4 shows the locking mechanism in an intended locked position;

Fig. 5 shows the locking mechanism in a released position;

Figs. 6-7 shows the locking mechanism in two different intermediate connection positions;

Fig. 8 shows a bottom perspective view of the load cassette and a lateral dividing profile positioned to the side with the locking mechanism in the locked position;

Figs. 9-16 show a second illustrative embodiment with cargo trailers, where:

Fig. 9 shows how a cargo container on a trailer is transported on the deck by a cargo vehicle along lateral dividing profiles positioned to the side;

Fig. 10 shows an exploded view of the system shown in Fig. 9;

Fig. 11 shows a trailer support standing on a deck and illustrated in the opened position ready for locking;

Figs. 12-13 show details of a locking mechanism included in the trailer support with the support in a locked position;

Fig. 14 shows a bottom view of the aforementioned trailer support in a position with a locking device locked to a lateral dividing profile positioned to the side;

Fig. 15 shows the trailer support viewed in perspective at an angle from above;

Fig. 16 shows a side support leg of the trailer support with the constituent locking device in a position locked to a profile; and

Figs. 17-23 show different embodiments of locking devices accommodated in lateral dividing profiles.

The invention, which is illustrated in the drawings, is in the form of an arrangement 1 and 101 which is arranged for the detachable locking of a cargo 2 and 102 to a deck 3 on board a ship 40 and comprises long lateral dividing profiles 4, 4^1, which are capable of being set up on the deck 3 and of being locked to the deck 3, which profiles are so arranged as to form cargo lanes 5 between pairs of profiles 4, 4^1 … arranged in rows.

The aforementioned lateral dividing profiles 4, 4^1 appropriately exhibit in accordance with a number of illustrative embodiments channel-like lock-accommodating openings 6, 7, which are situated at the lower end 4A of the profiles to either side of a stand part 8 forming the bottom, from which a number of securing devices 9 project in a direction downwards, appropriately in the form of a laterally extending retaining component 10 attached to an upright 11, which can be tightened from the inside of the profile 4 after

the retaining component 10 has been introduced into a matching opening in the deck 3.

In this way, the profile 4 is clamped securely to the deck 3 and forms lane dividers when driving cargo along it on the deck 3.

The lateral lock-accommodating openings 6, 7 are adapted in size to accommodate rotatable and/or movable locking devices 151, 12 from trailer supports 150 and/or cargo cassettes 11 capable of being parked in the cargo lane 5 on the deck. Present on the trailer support 150 and/or the load cassette 11 in question is a mechanism 14, 154 which is connected to the aforementioned locking device for the purpose of releasing I, CI or locking II, CII the trailer support 150 or the cargo cassette 11. A cargo vehicle 13, 113, which can be driven along and between the profiles 4, 4^1, is so arranged as to actuate the mechanism 14, 154.

In accordance with the invention illustrated in the drawings in Figs. 9-16, the aforementioned trailer support 150, which is formed appropriately by a portal-shaped support component with a connecting pin 153 on its underside and internally within it, which pin is capable of detachable attachment to a cargo tractor vehicle 113 of the kind in question, has a mechanism 154 capable of actuation by the tractor vehicle. The aforementioned mechanism is so arranged, as a result of actuation by the cargo tractor vehicle 113, as to cause the locking devices 151 in the trailer support stand 150 to be moved into a released position CI in which they are disengaged from the profiles 4, 4^1. When the cargo tractor vehicle 113 is disconnected from the trailer support, the locking devices 151 in the trailer support 150 are so arranged as to be positively guided into a locked position CII.

Present in conjunction with this is a spring element 161 in the form of a draw spring, which is so arranged, when in the unactuated position by the cargo

tractor vehicle 113, as to cause the locking devices 151 to move to the locked position CII and into engagement with the profiles 4, 4' and their lock-accommodating openings 6, 7 in the profiles 4, 4'.

The aforementioned actuating mechanism 154 is formed by an actuating component 155 capable of being pushed in by the cargo tractor vehicle 113, for example by means of its turntable 167, and situated on the side of a kingpin 153, which actuating component in the case illustrated here is formed by a vertically guided upright which, with its bottom part 155A, is attached in an articulated fashion to a pivoting arm 156. Supported on the top part 155B of the upright is a rotating pulley wheel 183, which is so arranged as to extend along a plane extending in the longitudinal median plane 157 of the trailer support 150. The aforementioned actuating component 155 is attached via cables 159, 160 to the locking device 151 in question and a spring 161.

The function of the aforementioned defined arrangement 101 should have been appreciated from the above description, although briefly it functions as follows:

A cargo vehicle 113 reverses in under a trailer support 150 of the kind in question, in conjunction with which the mechanism 154 is caused by the cargo tractor vehicle 113 and its turntable 182 to push in the upright 155. The two cables 159, 160, each of which is attached to the axle 164, 165 of its own deflector pulley 162, 163, are tensioned in conjunction with this. The springs 161, one in each trailer support leg 166, 167, normally try to pull on the locking devices 151 so that they adopt their locked position; see Fig. 13. The locking devices can be in the form of pairs of pivotally mounted blocks 151, each of which is rigidly attached to its own vertical axle 168, 169. Each of the aforementioned axles 168, 169 is rigidly attached to its own horizontal arm 170, 171, which, with the help of an

articulated connecting link arm 172, provides simultaneous pivoting of the locking devices 151.

The link arm 172 has a support 173, to which the spring 161 and the cables 159 and 160 on the other leg are attached. Pulling on the cable in the direction 174 causes extension of the spring 161, in conjunction with which the axles 168, 169 rotate in the locking devices 151 in the associated cavity 175, 176 in the trailer support legs 166, 167, after which the trailer support 150 will have been released from engagement with the locking devices 151 in the matching lock-accommodating openings 6, 7 in the profiles 4, 4^1. The cargo trailer 177 can then be connected to its kingpin 178 in a turntable 179 on the top side 150B of the trailer support 150.

After the rig has reversed into the ship between the profiles 4, 4^1, the cargo tractor vehicle 113 is disconnected from the cargo trailer and the trailer support 150, in conjunction with which the upright 155 is caused to be displaced downwards when the spring 161 relaxes, and the locking devices 151 are caused to pivot out into the locked position. The arrangement 101 thus has a simple and effective function. The rear part of the cargo trailers is attached securely to the deck 3 by means of straps 180, which are normally kept rolled up in compartments 181 in the profiles 4, 4^1.

The nature of the embodiment in accordance with the other drawings 1-8 is such that the cargo cassettes 11 exhibit a centrally located space 15 to accommodate a cargo vehicle 13, which has lifting means enabling a cassette 11 to be hoisted to the desired level for transport or setting down on the deck 3. Projecting actuating devices 16-16^3 are provided and are so arranged as to be actuated by the cargo vehicle 13 as it drives into the inner space of the cassette 15 in both directions of travel 17, 18. A rotating component 19, which is rotatably attached to a rotatable

locking device 12, has a number of such radially projecting pivot pins 16-16', which are connected to the rotating component 19.

The aforementioned cargo vehicle 13 exhibits lateral stops 20, 21 at each end 13A, 13B of the vehicle to either side of it. The aforementioned stops 20,21 project laterally in order to come up against an actuating device 16-16^3 as the cassette 11 passes internally 15 therein.

One part of a laterally projecting pin 16-16' attached to the rotating component 19 is guided in such a way as to be capable of actuation in a V-shaped slot 22 in a flat part of the frame 23 of the cassette 11. The locking device 12 is pivotally 25 connected via a universal joint 24 to a rotating component executed as an axle 19 for the purpose of its lateral displacement.

The V-shaped slot 22 is arranged with its meeting point 26 situated between straight elongated openings 27, 28 which meet one another and extend upwards at an angle facing in a direction downwards directly in line with an aforementioned laterally projecting pin 16-16^3. The pin 16-16^3 is thus capable of actuation by a spring 29 causing it to be positively guided in a downward direction towards the bottom of the aforementioned V-shaped slot 22, i.e. the aforementioned centrally located meeting point 26.

The rotating component 19, which is accommodated internally in a U-shaped frame 30, which is open in an upward direction, in one side 31 of which a horizontal opening 32 is present, through which pins 16-16^3 project laterally, supports a freely moving ring 33 on its external boundary surface 19A. The ring 33 is provided with, for example, four radially projecting pivot pins 16-16^3. A compression spring 29 is accommodated by the rotating component 19 acting between the upper part 33A of the ring 33 of the rotating component and a stop 34 located at a higher point for the purpose of producing compression of the aforementioned ring

33 of the rotating component until it is level with the bottom 26 of the V-shaped groove. A slotted sleeve 35 is permanently attached to the under part 33B of the ring 33 of the rotating component, and a rotation-transmitting component 37 accommodated in the slot 36 is permanently connected to the rotating upright 19.

The ring 33 of the rotating component is capable of axial movement along a section of the aforementioned upright 19, but is positively guided in its direction of rotation, in conjunction with which the locking mechanism 14 is so arranged, in conjunction with actuation by a vehicle 13, as to be positively guided towards locking position II and locking position I when an aforementioned vehicle 13 passes below the cassette 11, and the pins 16-16^3 are caused to rotate with their lateral stops 20, 21 situated at the front and rear, so that the locking device 12 which is connected to the upright 19 also rotates.

This embodiment should have been appreciated from the above description.

The embodiments in accordance with Figs. 17-23 differ from those described above and the illustrative embodiments of the invention shown in earlier Figures. The embodiment shown in Figs. 17-21 comprises locking devices in the form of a number of long, rail-like locking profiles 251 which are actuated, for example by jacks, causing them to be displaced horizontally in a direction 252 across the cargo-accommodating lanes 204 in question and the lateral dividing profiles 205 set out in pairs.

A mechanism can thus be provided on the trailer support 250 and/or the load cassette 211 in question or on the lateral dividing profiles 205 in question, which are not shown in the drawings. The aforementioned mechanism is connected to the aforementioned locking device in order to release and lock the locking device. A cargo vehicle which is capable of being driven along the profiles 205 and between

them is so arranged as to actuate the mechanism automatically when the cargo vehicle in question passes the mechanism.

The invention is not restricted to the illustrative embodiments described above and shown in the drawings, but may be varied within the scope of the Patent Claims without departing from the idea of invention.

Patent Claims

1. Arrangement (1; 101) for locking cargo (2; 102) to a deck (3) on board a ship (40), ***characterized in that*** lateral dividing profiles (4, 4'), which are capable of being laid out on the deck (3) and secured to it, and which are so arranged as to form loading lanes (5) between pairs of rows, exhibit either lock-accommodating openings (6, 7) to accept rotatable and/or movable locking devices (12; 151) from trailer supports (150) and/or cargo cassettes (11) capable of being parked in the cargo lane (5) or locking devices (251) capable of lateral displacement from lateral dividing profiles (205), which are so arranged as to interact with trailer supports (250), cargo vehicles, cargo cassettes (211) and/or some other cargo capable of being parked in the cargo lane (204), and in that present on the trailer support (150) and/or load cassette (11) or lateral dividing profiles (204) in question is a mechanism (154; 14) which is connected to the aforementioned locking device (150, 12) for the purpose of releasing (I) it or locking (II) it, in conjunction with which a cargo vehicle (113, 13), which can be driven along and between the dividers (4, 4'; 204), is so arranged as to actuate the mechanism when the cargo vehicle in question passes the mechanism.

2. Arrangement in accordance with Patent Claim 1, ***characterized in that*** the trailer support (150), which is formed appropriately by a portal-shaped support component with a connecting plate (152) capable of detachable attachment to a cargo tractor vehicle (113), has a mechanism (154) capable of actuation by the tractor vehicle (113), which is so arranged, as a result of actuation by the cargo tractor vehicle (113), as to cause the locking devices (151) in the trailer support stand (150) to be moved into a

released position (CI) in which they are disengaged from the profiles (4, 4') and in that, when the cargo tractor vehicle (113) is disconnected from the trailer support (150), the locking devices (151) in the trailer support are so arranged as to be positively guided into a locked position (CII).

