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(54) Base for movable shelving

(57) Base for movable shelving, comprising a supporting frame formed by a plurality of longitudinal elements (14), able to be connected to a plurality of transverse elements (16). Some longitudinal elements (14) each comprise a pair of bars held together by head elements, so as to define an intermediate compartment (38) between the bars of each pair. In the intermediate compartment (38) of first longitudinal elements (14) at least a first wheel (40, 42) is able to be arranged, rotatably supported by the bars, and at least a second wheel (40, 42) is arranged in the intermediate compartment (38) of second longitudinal elements (14). At least a motor (54) is mounted on the supporting frame and is associated with at least one of the wheels (42) to make it a drive wheel.

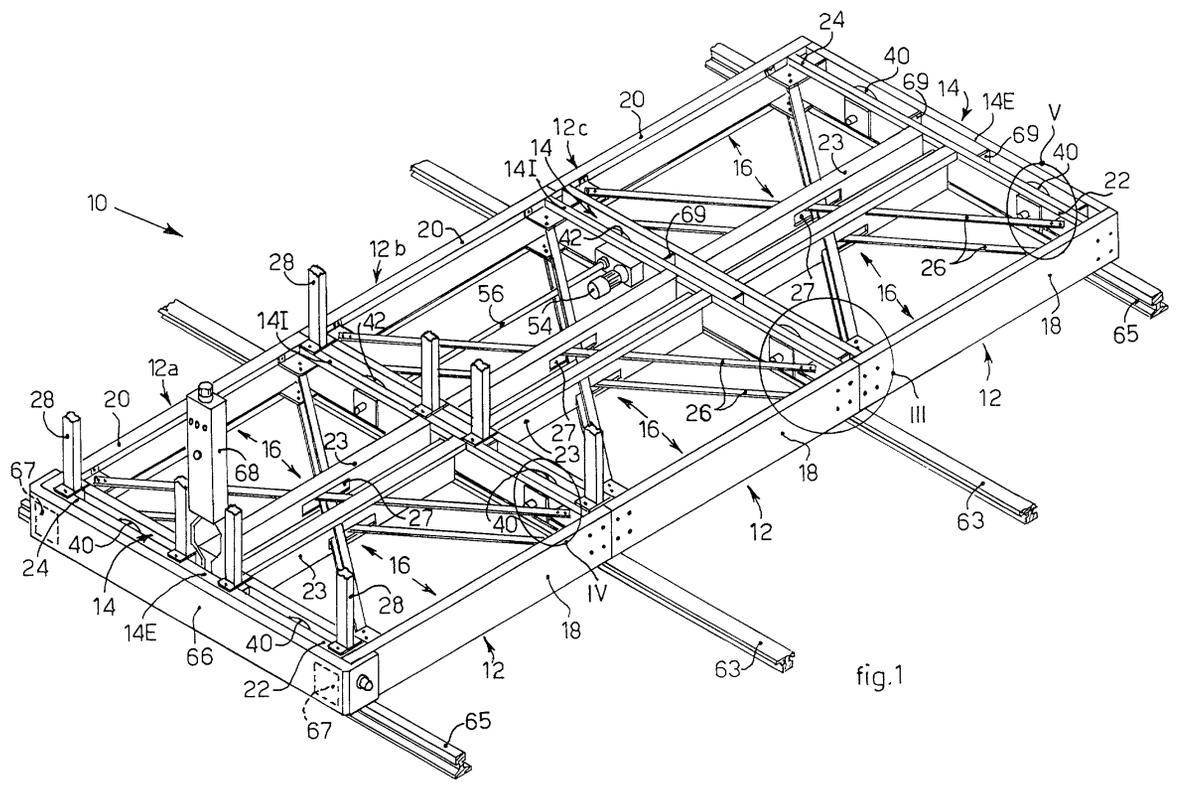

fig.1

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Description

FIELD OF THE INVENTION

[0001] The present invention concerns a base for a movable shelving able to be arranged in a storage warehouse, a depot or similar. The base comprises a frame formed by a plurality of pairs of profiled bars, connected to each other by means of a plurality of cross pieces and reinforcing tie rods. The vertical uprights of the shelving are mounted on the frame. A plurality of wheels are associated with the profiled bars, some of which are drive wheels and by means of which it is possible to easily move the shelving above, which can even be of very large size and particularly heavy, in the range of several tons.

BACKGROUND OF THE INVENTION

[0002] It is known a base for a fixed shelving for a storage warehouse, wherein the frame consists of a plurality of longitudinal bars assembled at the respective ends with corresponding metal heads so as to form individual beams. The beams are connected to corresponding transverse bars so as to form a supporting grid able to support a shelving above of large size and heavy weight, for example more than 12 metres high and with an overall weight of about 750,000 Kg.

