(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 1 889 807 A2**

(12) **EUROPEAN PATENT APPLICATION**
published in accordance with Art. 153(4) EPC

(43) Date of publication:
20.02.2008 Bulletin 2008/08

(21) Application number: **05750578.6**

(22) Date of filing: **19.05.2005**

(51) Int Cl.:
B66B 9/16 *(2006.01)*

(86) International application number:
PCT/ES2005/000282

(87) International publication number:
WO 2006/122992 (23.11.2006 Gazette 2006/47)

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IS IT LI LT LU MC NL PL PT RO SE SI SK TR
Designated Extension States:
AL BA HR LV MK YU

(71) Applicant: **Tecnologia en Sistemas de Elevacion y Transporte**
33400 Aviles (Asturias) (ES)

(72) Inventors:
- **MORO SUAREZ, Anibal**
  E-33450 Piedras Blancas - Castrill n (As (ES)
- **MORO SUAREZ, Aljandro**
  E-33450 Piedras Blancas-Castrill n (Astu (ES)
- **MORO SUAREZ, Daniel**
  E-33450 Piedras Blancas-Castrill n (Astu (ES)
- **GONZALEZ DOMINGUEZ, Jesus**
  E-33203 Gij n (Asturias) (ES)

(74) Representative: **Gonzalez-Alberto Rodriguez, Natalia**
Carrigues
Hermosilla, 3
28001 Madrid (ES)

(54) ELEVATOR

(57) The invention relates to an elevator having a loading moving device or trolley (4) coupled preferably by automatic means to a frame associated to a vertically moving drive unit (12), such that when said moving device (4) is detached from the frame (11) it can move freely in a horizontal direction.

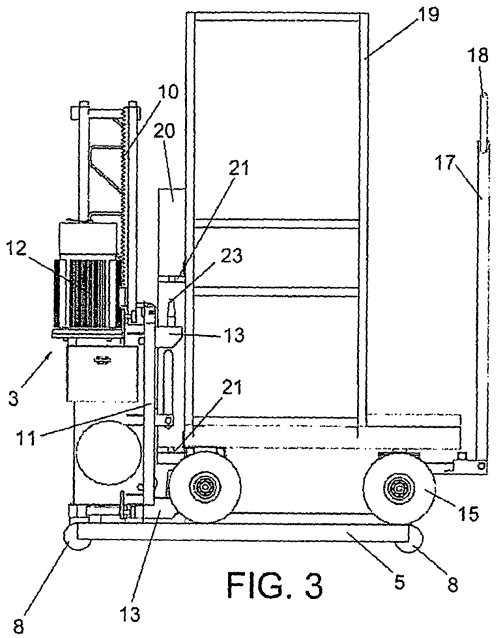


FIG. 3

EP 1 889 807 A2

Description

OBJECT OF THE INVENTION

[0001] The present invention relate to an elevator or vertical load transport machine, of the type usually installed at construction sites, mainly renovation sites, providing a cyclic loading and unloading system, allowing a continuous work system in the process for transporting and moving loads from their storage area, usually located at ground level and separated from the site, to its final location, located at a height above the storage area.

[0002] To that end, the machine has an elevation driving device in which different moving devices, which are preferably automatically coupled to said driving device, are interchanged.

BACKGROUND OF THE INVENTION

[0003] There are currently several vertical transport devices for elevating goods or material that are essential in different types of jobs and are usually formed by an elevating structure and platforms permanently fixed to said structure.

[0004] Load elevation systems incorporating a driving element have the drawback that once all their components are installed, said elevation driving device and platform for loads are static, which means:

- A single use of the platform, without adapting to the type of the load, which involves less safety and more loss of time in its handling,
- The simultaneous prevention of moving, loading and unloading tasks with the subsequent cost increase,
- Down times of at least one employee since loading and unloading tasks of the machine cannot be carried out until the machine reaches its work level, and
- The unloading of the platform on the floor is prevented since horizontal movement systems and moving trolley systems are not provided.

[0005] Likewise, even when the known systems allow interchanging platforms adapted to different materials or components (scaffolds, bricks, liquids, panels,...), they require not using the elevating machine during the platform substitution time as well as its partial disassembly, thus negatively affecting production times. These platform changes further require being carried out by qualified staff, which entails a cost increase in the installation.

[0006] A limitation for the installation and the use of this type of elevating machines is the space available at the job site because most of the machines known in the state of the art occupy a considerable space on the floor, such that at sites located near centric areas that are difficult to access or have heavy traffic of people and/or vehicles, said devices can be a obstacle for the public pathways, with the subsequent annoyance for pedestrians and/or drivers that this involves. Sometimes and due to the features of said machines, the transport and location in certain areas is impossible due to their size and weight.