3. Arrangement in accordance with Patent Claim 2, ***characterized in that*** a spring element is present, which is so arranged, when in the unactuated position by the cargo tractor vehicle (113), as to cause the locking devices (151) to move to the locked position (CII) and into engagement with the profiles (4, 4') and its lock-accommodating openings (6, 7) in the profiles (4, 4').

4. Arrangement in accordance with Patent Claim 3, ***characterized in that*** the actuating mechanism (154) is formed by an actuating component (155) capable of being pushed in by the cargo tractor vehicle (113), which is attached via cables (159, 160) to the locking device (151) in question and a spring (161).

5. Arrangement in accordance with Patent Claim 1, ***characterized in that*** the cargo cassettes exhibit actuating devices (16-16^3) projecting laterally inwards into the centrally located space (15) of the cassettes to accommodate a cargo vehicle (13), which are so arranged as to be actuated by the cargo vehicle (13) as it passes through the internal spaces (15) of the cassettes in both directions of travel (17, 18).

6. Arrangement in accordance with Patent Claim 5, ***characterized in that*** the cargo vehicle (13) exhibits stops (20, 21) at each end, which project laterally in order to come up against an actuating device as the cassettes (11) pass internally therein.

7. Arrangement in accordance with one or other of Patent Claims 5-6, ***characterized in that*** a rotating component (19), which is rotatably attached to a rotatable locking

device (12), has a number of radially projecting pivot pins (16-16^{4}) which are connected to the rotating component (19).

8. Arrangement in accordance with Patent Claim 7, ***characterized in that*** one part of a laterally projecting pin (16-16^{3}) attached to the rotating component (19) is guided in such a way as to be capable of actuation in a V-shaped slot (22) in a part of the frame (23) of the cassette (11).

9. Arrangement in accordance with Patent Claim 8, ***characterized in that*** the locking device (12) is connected via a universal joint (24) to a rotating component executed as an axle (19).

10. Arrangement in accordance with one or other of Patent Claims 8-9, ***characterized in that*** the V-shaped slot (22) is arranged with its meeting point (26) situated between straight elongated openings (27, 28) which meet one another and face downwards directly in line with an aforementioned laterally projecting pin (16-16^{3}), in conjunction with which the pin is so arranged as to be capable of actuation by a spring (29) causing it to be positively guided in a direction towards the bottom of the aforementioned V-shaped slot (22), i.e. the aforementioned centrally located meeting point (26).

11. Arrangement in accordance with Patent Claim 10, ***characterized in that*** the rotating component (19) supports a freely moving ring (33) with pivot pins (16-16^{3}) projecting diametrically away from one another and with a compression spring (29) acting between the upper part (33A) of the ring (33) of the rotating component and a stop (34) for the purpose of producing compression of the aforementioned ring of the rotating component towards the bottom (26) of the V-shaped groove, in that a slotted sleeve (35) is permanently attached to the under part (33B) of the ring (33) of the rotating component, in that a rotation-transmitting component (37) accommodated in the slot (36) is permanently connected to the rotating upright (19), and in that the ring (33) of the rotating component is capable of

axial movement along a section of the aforementioned upright (19), but is positively guided in its direction of rotation, in conjunction with which the locking mechanism (14) is so arranged, in conjunction with actuation by a vehicle (13), as to be positively guided towards locking position (II) and locking position (I) when an aforementioned vehicle passes below the cassette.

12. Arrangement in accordance with Patent Claim 1, ***characterized in that*** the aforementioned locking devices (251) are capable of interacting with congruently executed lock-accommodating devices on the aforementioned lockable load, for example in the form of grooved side rails.

13. Arrangement in accordance with one or other of Patent Claims 1 or 12, ***characterized in that*** the aforementioned locking devices (251) are capable of being accommodated in matching lock-accommodating openings in the load.