[0003] This conventional base is not very suitable to be equipped with means which can move it from one place to another in the warehouse together with the structure above, for considerable distances, even in the range of some tens of metres.

[0004] The present Applicant has devised and embodied this invention to overcome this shortcoming of the state of the art and to obtain further advantages.

SUMMARY OF THE INVENTION

[0005] The present invention is set forth and characterized essentially in the main claim, while the dependent claims describe other innovative characteristics of the invention.

[0006] The purpose of the invention is to achieve a strong and reliable base on which a shelving of large size and capacity is installed, and which can be easily moved, for example translating on steel tracks located level with the floor so as to eliminate all corridors between the shelvings, except for one, which will open on command in correspondence with the shelvings to be loaded or unloaded and thus obtain a system of a type which can be compacted and which allows to double the storage capacity of the warehouse.

[0007] In accordance with this purpose a base according to the invention, which is able to be used as a base element to obtain a movable shelving, comprises a supporting frame formed by a plurality of longitudinal elements, also called sliders, which are able to be connected to a plurality of transverse elements. Each slider comprises a pair of bars held together at a determined distance by head elements, so as to define an intermediate compartment between the bars. In the intermediate compartment of at least a first slider at least a first wheel is able to be arranged, rotatably supported by the slider itself, while in the intermediate compartment of a second slider at least a second wheel is arranged.

[0008] Advantageously on the supporting frame, according to the present invention, drive means are also assembled, associated with at least one of the afore-said wheels to make it a drive wheel.

[0009] According to a preferential embodiment, each base comprises two sliders each containing at least two wheels with a guide function, and a variable number (even tens of units) of other sliders which each contain at least a drive wheel.

[0010] Advantageously an idler wheel is also associated with a drive wheel on the same slider.

[0011] In this preferential embodiment, the sliders, which contain the wheels functioning as guides, are the outer or lateral sliders (front and rear of the base), while the sliders which contain the drive wheels are the ones inside the base.

[0012] All the drive wheels are advantageously connected with each other by means of a transmission shaft, connected to at least a motor, so as to transmit movement uniformly over the whole length of the base, thus preventing torsions thereof.

[0013] Several motors may be also provided, all connected to the transmission shaft and distributed, in number and power, according to the total load bearing on the base.

[0014] By driving the electric motors simultaneously it is possible to move the entire base and the shelving above, backwards and forwards, in a direction parallel to the afore-said sliders.

[0015] According to one characteristic of the present invention, the base for movable shelving is of the modular type and is able to support and move, at the same time, weight loads of more than 750,000 Kg.

[0016] In this case, a pair of sliders forms with the afore-said transverse elements a corresponding supporting grid of great stability. The opposite vertices of each grid are connected together by means of a plurality of tie rods, able to further reinforce the base on which the overlying shelving is attached.

[0017] According to one solution of the invention, the base comprises a high number of such grids, for example several tens, and is provided with at least a control panel connected to the drive means to control and move the frame, selectively and automatically, even at a distance, according to the possible operations of loading and unloading goods onto/from the shelving, even in extended spaces.

BRIEF DESCRIPTION OF THE DRAWINGS

[0018] These and other characteristics of the present invention will be apparent from the following description of a preferential form of embodiment, given as a non-restrictive example, with reference to the attached drawings wherein:

Fig. 1 is a prospective view of the base according to the present invention;
Fig. 2 is a prospective view of a slider of the base in Fig. 1;
Fig. 3 is a view from above of the detail III in Fig. 1;
Fig. 4 is a transverse section of the detail IV in Fig. 1;
Fig. 5 is a transverse section of the detail V in Fig. 1.

DETAILED DESCRIPTION OF A PREFERENTIAL FORM OF EMBODIMENT OF THE INVENTION

[0019] With reference to Figs. 1 and 2, a base 10 for movable shelving according to the present invention, for example for a storage warehouse, comprises a plurality of supporting grids 12, for example three, of a modular type, to be more exact, a first outer grid 12a, a second outer grid 12c and an intermediate grid 12b.

[0020] Each grid 12 is substantially rectangular in shape and is formed by two longitudinal elements or sliders 14, and by a plurality of transverse elements 16, for example four, connected orthogonally to the sliders 14. To be more exact, the transverse elements 16 comprise two outer bands 18 and 20, attached respectively to the front ends 22 and rear ends 24 of two contiguous sliders 14, and two central bands 23, attached in a substantially central zone of the sliders 14.