DESCRIPTION OF THE INVENTION

[0007] The job site elevator proposed by the invention completely and satisfactorily solves the drawbacks set forth previously in the different commented aspects, providing an elevator the loading platform of which can move freely in a horizontal direction when a moving device or trolley is at the floor level, the measurements of said moving device or trolley being variable according to the load and the type of job task or process, which confers the possibility of adaptation to the minimum occupation of public pathways, also being able to be integrated inside the protective area of a scaffold structure.

[0008] The object of the invention is to provide a load elevator having a loading moving device or trolley preferably coupled by automatic means to a frame associated to a drive unit which moves vertically, such that when said moving device is detached from the frame it can move freely in a horizontal direction.

[0009] Another object of the invention is to provide a second frame moving horizontally with respect to the first frame, thus allowing the horizontal movement of the moving device coupled to said second frame.

[0010] Two securing systems between the moving device and the vertical movement frame are also an object of the invention.

[0011] A final object of the invention is a loading moving device.

[0012] To that end and more specifically, the elevator device is formed from a base structure from which a guide mast vertically projects upwards, a frame being able to move along said guide mast, which frame can be provided with rotation and incorporates a system for coupling and detaching the loading moving devices.

[0013] The support base has a preferably U-shaped light metal structure, internally reinforced with a crosspiece and provided at its ends with rounded supports in the form of wheels, which allow tipping the device easily for its support on the wheels arranged in the rear part and allow the manual transfer of the elevator to any other place of the work of for its transport.

[0014] The mentioned guide transport emerges from the rear middle area of said base, with a modular structure which allows its longitudinal coupling to be adapted to the height of the job, said mast incorporating a movement system, preferably a longitudinal rack, allowing the movement of the frame and therefore of the moving device thereupon.

[0015] The frame is formed by a tubular structure on which a drive unit, the running gear of the machine, as well as the usual ends of the run of the trolley and the safety gear brake are installed.

[0016] Said structure in turn incorporates a system for coupling and detaching the loading moving devices

which preferably consists of a series of raising bolts which in the upward movement of the frame are coupled to said moving device by means of through holes and which have been previously guided on the support base, said loading moving device being able to be raised to the desired height. Other types of coupling systems can also be used.

[0017] The width of said coupling system can be adjusted, such that it allows the coupling of loading moving devices the width of which can vary according to the load or materials to be transported.

[0018] The loading moving devices are formed from a structure the base of which incorporates at least two wheels for its movement, coupling means for coupling it to the frame and a device or platform which can be coupled to said structure and can be interchanged for the storage and loading of different materials. This loading moving device allows defining different type of moving devices according to the job task or process, for the purpose of adapting it as much as possible to the type of load and materials, such as a specific loading moving device for raising the scaffold material during the assembly thereof or a general load trolley incorporating a platform rotation system for unloading on-site.

[0019] Since the elevator has several loading moving devices which can be interchanged and coupled thereto, whereas a moving device is unloaded on an upper floor of the work, another moving device can be loaded with material in the lower level, thus speeding up the loading and transport process and reducing job times.

[0020] This elevator in turn allows raising the upper sections or modules of the guide mast of the elevator, facilitating the assembly of said guide mast.

[0021] The elevator can also incorporate a second frame coupled to the first frame which is integral with the drive unit, in this case said second frame incorporating the coupling means for coupling it to the loading moving device and horizontal movement means with respect to the first frame. Said horizontal movement means can be manually actuated, such as for example by means of a worm screw manually actuated by an operator, or automatically actuated by means of the use of at least one linear moving device. By means of this horizontal movement system, the elevator can introduce the loading moving device in the upper floor for its subsequent detachment and horizontal transfer of the moving device throughout the floor and vice versa.

DESCRIPTION OF THE DRAWINGS

[0022] To complement the description being made and for the purpose of aiding to better understand the features of the invention according to a preferred practical embodiment thereof, a set of drawings is attached as an integral part of said description in which the following has been shown with an illustrative and non-limiting character.

[0023] Figure 1 shows a perspective view of an elevator (basic assembly) without the loading moving device or trolley in which a coupling system between the frame and trolley by means of bolts can be seen.

[0024] Figure 2 shows a perspective view of the elevator of the previous figure with the loading moving device arranged on its support and guide structure prior to the coupling thereof to the frame.

[0025] Figure 3 shows a side elevational view of the elevator shown in the previous figure.

[0026] Figure 4 shows a side elevational view of the elevator with the moving device or trolley coupled to the frame.

[0027] Figure 5 shows a plan view of a detail of the elevator in which the two positions (A and B) of the second frame with horizontal movement with respect to the first frame for unloading on the floor can be seen.

[0028] Figure 6 shows a perspective view of an elevator without the loading moving device or trolley in which a horizontal piston and guide coupling system can be observed.