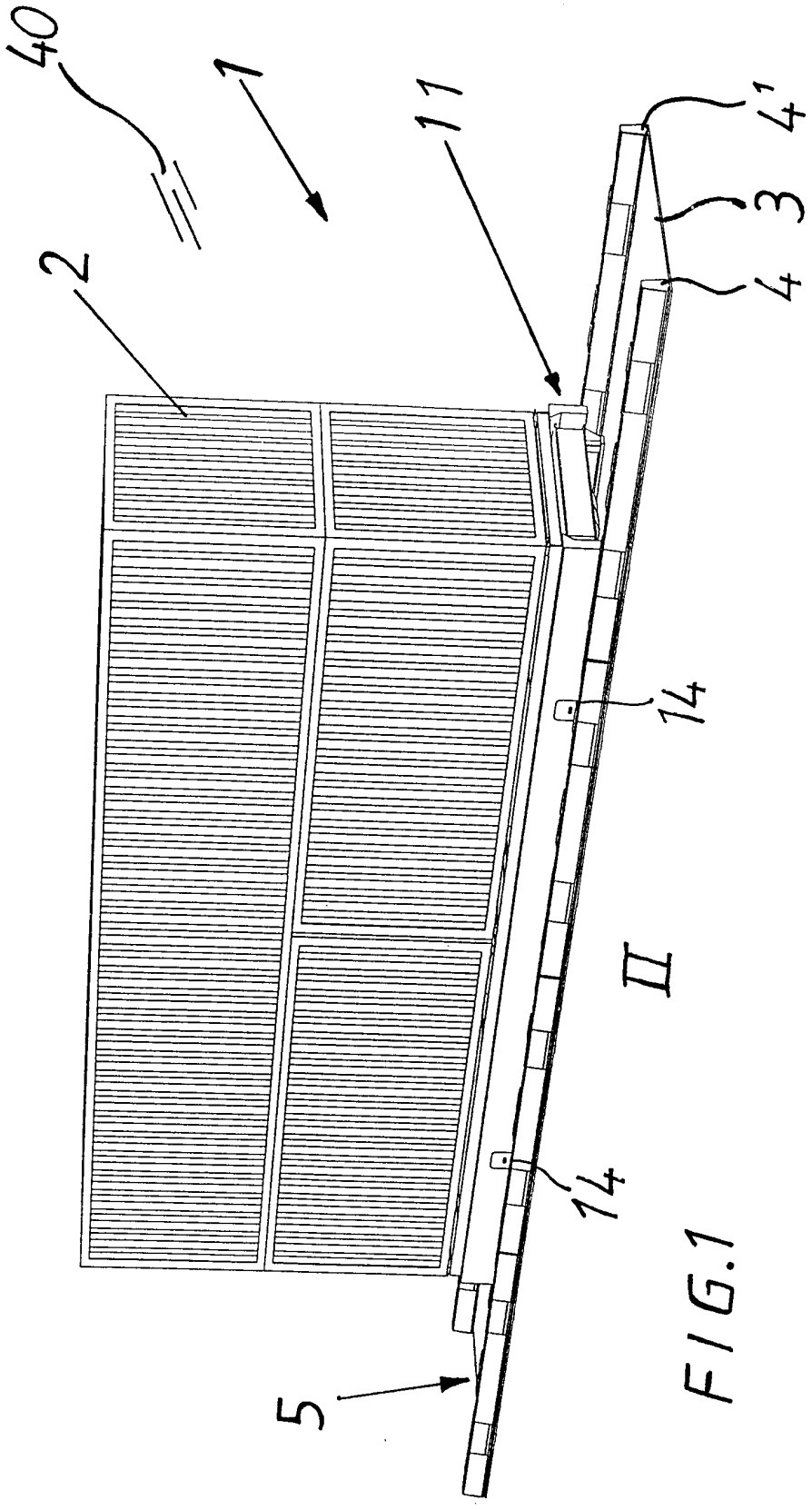


FIG.1

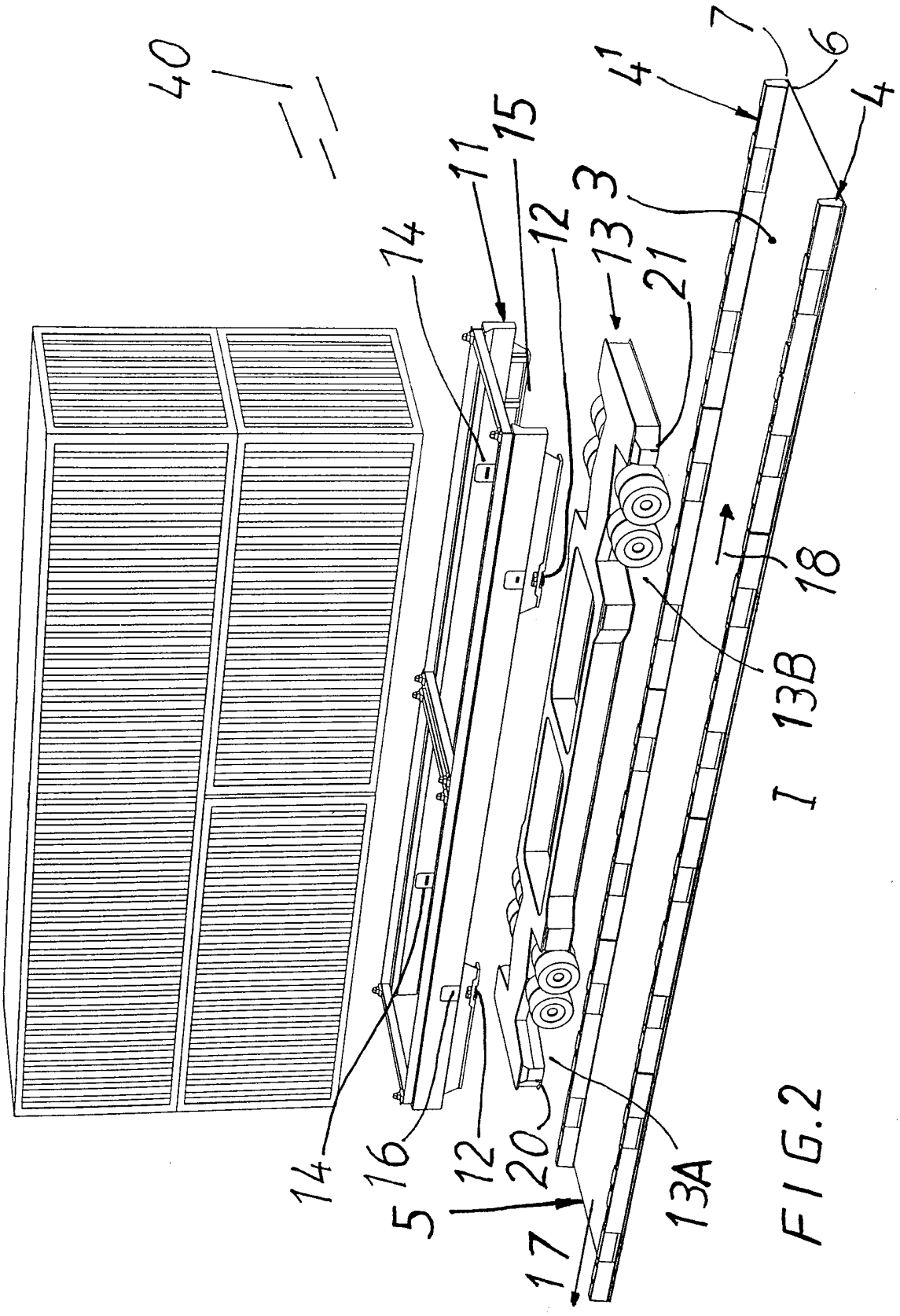


FIG.2

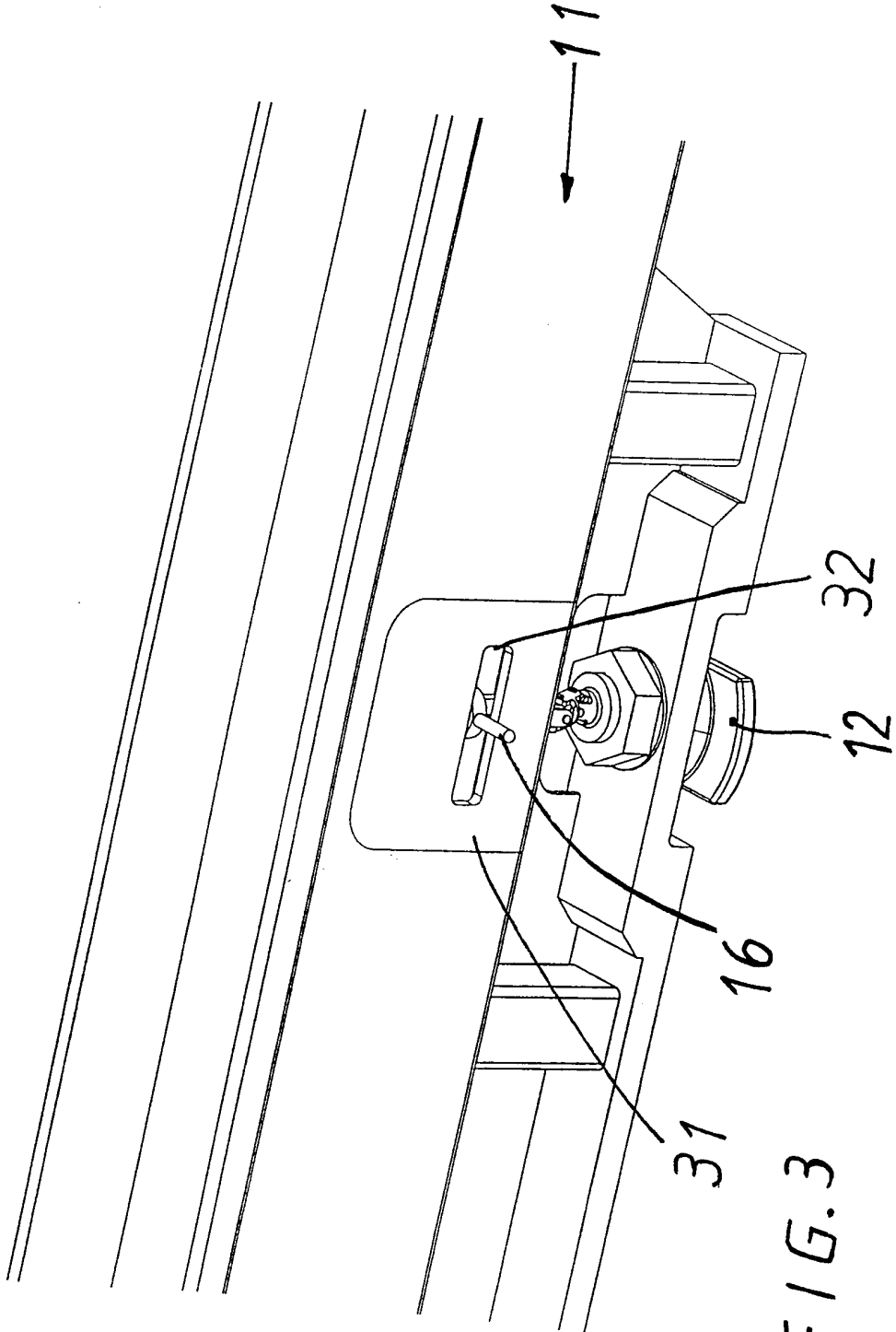


FIG.3

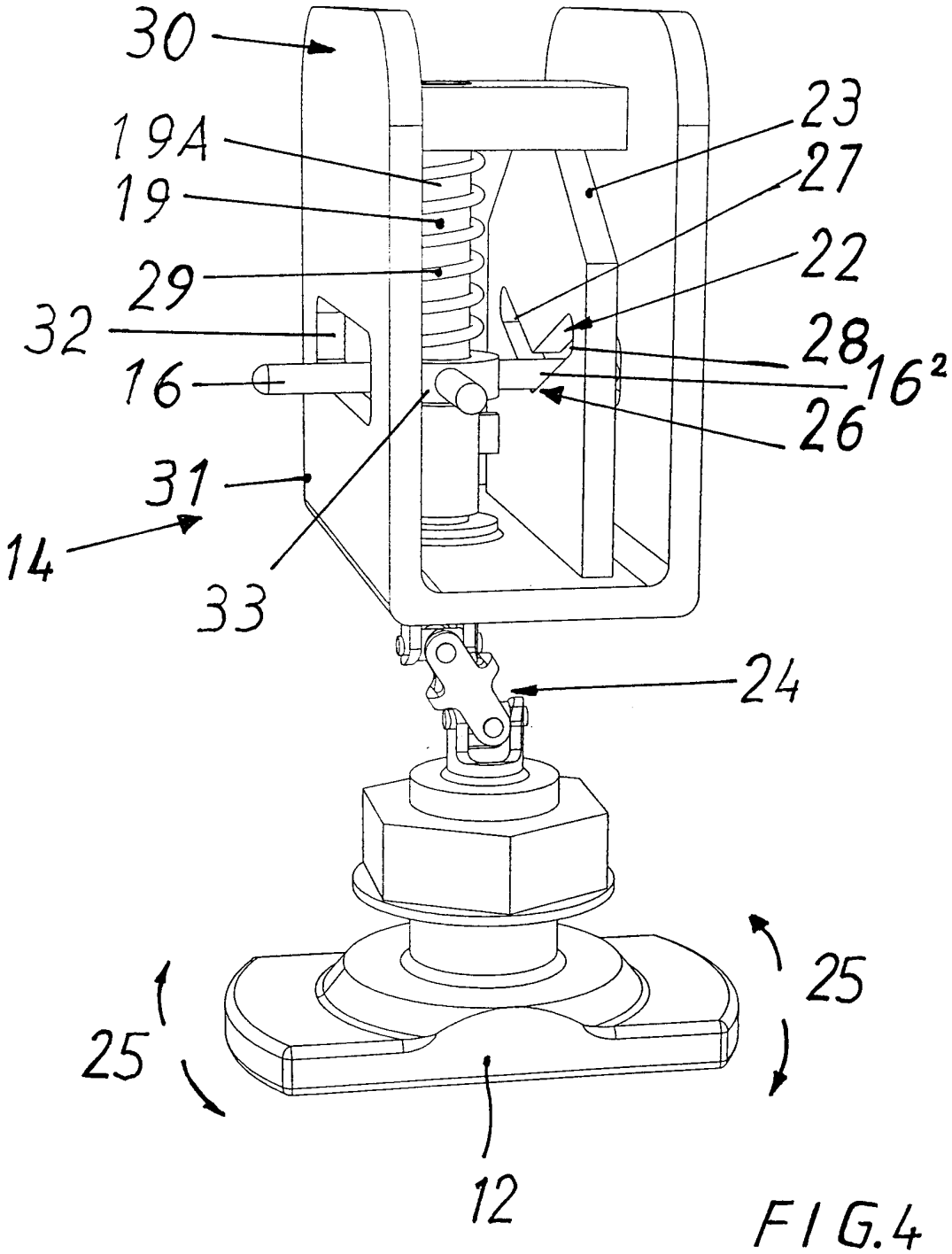


FIG.4