[0021] The sliders 14 of the inner grid 12b are common respectively to the first outer grid 12a and the second outer grid 12c.

[0022] In correspondence with the opposite vertices of each grid 12 pairs of tie rods or cross bars 26 are also attached, able to further reinforce the base 10, to support the overlying structure of the shelving; for the sake of simplicity, only the uprights 28 of the shelving are shown here. In fact, the part of the shelving above the base 10 can be of any conventional type.

[0023] The cross bars 26, for example, each made from a single C-shaped profile, cross in the center of each grid 12, passing through the two central bands 23 in suitable rectangular through apertures or eyelets 27.

[0024] According to one characteristic of the invention, the sliders 14 each comprise two elements 30, 32 (Fig. 2), appropriately holed and shaped by extremely high precision tools (laser cutting), and subsequently bent or profiled to obtain a substantially C-shaped transverse section and arranged parallel to each other with the respective vertical flanks 36 arranged opposite, so as to define an intermediate compartment 38.

[0025] The two C-shaped elements 30 and 32 are joined together by means of several welded intermediate reinforcement spacers 69 and, in correspondence with the respective ends, by means of metal plates 34, of a conventional type, each of which is provided with four lateral fins 35, two upper and two lower, on which the end of a corresponding tie bar 26 is able to be attached. The end portions of two adjacent outer bands 18a, 18b are also attached to the metal plates 34 (Fig. 3).

[0026] The particular conformation of the individual components of each slider 14 allows a precise and perfect fit thereof for an easy assembly and subsequent welding of the whole, without needing further particular templates or clamps.

[0027] According to another characteristic of the present invention, the supporting grids 12 are able to move in a single body in a direction parallel to the sliders 14, by means of pairs of wheels 40 and 42 arranged in the intermediate compartment 38 and pinned rotatably on pins 43 (Fig. 4) inside the sliders 14. To be more exact, a first wheel 40 is idle and pinned in proximity with the front end 22 of the elements 30 and 32, while a second wheel 42 is a drive wheel and pinned in proximity with the rear end 24 of the sliders 14. The second wheel 42 is connected to an electric motion-reduction unit 54 with a through shaft of a conventional pendular type.

[0028] Moreover, on the vertical flanks 36, in correspondence with each wheel 40 and 42, metal platelets 48 are attached to support and reinforce the respective pins 43 (Fig. 2).

[0029] In this embodiment, only the inner supporting grid 12b is provided with drive wheels 42 (Fig. 1), which are connected to each other by means of a transmission shaft 56, while the outer supporting grids 12a and 12c are provided only with idler wheels 40.

[0030] To be more exact, all the outer sliders 14, indicated by the reference number 14E, each comprise two or four wheels, all idle and shaped with a guide function.

[0031] On the contrary, all the inner sliders 14, indicated by the reference number 14I, of which there may even be a great number, in the range of tens of units, each comprise at least an idler wheel 40 and a drive wheel 42, both with a plane profile, with a mere supporting function.

[0032] All the drive wheels are connected to each other by means of transmission shafts 56 so as to transmit movement uniformly over the whole length of the base, thus preventing torsions thereof. The motors are attached along the transmission shaft 56 and distributed in number and power, according to the total load which bears on the base.

[0033] The wheels 40 and 42 are able to slide in mating longitudinal sliding rails 63 and 65, inserted in the floor of the storage warehouse where the shelving is arranged, in order to move the shelving, with its base 10, in reciprocally opposite directions.

[0034] In this case, each outer sliding rail, denoted by the reference number 65, has a shaped profile, while each inner sliding rail 63 is substantially flat.

[0035] The base 10 according to the present invention also comprises an anti-knock bar 66 for lateral protection, attached on the outer slider 14E of the first outer grid 12a. Inside each protective element of the front and rear corners of the base 10 safety photocells 67 are positioned, connected with a transceiver device, of a conventional type and not shown in the drawings. The beam of light of the photocells 67, positioned a few millimetres from the ground, can be adjusted and acts as a barrier along the whole base and allows to stop the plant if an object should accidentally occupy the corridor where the trolley moves (for example any material which has accidentally fallen from the shelving).

[0036] A command unit 68 is connected to the electric motor 54, and is able to automatically command the movement of the whole base 10 backwards and forwards along the sliding rails 63 and 65, to a stop position determined by the photocells 67 and by adjustable proximity photocells, located in the front part of the base, in the protected curve where there is a little window.