PREFERRED EMBODIMENT OF THE INVENTION

[0029] The load elevator for construction jobs proposed by the present application is formed by two basic assemblies, a base structure 3, 24 formed by a first frame 11 associated to a drive unit 12, a guide mast 2 and a support base, and a second structure coupled to the frame of the first structure formed by the loading moving device or trolley 4, which can be interchanged and provides free movements on the horizontal plane of the floor until it is coupled to the frame 11, 31 and 24.

[0030] The base 1 of the base structure 3 of the device is formed by two longitudinal bars 5-5' arranged in parallel and spaced from one another by two crosspieces 6 and 7.

[0031] At the ends of the bars 5-5' there are rounded supports 8 which facilitate tipping the base structure 3 on the support wheel or wheels 37 arranged in the rear part of said base structure 3 to then horizontally move the entire structure 3 when the elevator is not operating and it must be transported either on the job site or for the transfer thereof.

[0032] The bars 5-5' also incorporate on their surface respective guides 9-9' which facilitate positioning the trolley 4 on said base, transversely immobilizing it.

[0033] The guide mast 2 projects perpendicularly from the middle area of the cross-beams 6 and 7, which mast has a light-weight and resistant modular lattice structure allowing the longitudinal coupling of a plurality of modules so as to adapt it to the required height, said mast incorporating a longitudinal rack 10 allowing the movement of the first frame 11 thereof.

[0034] The first frame 11 has a planar rectangular structure parallel to the guide mast 2 on which a drive unit 12 is installed, integral thereto, incorporating the different drive and safety elements common to this type of devices for their movement along the mast 2 through the rack 10, which engages with the gear wheels or gears arranged in the running gear of the first frame.

[0035] It is also possible to replace the vertical movement mechanism with a pulley and rope mechanism or with any other mechanism.

[0036] On the side opposite to the one incorporating the drive unit 12, the frame 11 has an securing or coupling system formed by four bolts 13 distributed in its four corners for coupling the loading moving trolleys 4 by means of through holes 22 arranged on the inner side of the trolley 4 to the frame 11 which can move vertically. The distance between said bolts can be modified according to the width of the trolley 4 to be coupled to the frame 11, 31.

[0037] Said anchoring system has an additional safety device for preventing the accidental movement of the moving device. Said safety device is formed by a solid longitudinal element 34 arranged transversely between at least two preferably through holes 35 located on the frame 11 and at least one through groove 36 preferably located on a vertical bar 20 joined to the trussing of the moving device 4, said groove being located between the two through holes 35 of the frame.

[0038] Therefore, as can be seen in Figures 3 and 4, for the lifting of a loading moving device or trolley 4, the latter is located on the base 1 through its guides 9-9', moving said trolley 4 until coming into contact with the first frame 11 of the elevator, which must previously be at the lower level such that the raising bolts 13 are facing the through holes 22 of the flanges 21 of the trolley 4 with respect to its horizontal plane, and slightly vertically spaced under them, such that when the drive unit 12 is actuated and the frame 11 is moved vertically upwards, the latter causes the conical shape 23 of the bolts 13 to be introduced in the through holes 22 of the flanges 21 of the structure of said moving device 4, causing its vertical movement.

[0039] The elevator can also incorporate a second frame 31 coupled to the first frame 11 integral with the drive unit 12, said second frame 31 in this case incorporating the coupling means for coupling it to the loading moving device and horizontal movement means 32 with respect to the first frame 11. Said horizontal movement means can be manually actuated in the case of using a worm screw 32 manually actuated through the actuator 33, or automatically actuated by means of using at least one linear moving device (not shown). By means of this horizontal movement system the elevator can introduce the loading moving device on the upper floor for the subsequent detachment thereof and horizontal transfer of the moving device throughout the floor, and vice versa.

[0040] In the case of an elevator with two frames 11, 31 the coupling and detaching system between the second frame 31 and the trolley 4 is identical to that described above for the case in which the elevator incorporates only a first frame 11.

[0041] Figure 6 shows an alternative coupling system between the frame 11, 31 and a set of loading moving devices or trolleys 4. To that end, the base structure 24 of the elevator incorporates a first frame 11, associated to a drive unit 12, a guide mast 2 and support base incorporating the coupling system. Said coupling system is carried out by means of guides 25-25' forming the base of the elevator and on which there are arranged cones 26-26' defining the coupling position of the trolley 4. Between said two guides 25-25' there is arranged an X-shaped structure 27 supporting at its intersection a pair of pistons 28, 28' which are actuated by the longitudinal movement of an actuator 29. When said actuator 29 is moved, permanently driven by a spring 30, the pistons 28, 28' are moved perpendicularly to the guides 25, 25', thus retaining the trolley 4. The system is actuated upon inserting the trolley 4 in the guides 25-25', said trolley actuated by the actuator 29 and generating the described movement of the pistons 28, 28' and inserting the free ends thereof in holes (not shown) made to that end in the trolley 4.