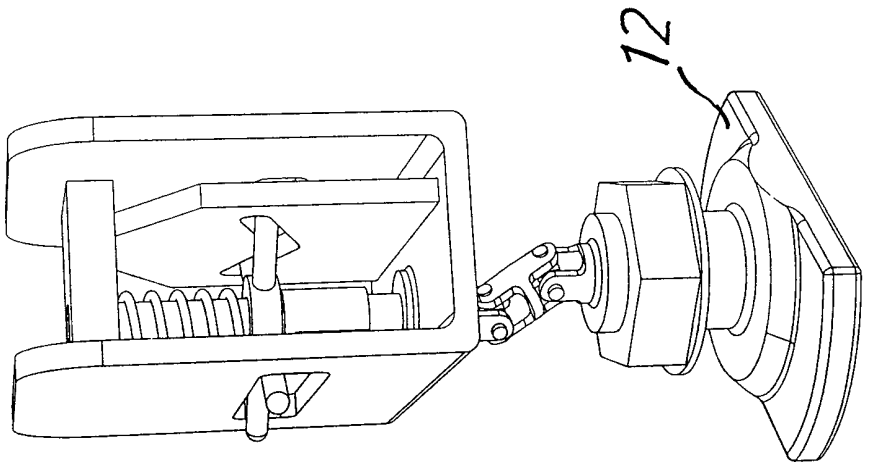


FIG.6

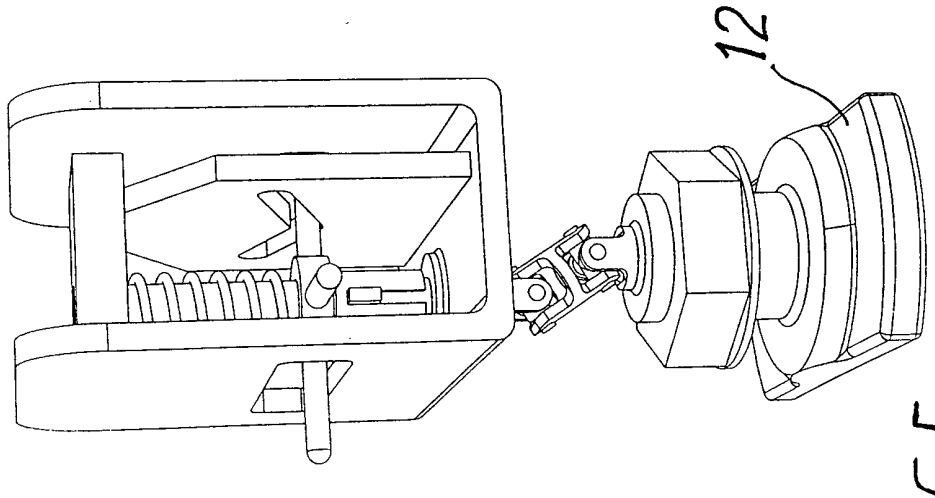


FIG.5

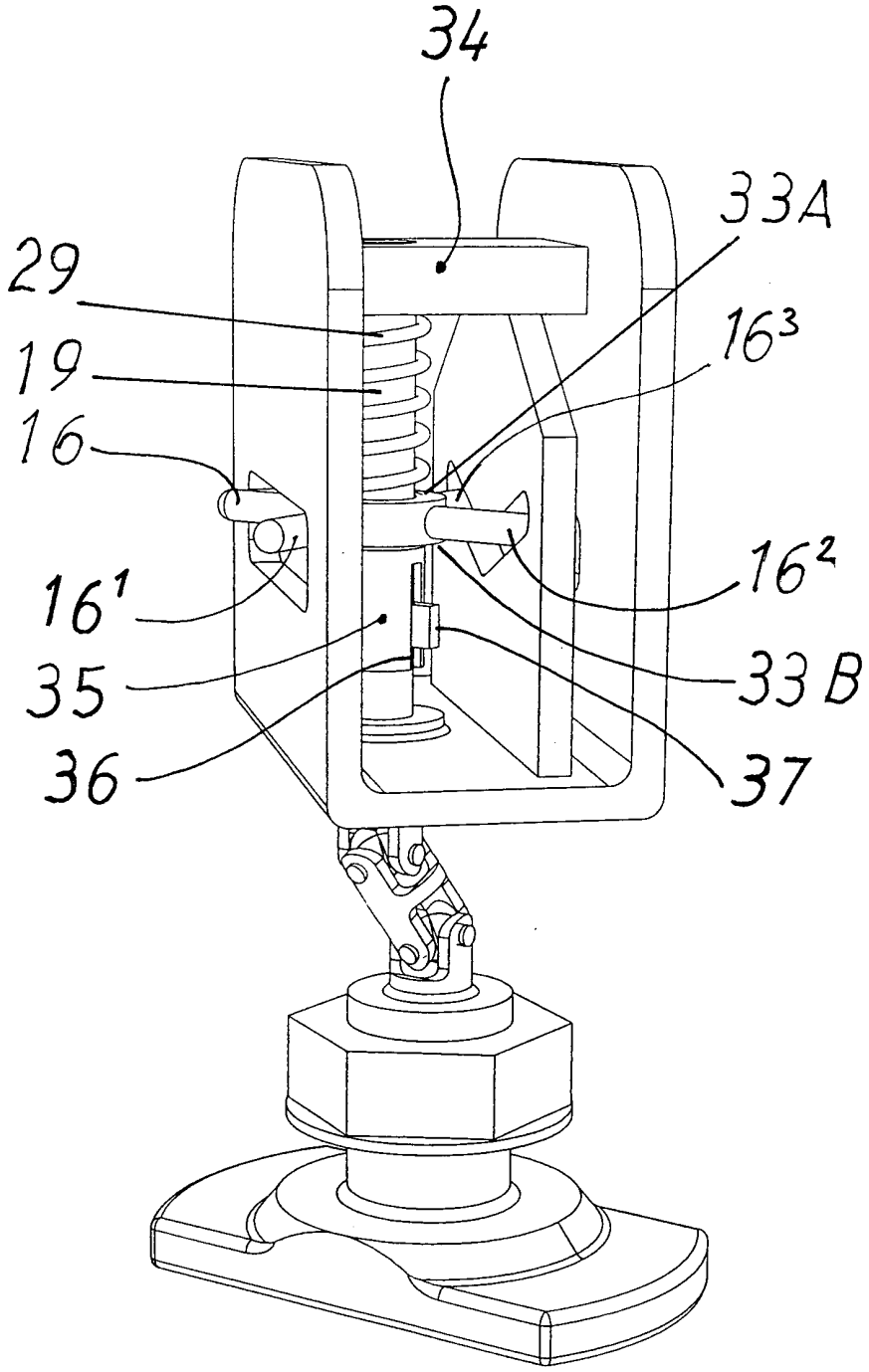


FIG.7

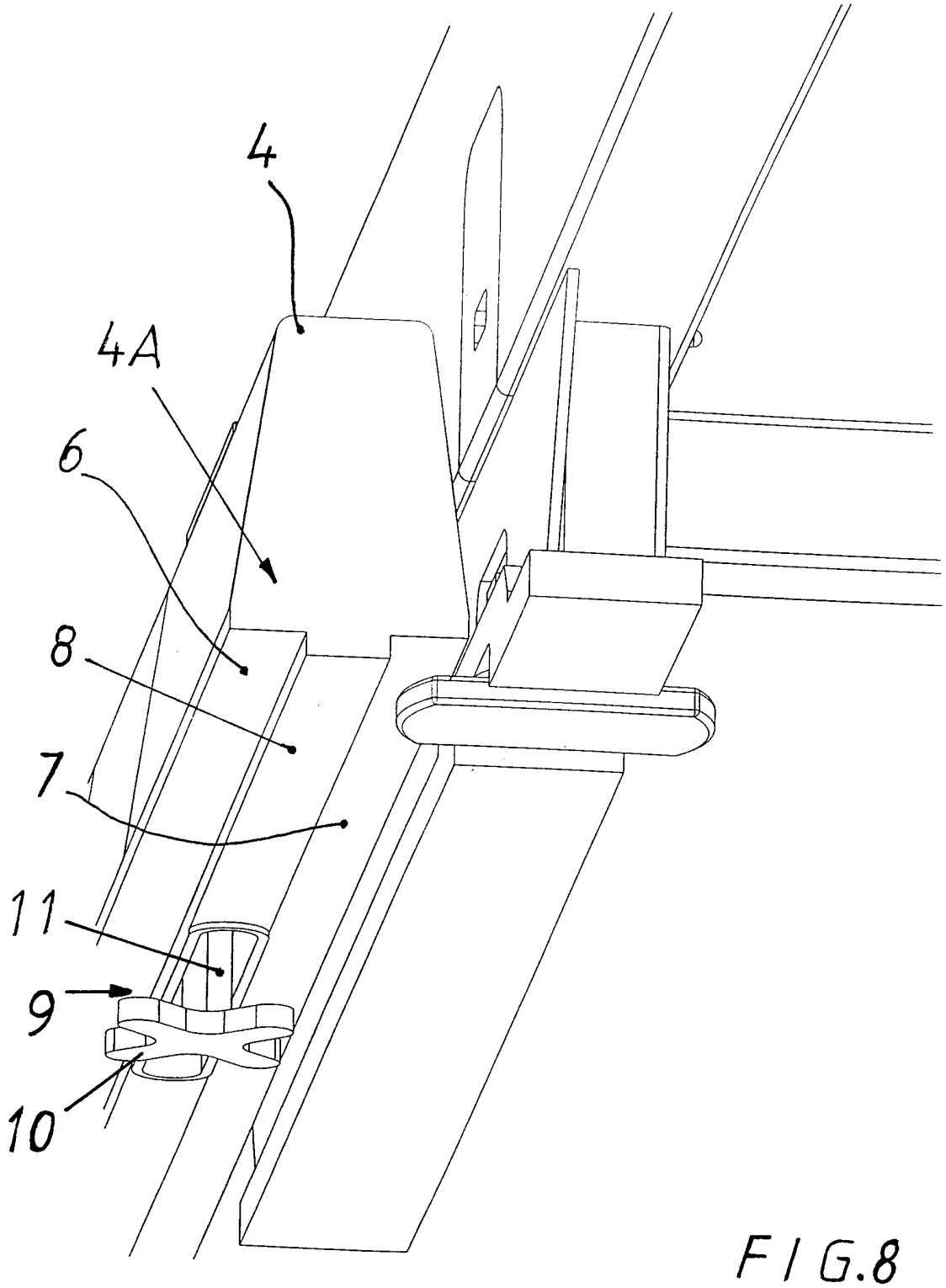


FIG.8

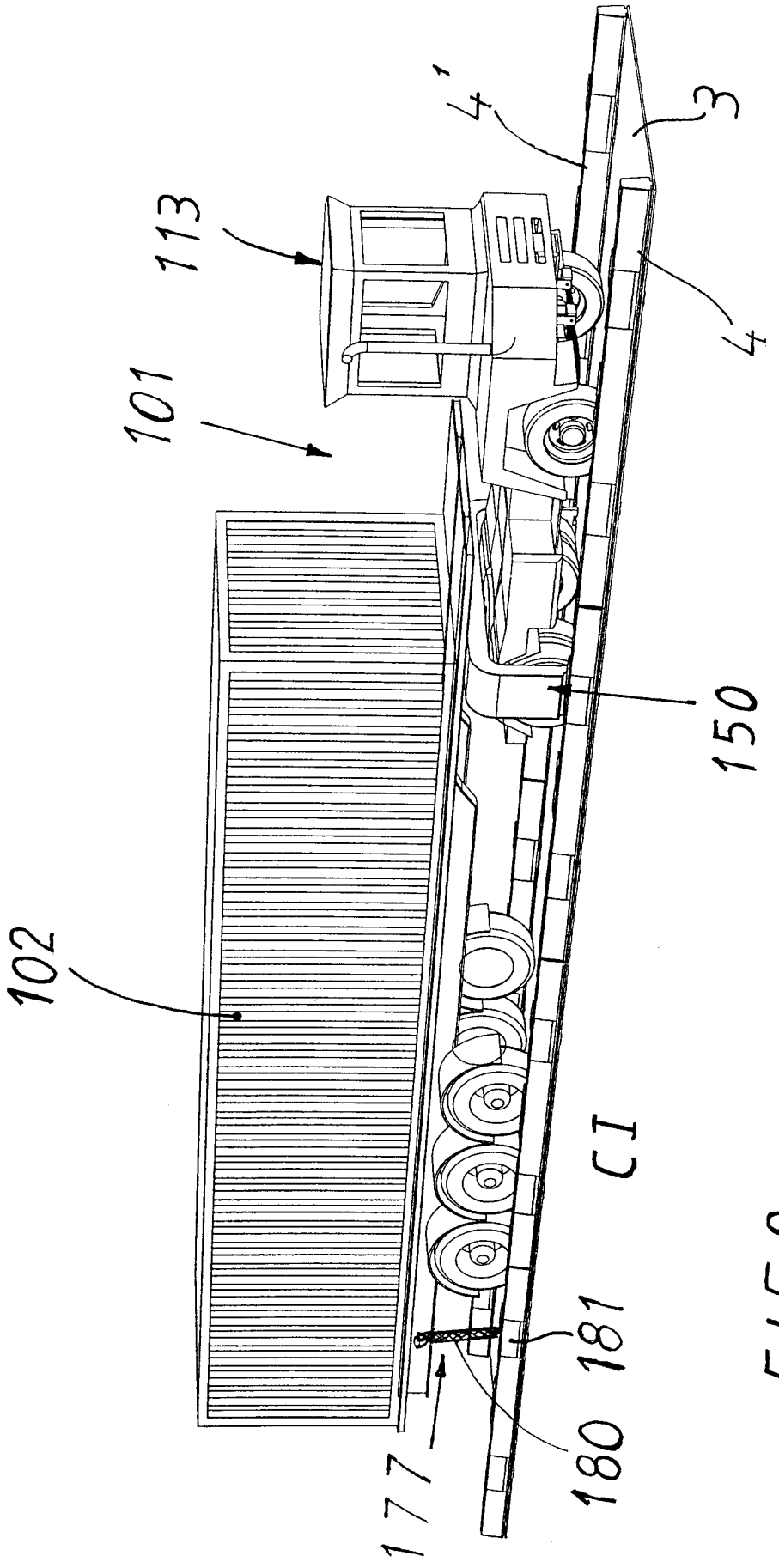


FIG.9

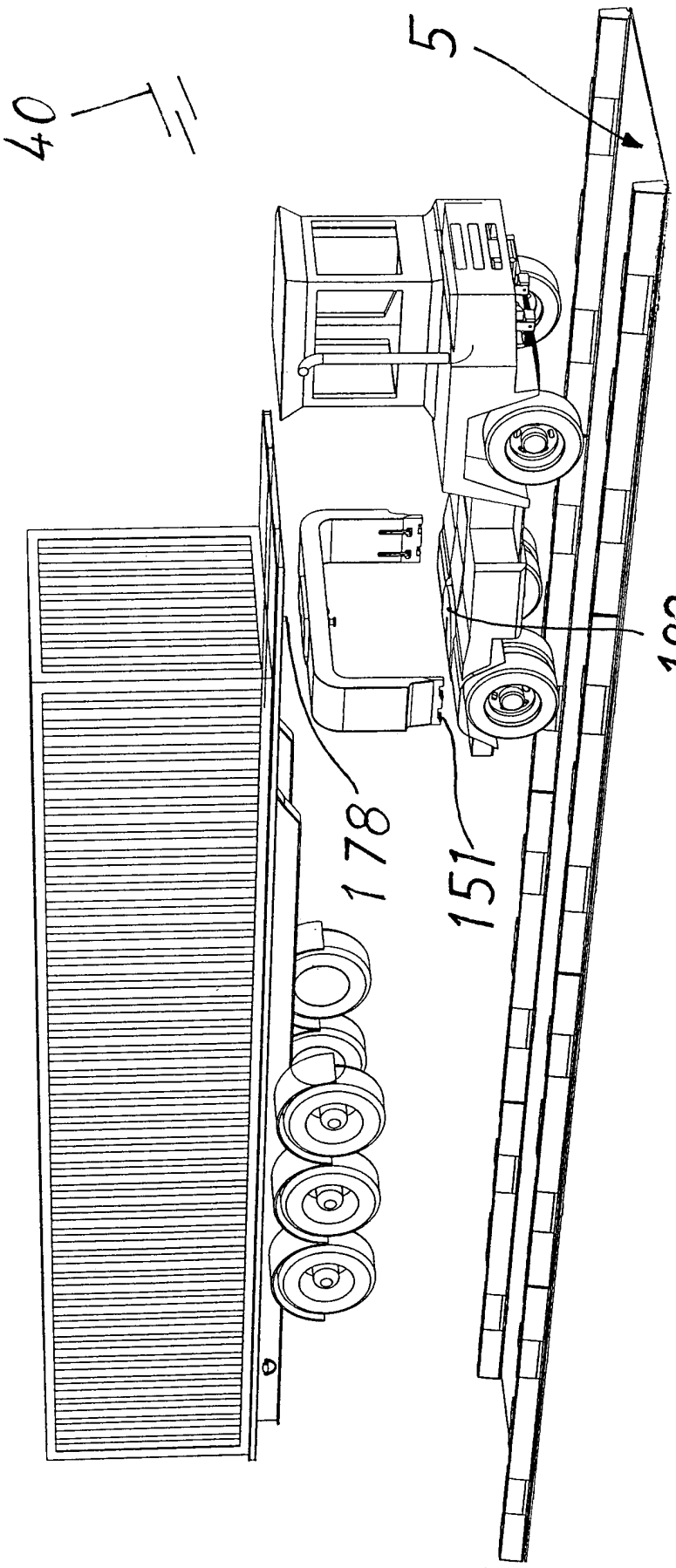


FIG.10

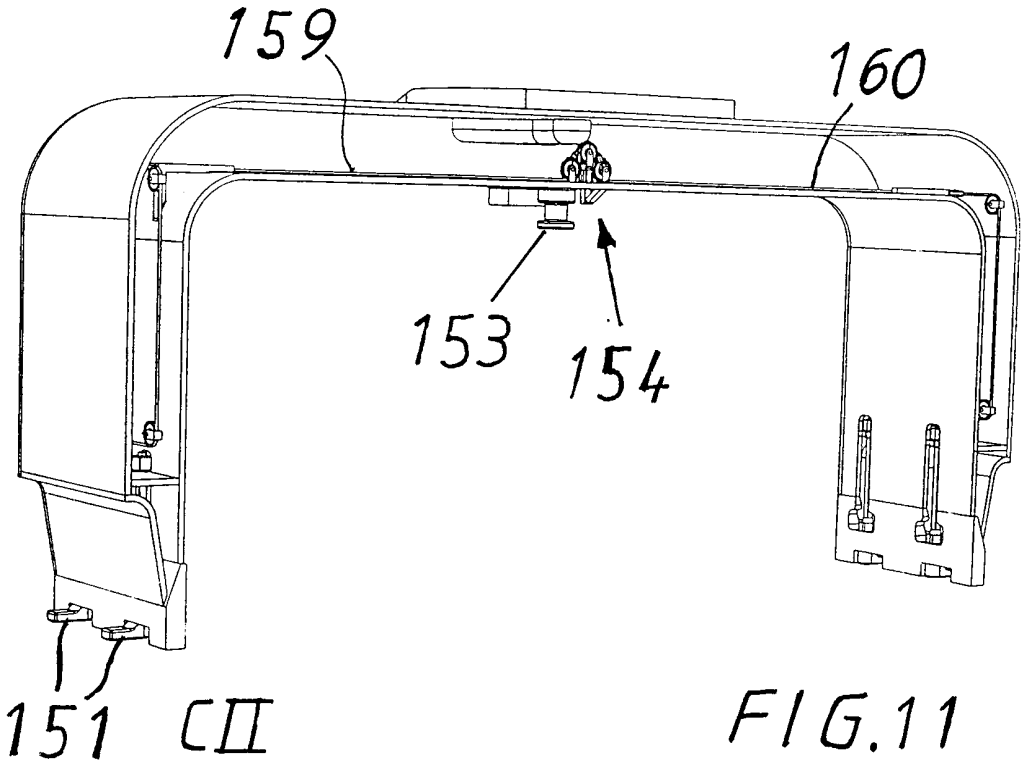

159
160
153
154
151
CII

FIG.11

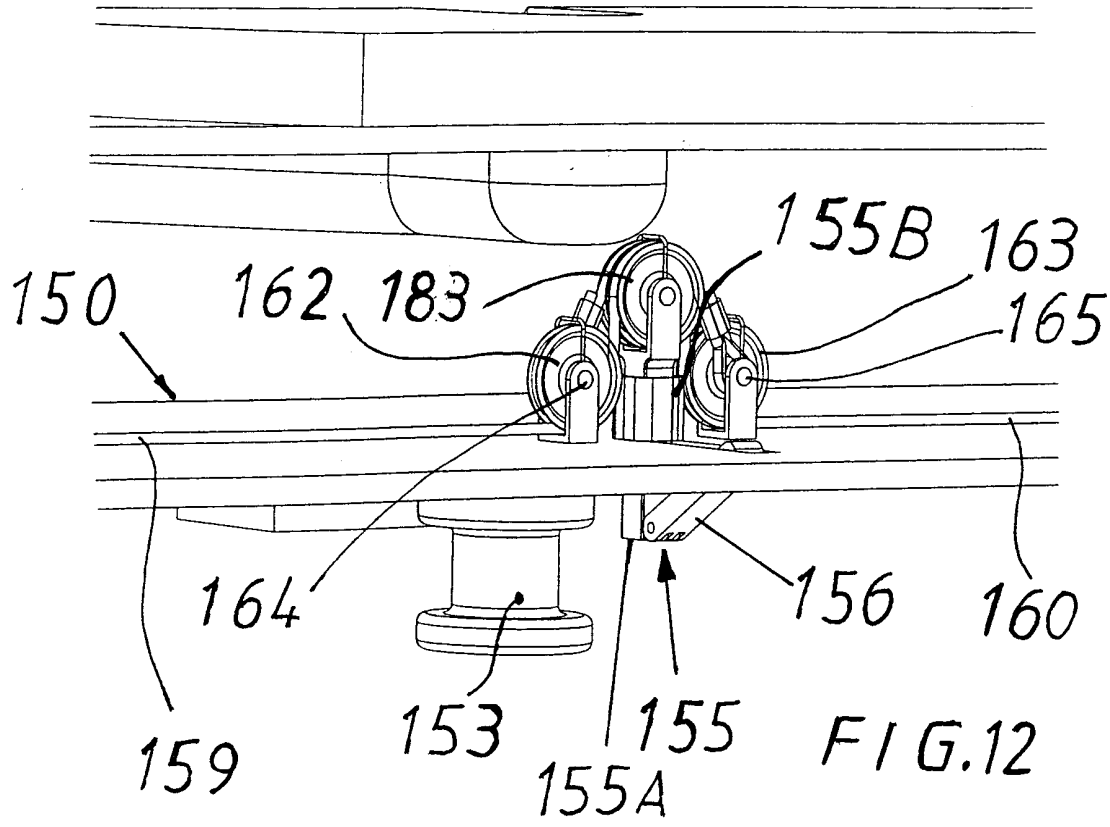