[0042] The loading moving device or trolleys 4 for transporting the scaffolds are formed from a loading platform 14, provided at the bottom part with at least one running gear, with its respective wheels 15, spaced a length that is suitable for the distance between the guides 9, 9' present in the support base 1, to allow their positioning thereupon.

[0043] The rear running gear 16 of said transport trolley 4 incorporates an arm 17 which can be lowered and is integral therewith and allows manually controlling the horizontal movement of said trolley 4 by means of a handgrip 18.

[0044] The platform 14 incorporates at its upper part a metallic trussing 19 forming the safety area for loading the materials, the side of which that is parallel to the raising mast 2 incorporates an element for the coupling to the moving device 3, formed by a vertical bar 20 joined to the metallic trussing 19 in the middle area thereof, and from which respective pairs of flanges 21 project perpendicularly, which flanges are vertically spaced from one another by the same distance existing vertically between the raising hitches 13, each of the mentioned flanges 21 incorporating a through hole 22 with suitable sizes for the male coupling parts 23 of the raising hitches 13.

Claims

1. An elevator of the type incorporating a base structure from which a section of a guide mast vertically projects, on which at least one frame moves vertically along said mast by means of at least one drive unit integral with said first frame, **characterized in that** said elevator comprises a detachable loading moving device and a securing system for the coupling thereof to the first frame, such that said moving device moves vertically when it is coupled to the first frame and moves horizontally by means of wheels, independently of the first frame, when it is not coupled thereto.

2. An elevator according to claim 1, **characterized in that** it has a second frame joined to the first frame, integral with the drive unit, said second frame comprising:

- horizontal movement means with respect to the first frame, and
- the securing system for the coupling of the moving device.

3. An elevator according to claims 1 and 2, **characterized in that** the securing system between the frame and moving device is automatic.

4. An elevator according to claims 1 and 2, **characterized in that** the securing system can vary in width.

5. An elevator according to the previous claims, **characterized in that** the securing system comprises at least two vertical bolts integral with the frame intended to be automatically housed in respective through holes located in the detachable moving device when the frame moves vertically.

6. An elevator according to claim 5, **characterized in that** the securing system has a safety device for preventing the accidental movement of the moving device which is formed by a longitudinal solid element which is arranged transversely between at least two through holes of the frame and at least one through groove of the moving device, said groove being located between the two through holes of the frame.

7. An elevator according to claims 1 to 4, **characterized in that** the securing system is comprised by a structure integral with and perpendicular to the frame, which structure is formed by two guides (25, 25') which guide and support the moving device, there being arranged between said two guides (25, 25') an X-shaped structure (27) supporting at its intersection a pair of pistons (28, 28') actuated by the longitudinal movement of an actuator (29) which is permanently driven by a spring (30) such that when said actuator (29) actuated by the moving device moves when it is inserted in the guides (25, 25'), the pistons (28, 28') move perpendicularly thereto and are inserted in respective holes made in the moving device.

8. An elevator according to claim 1, **characterized in that** said base structure incorporates means for its horizontal transport.

9. An elevator according to claim 8, **characterized in that** said transport means are formed by at least one wheel located in the rear part of the base structure, opposite to the coupling side of the moving device on the frame.

10. An elevator according to the previous claims, **characterized in that** the base structure incorporates in its support surface elements for guiding the moving device during its approach to the frame.

11. An elevator according to claim 1, **characterized in that** the frame incorporates a running gear formed by gears intended to be coupled to the longitudinal rack (10) incorporated in the guide mast.

12. An elevator according to claim 1, **characterized in that** the vertical movement elements are formed by a pulley and rope mechanism.

13. A moving device to be coupled to the frame of an elevator, **characterized in that** it comprises:

- a structure the base of which incorporates at least two wheels for its movement,
- coupling means for coupling it to the frame, and
- a loading device on said structure for the storage and loading of materials.

14. A moving device according to claim 13, **characterized in that** said loading device can be interchanged.

15. A moving device according to claim 14, **characterized in that** said loading device is provided with rotation means allowing its rotation on said structure.

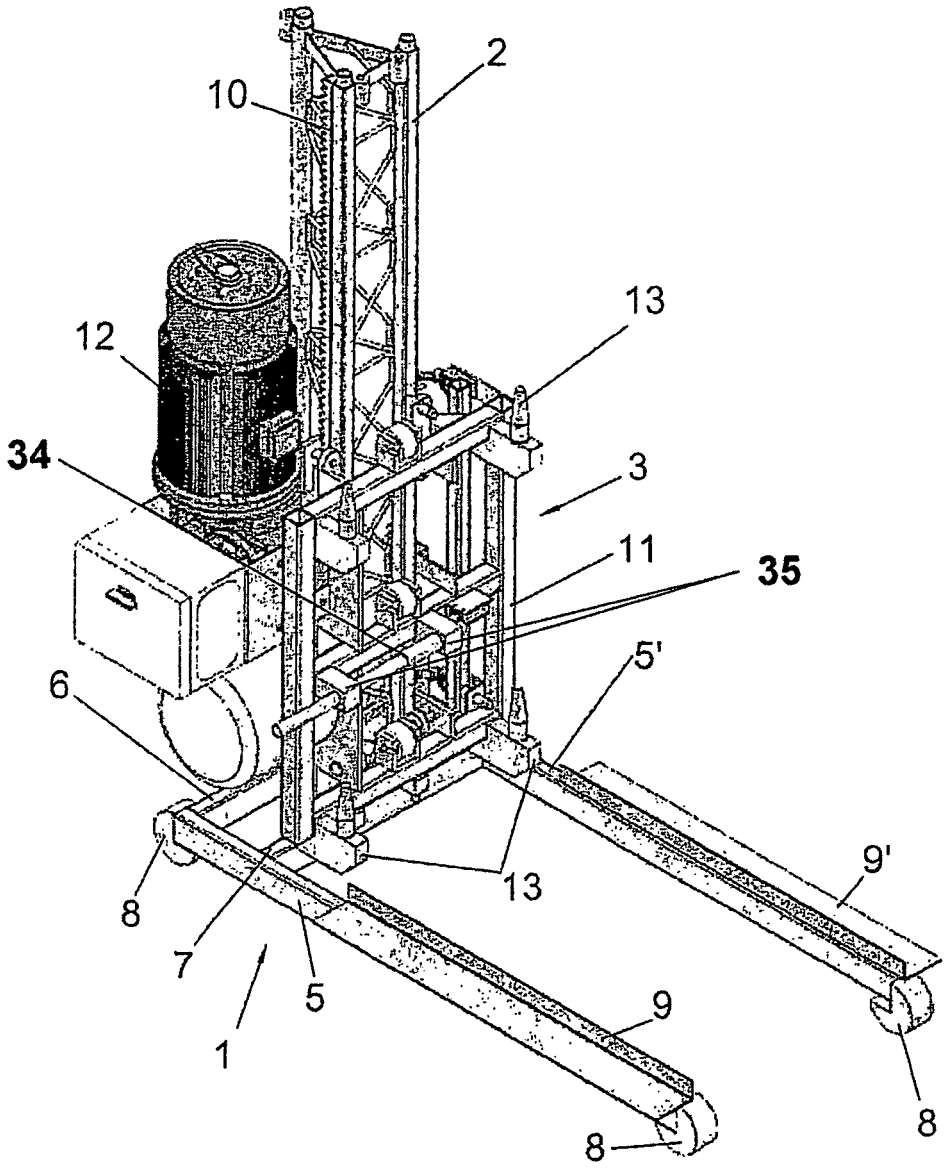


FIG. 1

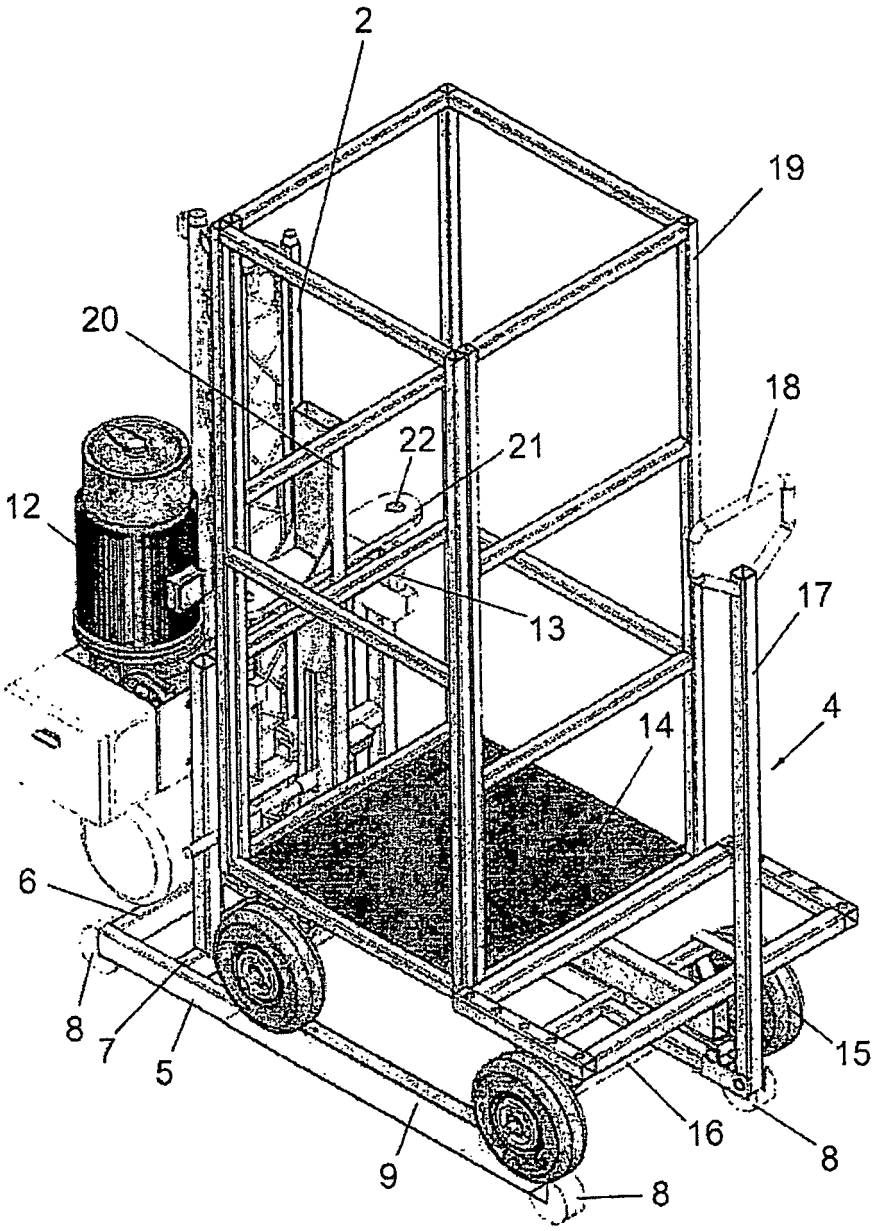