155B
163
150
162
183
165
164
156
160
159
153
155
155A

FIG.12

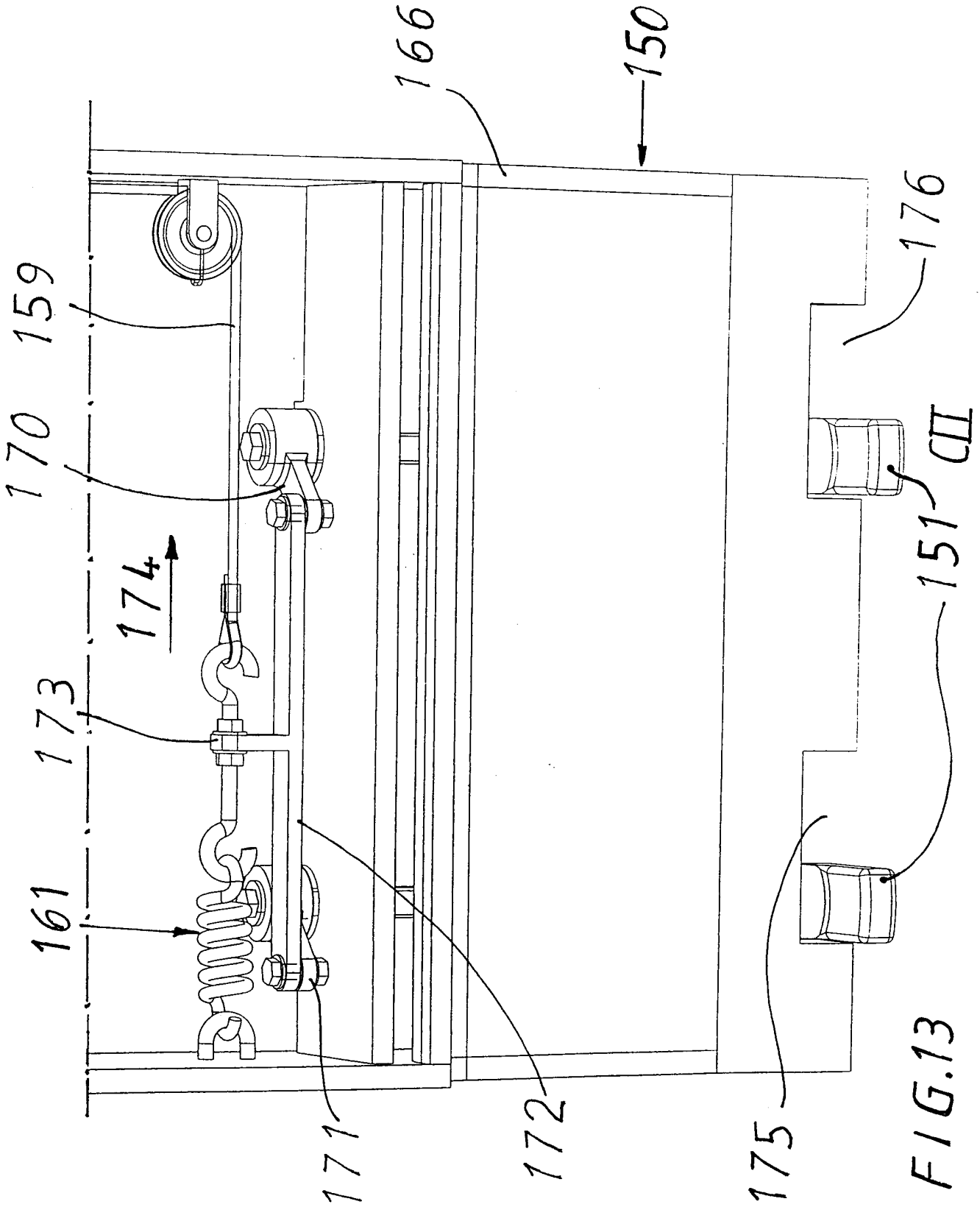


FIG.13

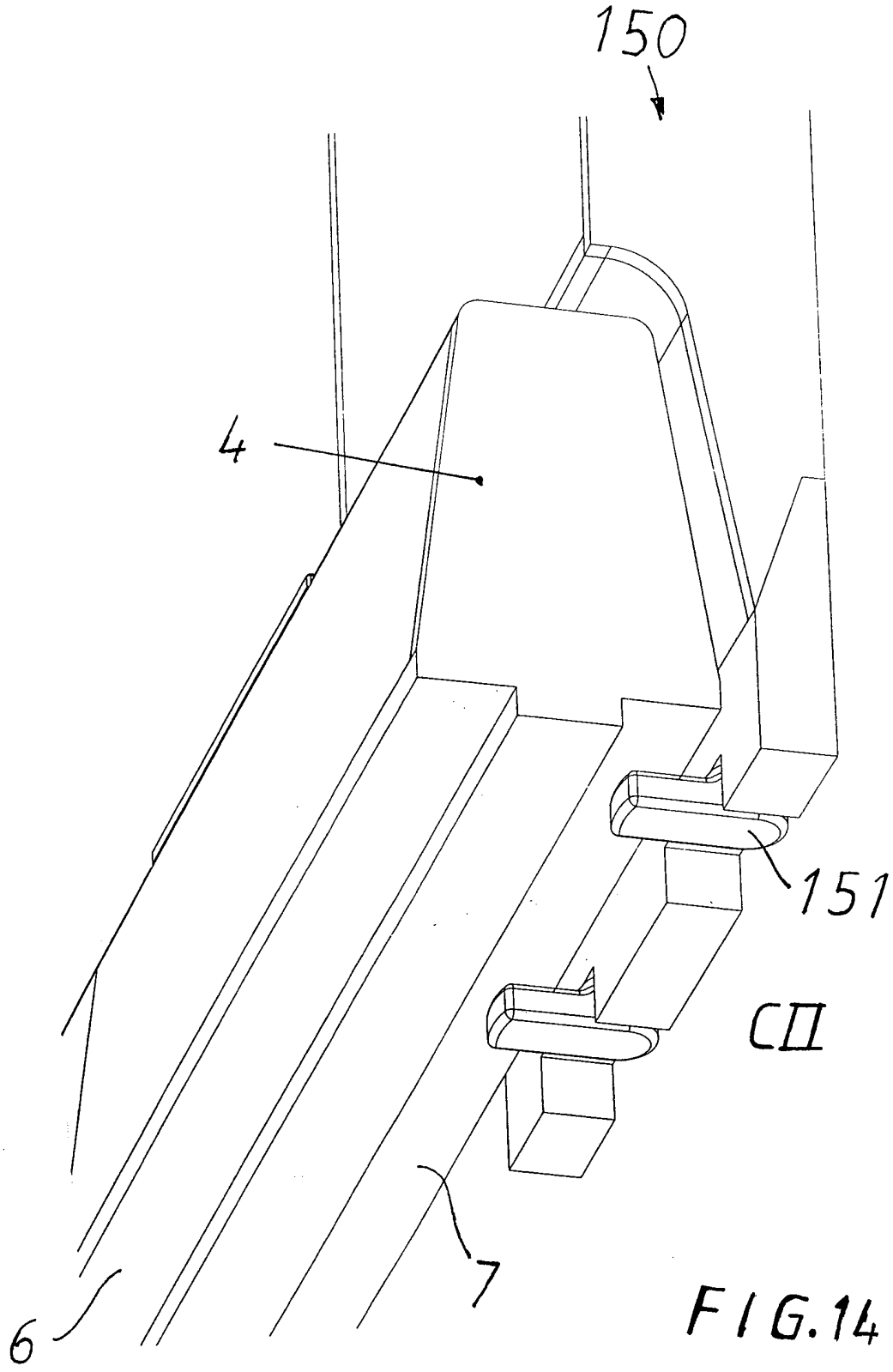
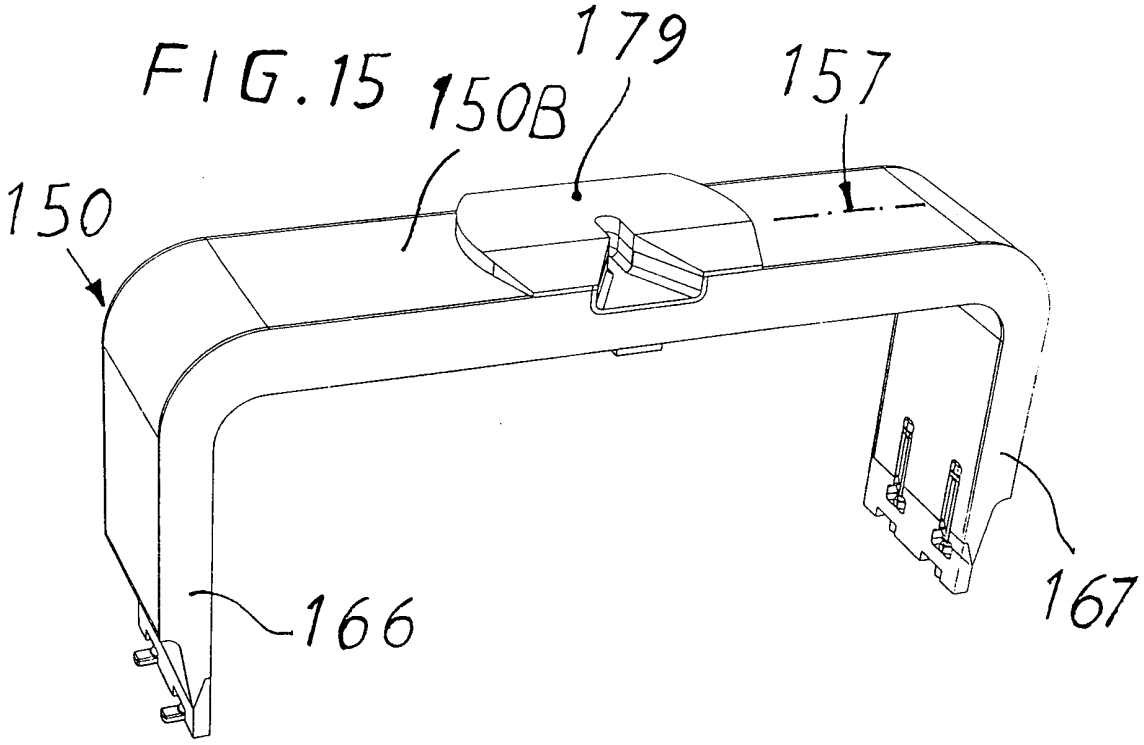