FIG. 2

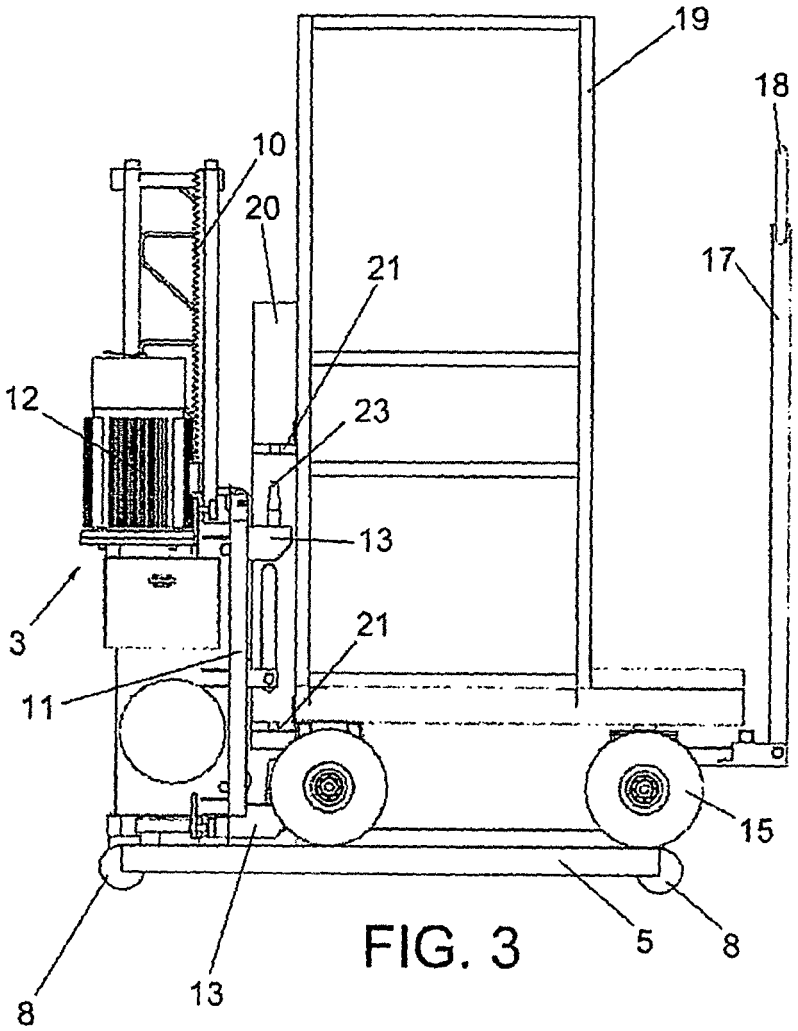


FIG. 3

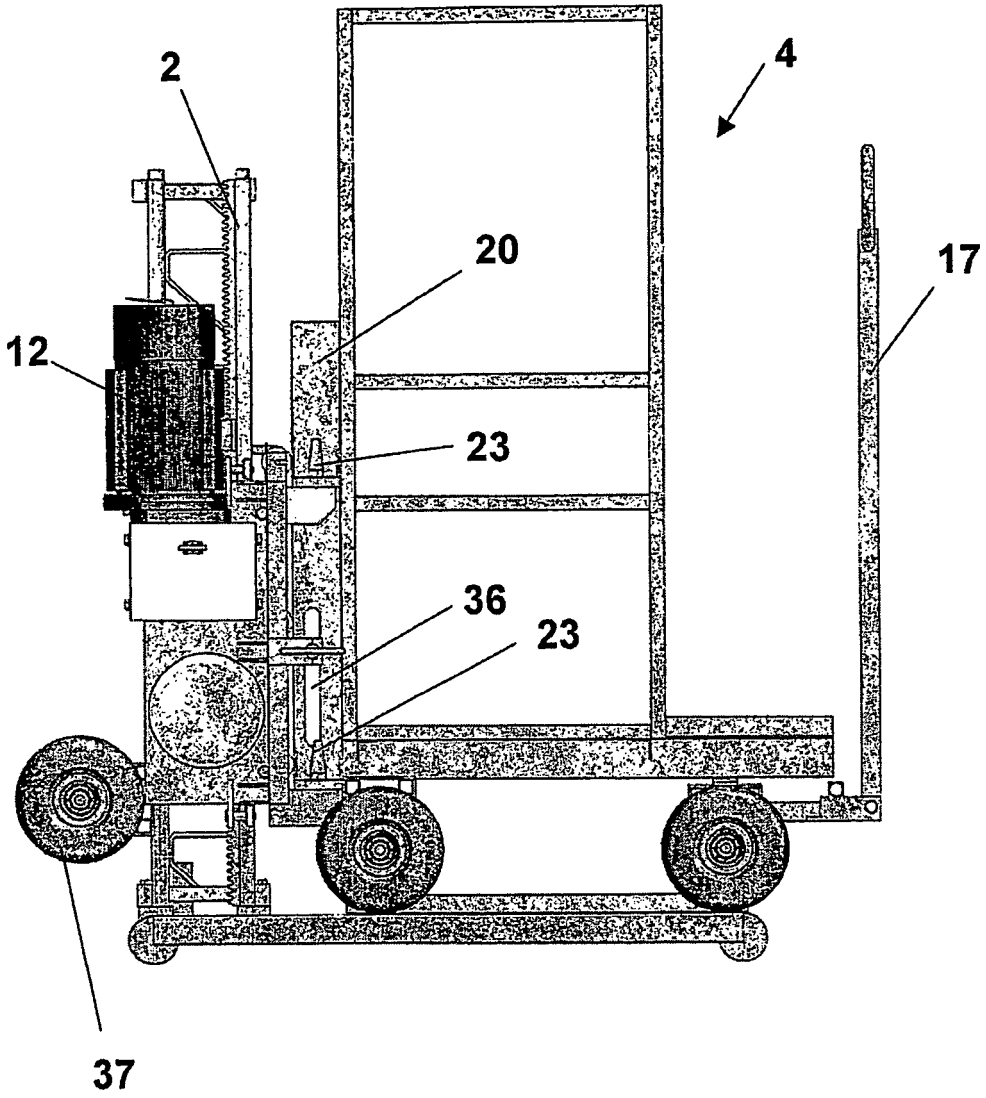
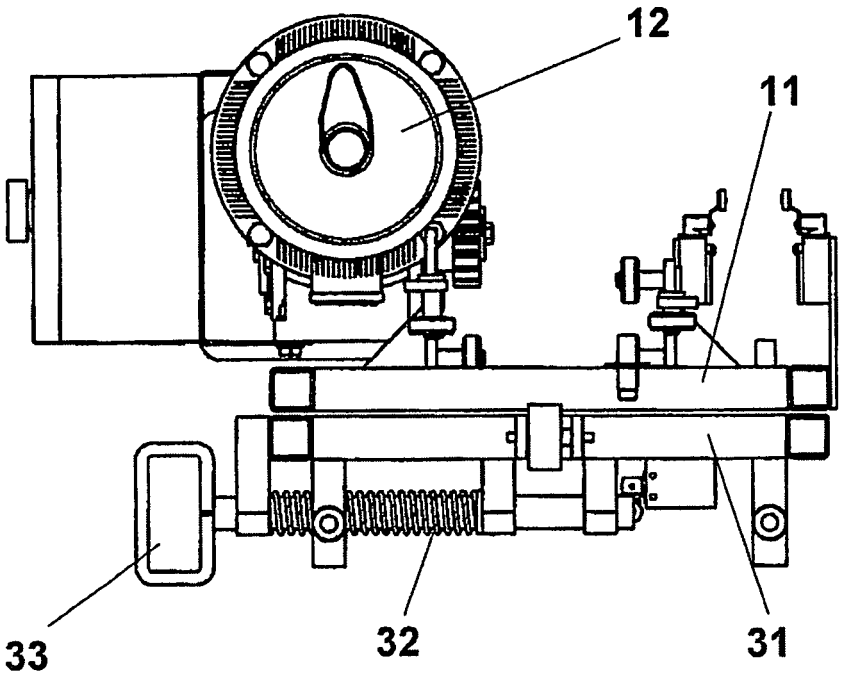
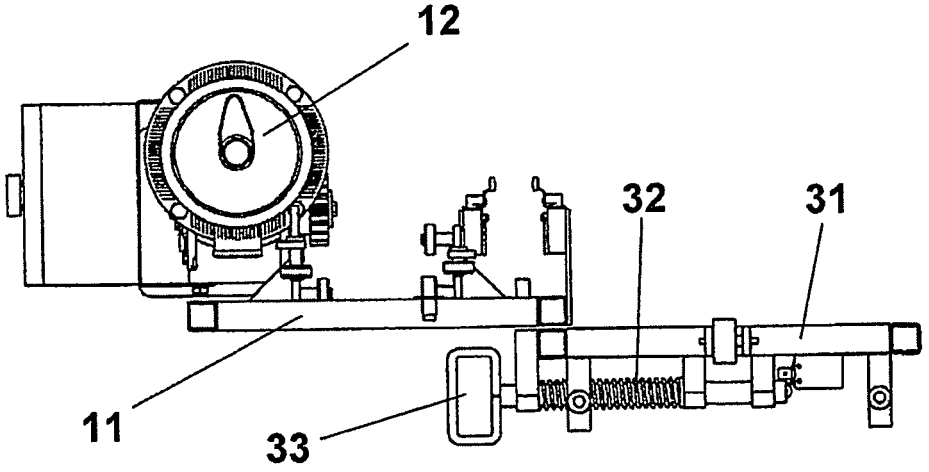