FIG.14

FIG.15



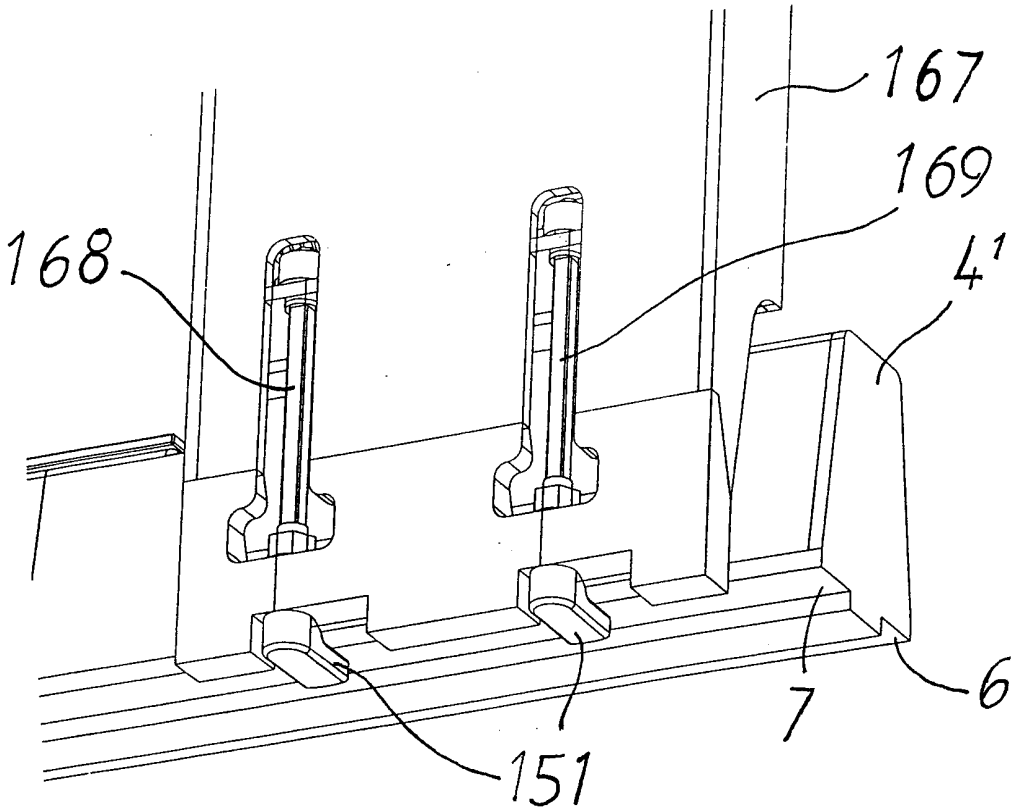


FIG.16

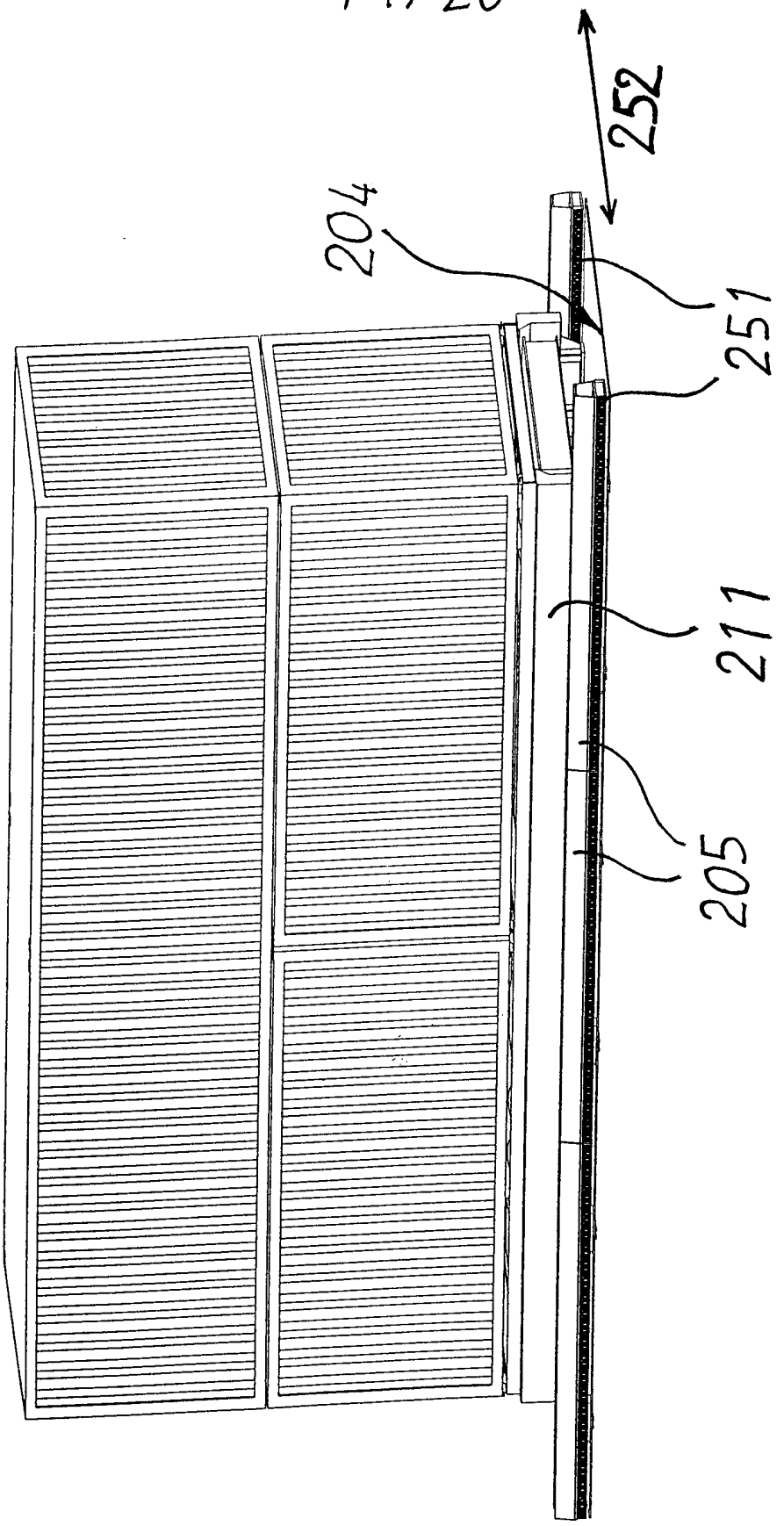


FIG. 17

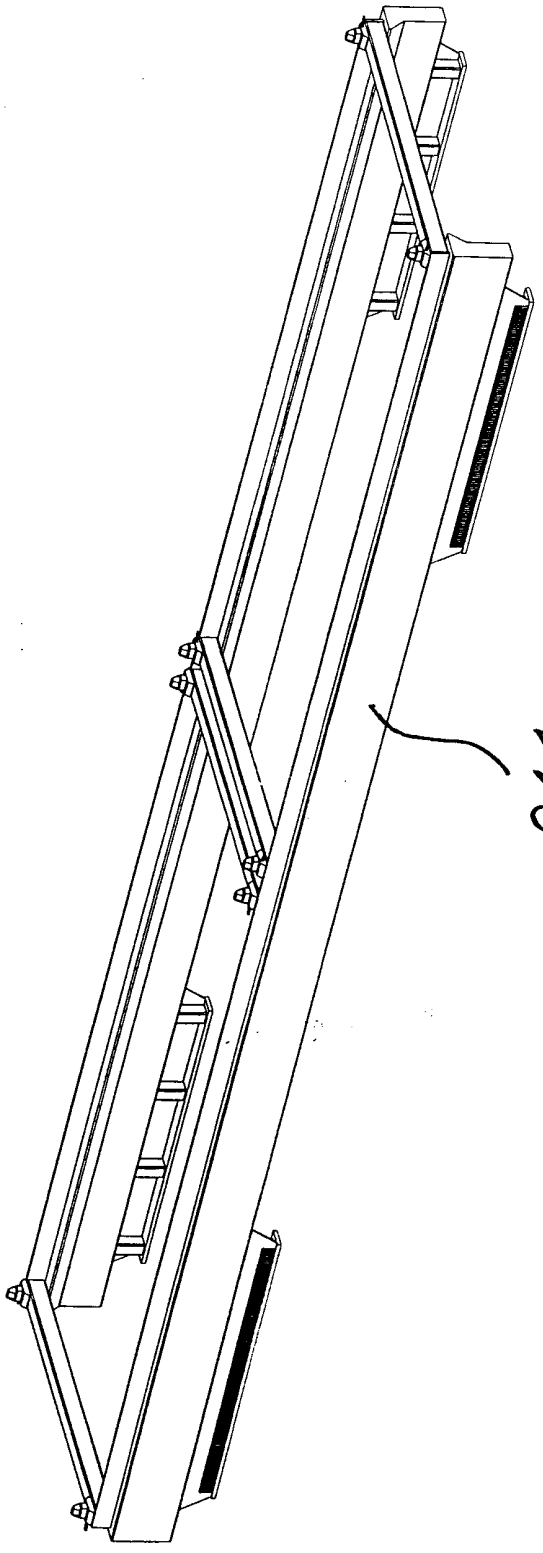


FIG.18

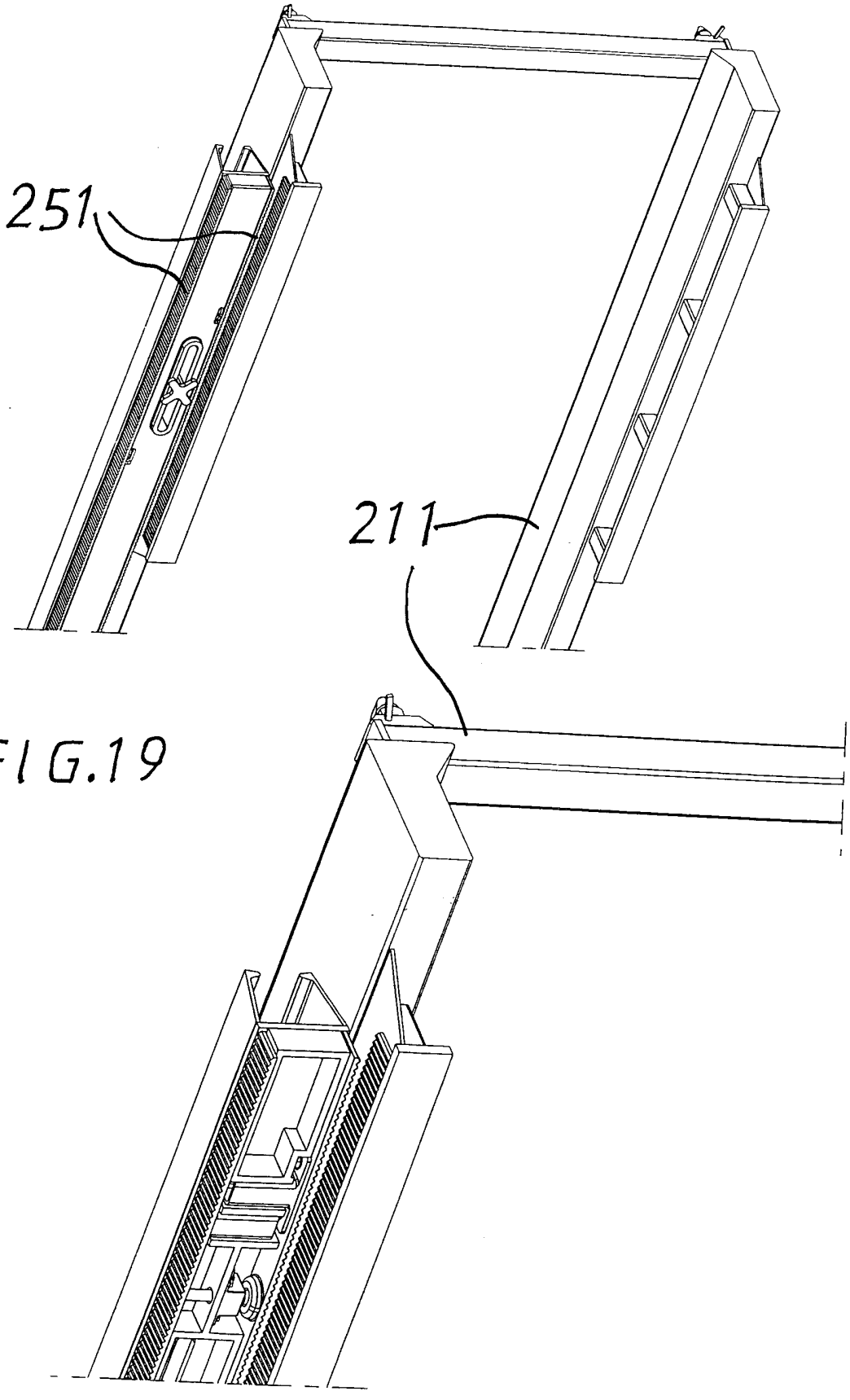


FIG.19

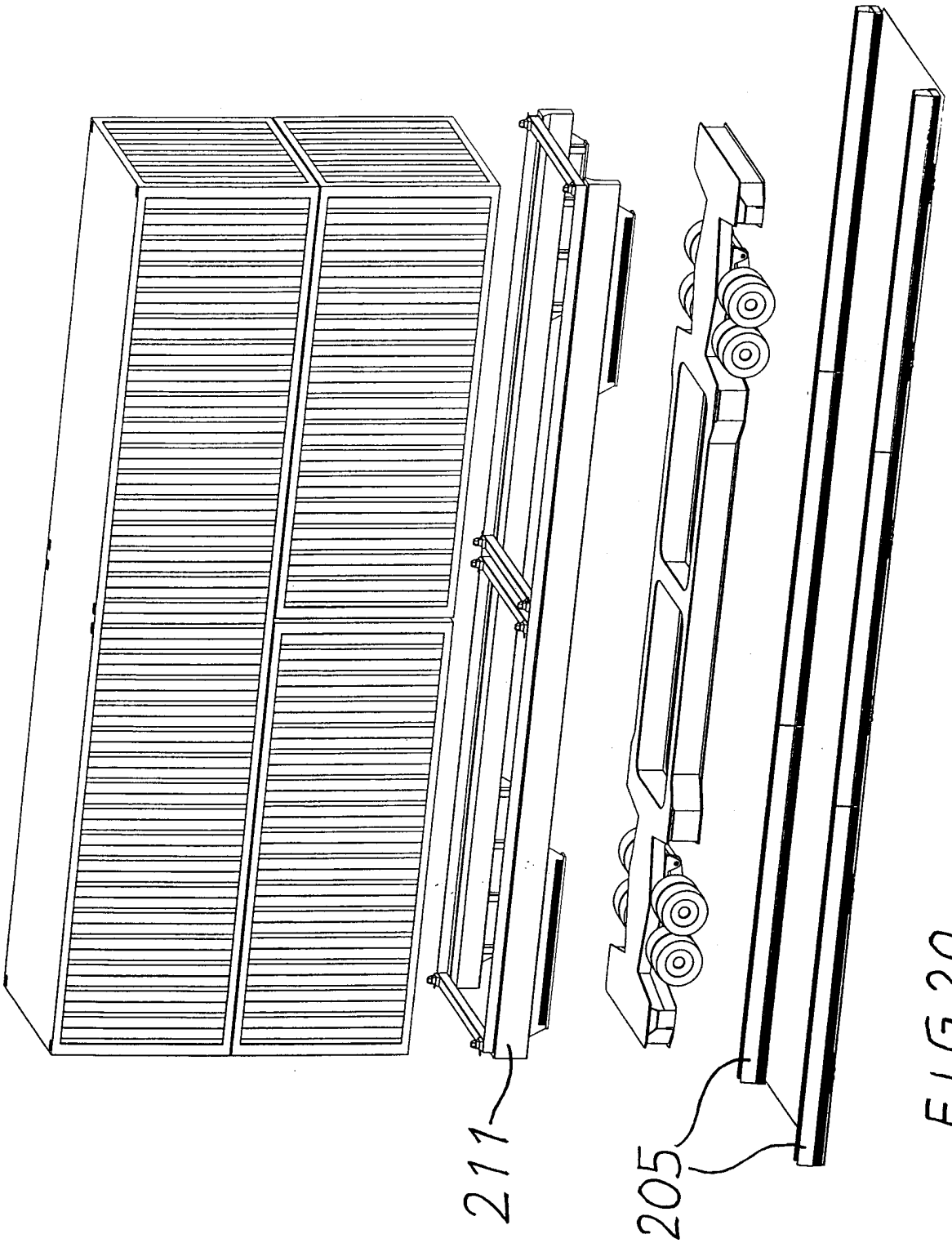


FIG.20

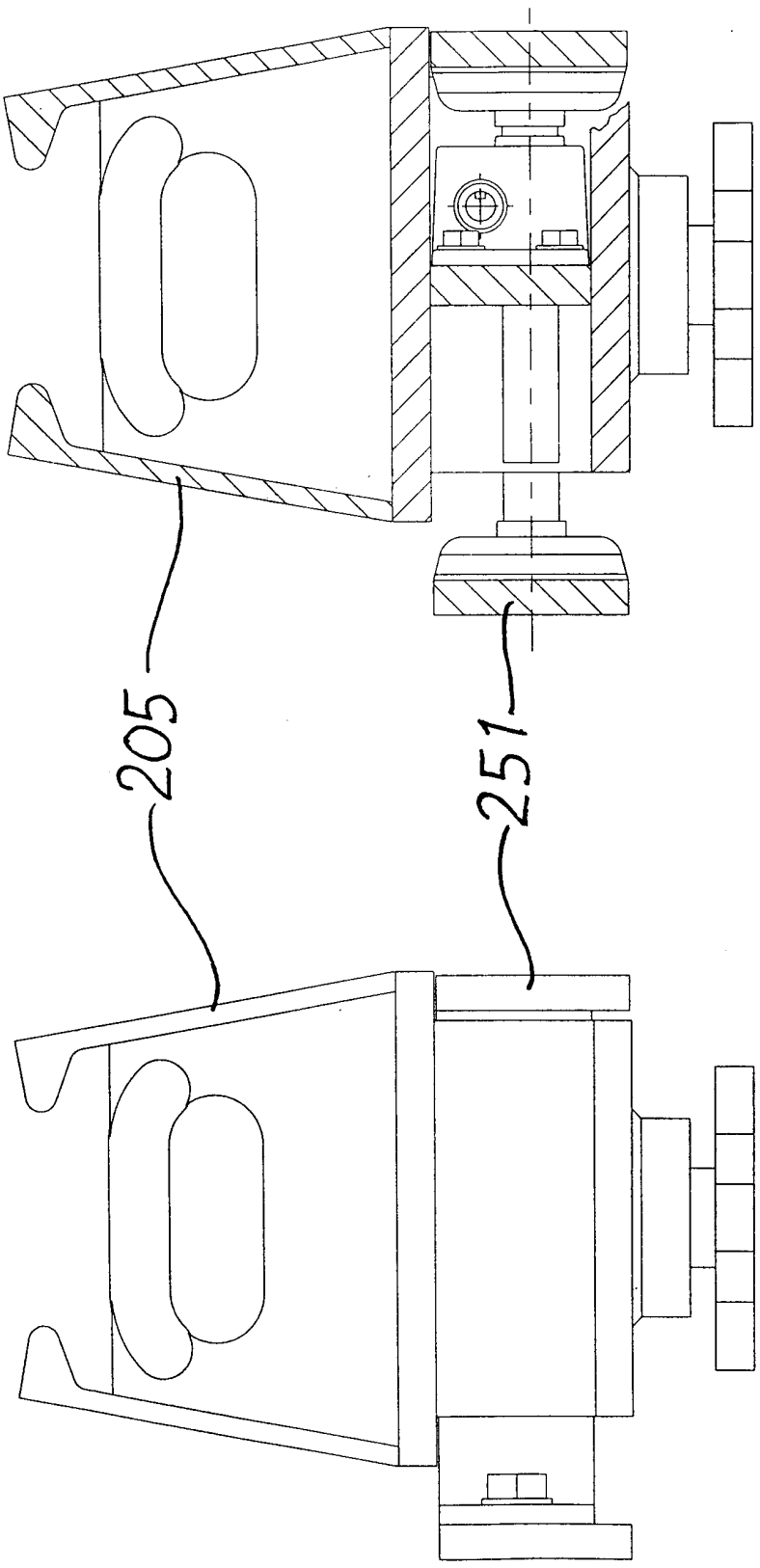


FIG.21

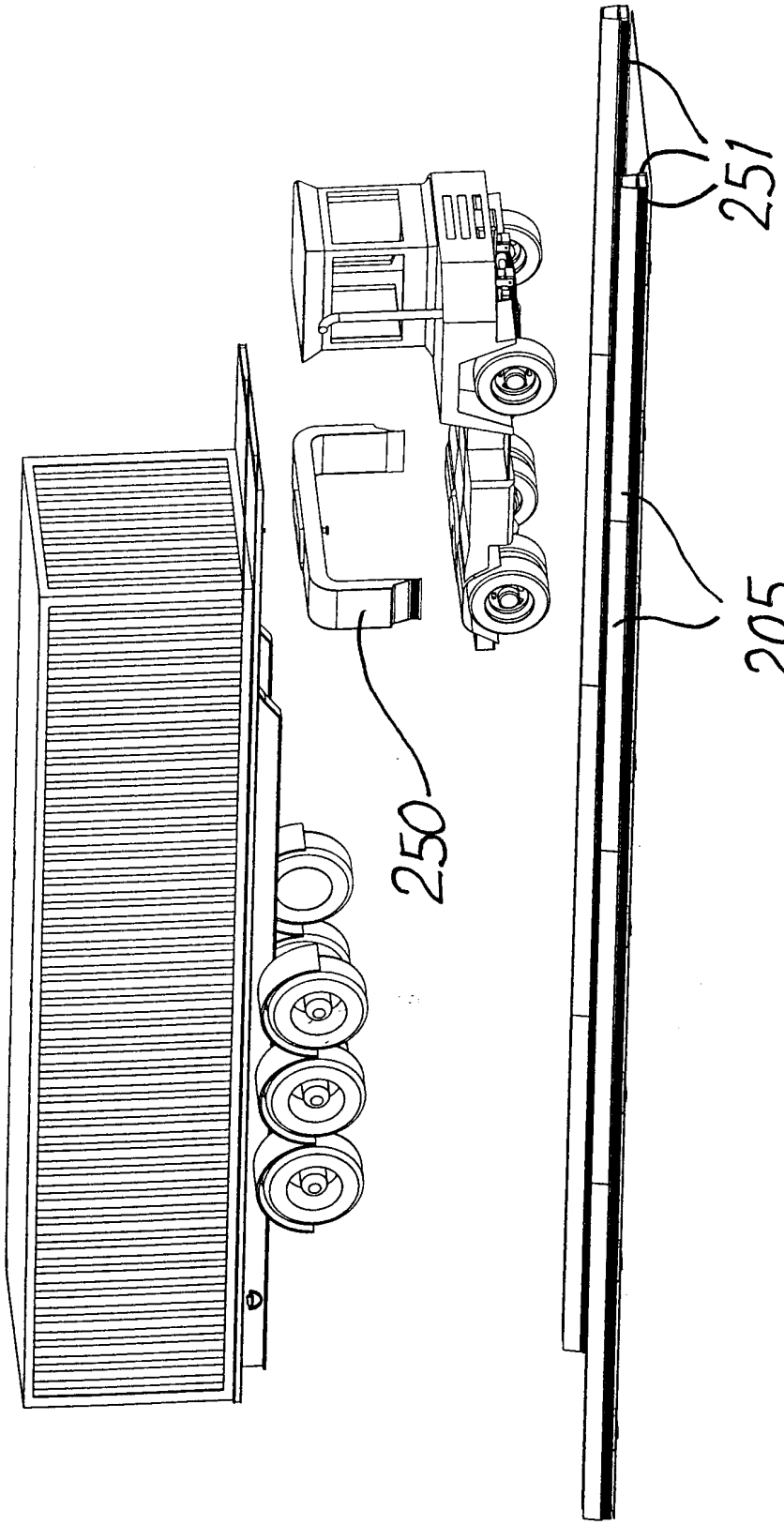


FIG.22

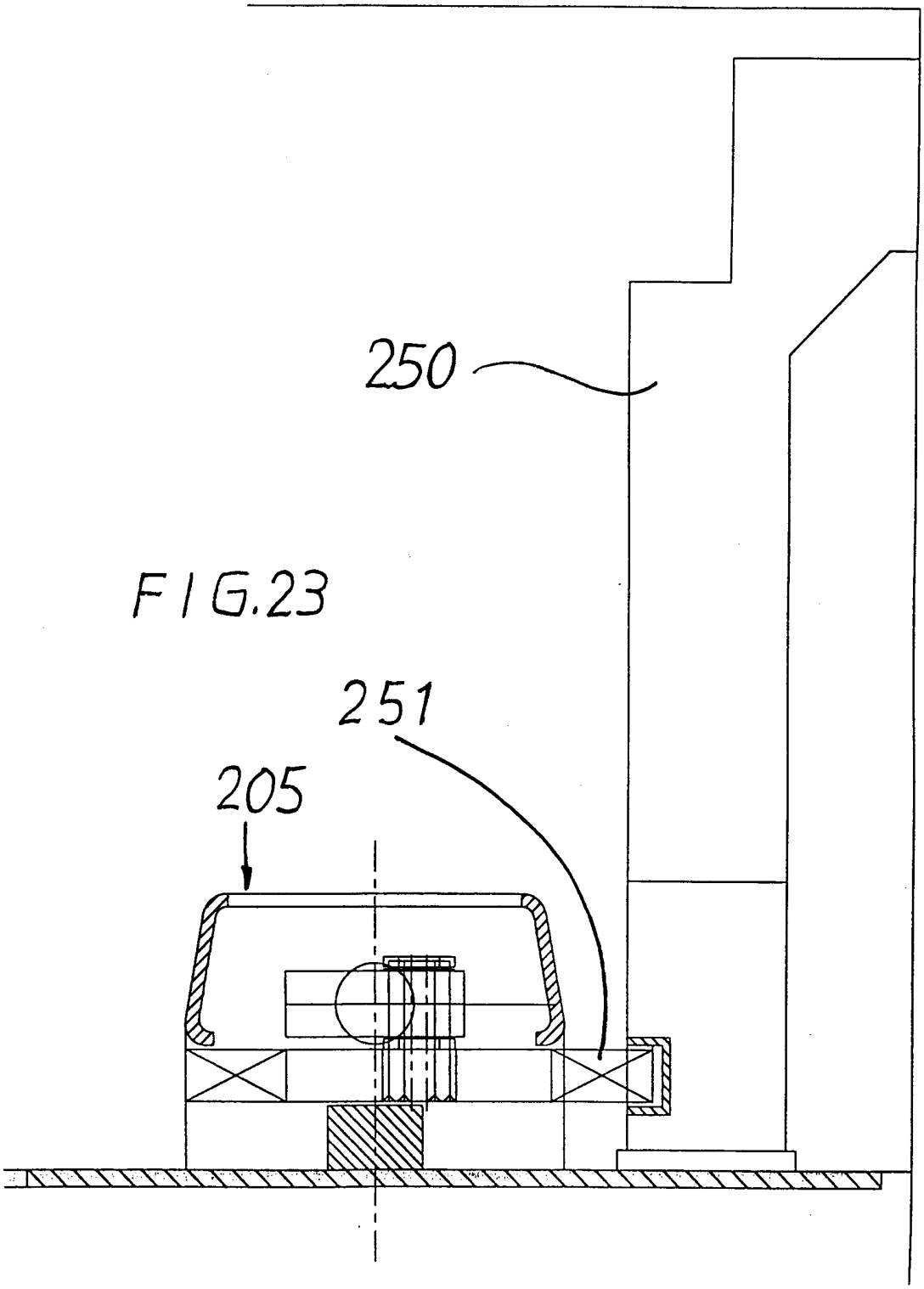


FIG.23

INTERNATIONAL SEARCH REPORT

International application No.
PCT/SE 00/00856

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: B63B 25/24
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: B63B, B60P, B61D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 9730890 A1 (JOHANSSON, MATS), 28 August 1997 (28.08.97) --	1-13
A	Patent Abstracts of Japan, Vol 9,No 333, M-443 abstract of JP 60-163788 A (MITSUBISHI JUKOGYO K.K.), 26 August 1985 (26.08.85) --	1
A	FI 74913 B (OY ELECTROLUX AB), 31 December 1987 (31.12.87) -- --------	1-13

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* Special categories of cited documents:
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"O" document referring to an oral disclosure, use, exhibition or other means
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"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
31 August 2000	05 -09- 2000
Name and mailing address of the ISA Swedish Patent Office Box 5055, S-102 42 STOCKHOLM Facsimile No. +46 8 666 02 86	Authorized officer Christer Jönsson/js Telephone No. +46 8 782 25 00

INTERNATIONAL SEARCH REPORT

Information on patent family members

08/05/00

International application No.
PCT/SE 00/00856

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9730890 A1	28/08/97	AU 2238197 A	10/09/97
		AU 5785796 A	29/11/96
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		EP 0880451 A	02/12/98
		SE 509258 C	21/12/98
		SE 9600632 A	21/08/97
FI 74913 B	31/12/87	FI 841504 A	14/10/85