FIG. 4



- A -



- B -

FIG 5

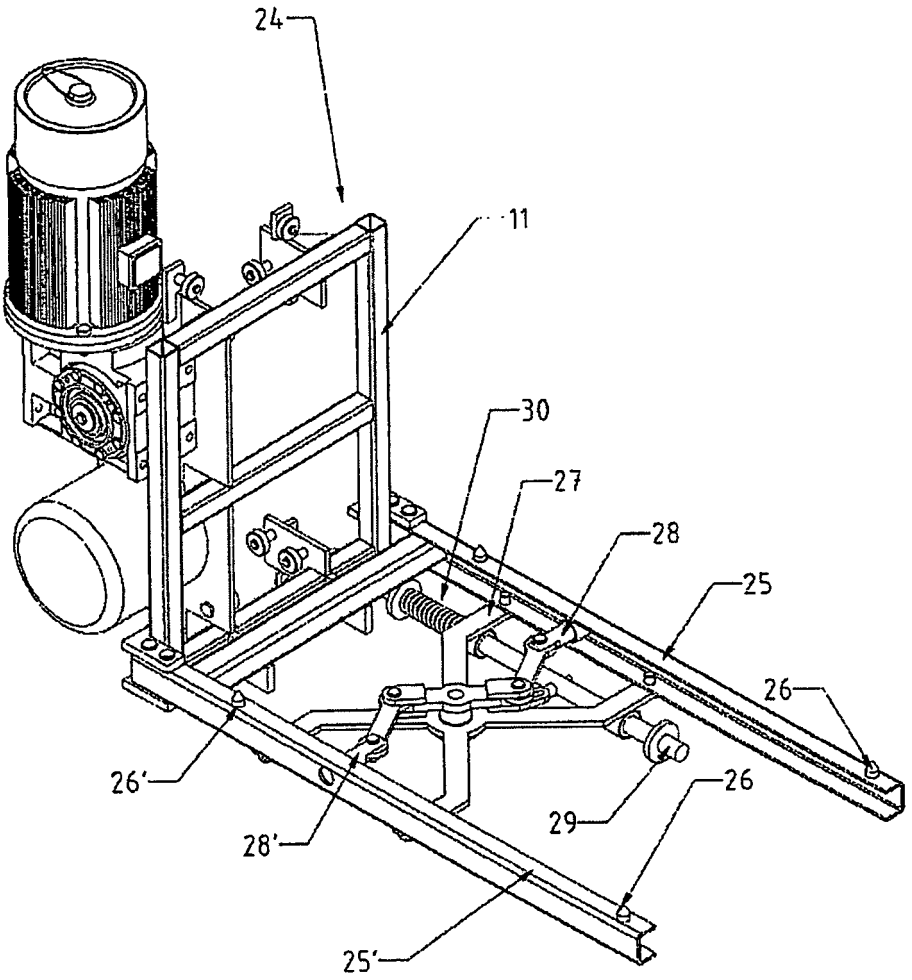


FIG. 6