[0037] When the proximity photocell of a base 10 detects the presence of the adjacent base 10, or of a wall at the outer limit of the plant, the control unit 68 automatically stops all the electric motors 54 of the moving base 10.

[0038] It is clear however that modifications and/or additions of parts can be made to the base 10 for a movable shelving as described heretofore without departing from the field and scope of the present invention.

[0039] For example, the base for movable shelving comprises more than three grids, for example ten, able to support and move an overlying structure of the large size shelving with an overall weight of more than 750,000 Kg.

[0040] It is also clear that, although the present invention has been described with reference to specific examples, a person of skill in the art shall certainly be able to achieve many other equivalent forms of the base 10, all of which shall come within the field and scope of the present invention.

Claims

1. Base for movable shelving, comprising a supporting frame formed by a plurality of longitudinal elements (14), able to be connected to a plurality of transverse elements (16), wherein at least some of said longitudinal elements (14) each comprise a pair of bars (30, 32) held together by head elements (34), so as to define an intermediate compartment (38) between the bars (30, 32) of each pair, **characterized in that** in the intermediate compartment (38) of at least first longitudinal elements (14) at least a first wheel (40, 42) is able to be arranged, rotatably supported by said bars (30, 32), and that at least a second wheel (40, 42) is arranged in the intermediate compartment (38) of second longitudinal elements (14), and that drive means (54) are mounted on said supporting frame and are associated with at least one of said wheels (42) to make it a drive wheel.

2. Base as in claim 1, **characterized in that** each of said bars (30, 32) has a substantially C-shaped transverse profile and is arranged with its vertical flank (36) opposite and parallel to that of the other bar (30, 32), so as to define said intermediate compartment (38).

3. Base as in claim 2, **characterized in that** each wheel (40, 42) is pinned on said lateral flanks (36) of said bars (30, 32).

4. Base as in any claim hereinbefore, **characterized in that** at least two of said wheels are arranged in said intermediate compartment (38), wherein a first wheel (40) is pinned in proximity of a first end of the corresponding bars (30, 32) and that a second wheel (42) is pinned in proximity of a second end of the same bars (30, 32).

5. Base as in claim 4, **characterized in that** said drive means comprise an electric motor-reduction unit (54) with a through shaft of the pendular type connected to said second wheel (42) to make it a drive wheel and to selectively move said frame in reciprocally opposite directions, in a direction parallel to said bars (30, 32).

6. Base as in any claim hereinbefore, **characterized in that** a plurality of drive wheels (42) are provided, each one mounted in a corresponding longitudinal element (14) and that said drive wheels (42) are connected to each other by means of a transmission shaft (56).

7. Base as in any claim hereinbefore, **characterized in that** on each of said bars (30, 32) in correspondence with each of said wheels (40, 42), drive and idler, platelets (48) are attached, to support corresponding pins (43) of said wheels (40, 42).

8. Base as in any claim hereinbefore, **characterized in that** each of said head elements comprises a metal plate (34).

9. Base as in claim 8, **characterized in that** the adjacent terminal portions of two of said transverse elements (18a, 18b) are attached on said metal plate (34).

10. Base as in any claim hereinbefore, **characterized in that** said frame is of the modular type and comprises a plurality of supporting grids (12), substantially rectangular in shape, each of which is formed

by two of said longitudinal elements (14) and that said transverse elements comprise two outer bands (18, 20) attached respectively to the front (22) and rear (24) ends of said longitudinal elements (14) and at least a central band (23) attached in a substantially central zone of said longitudinal elements.

11. Base as in claim 10, **characterized in that** at the opposite vertices of each of said grids (12) pairs of cross bars (26) are attached able to reinforce said frame to move and support an overlying structure (18).

12. Base as in claim 11, **characterized in that** said cross bars (26) are inserted with play into corresponding through eyelets (27) made in said central band (23), and are attached on lateral fins (25), solid with each of said head elements (34).

13. Base as in any claim hereinbefore, **characterized in that** it comprises two outer or lateral longitudinal elements (14E), in each of which one or more idler wheels (40) are mounted.

14. Base as in claim 13, **characterized in that** each of said idler wheels (40) is shaped with a guide function.

15. Base as in any claim hereinbefore, **characterized in that** it comprises a plurality of inner longitudinal elements (14I), in each of which at least an idler wheel (40) and at least a drive wheel (42) is mounted.

16. Base as in claim 15, **characterized in that** each wheel (40, 42) of said inner longitudinal elements (14I) has a plane supporting profile.

17. Base as in claim 16, **characterized in that** said plurality of said inner longitudinal elements (14I) is in the order of tens of units.

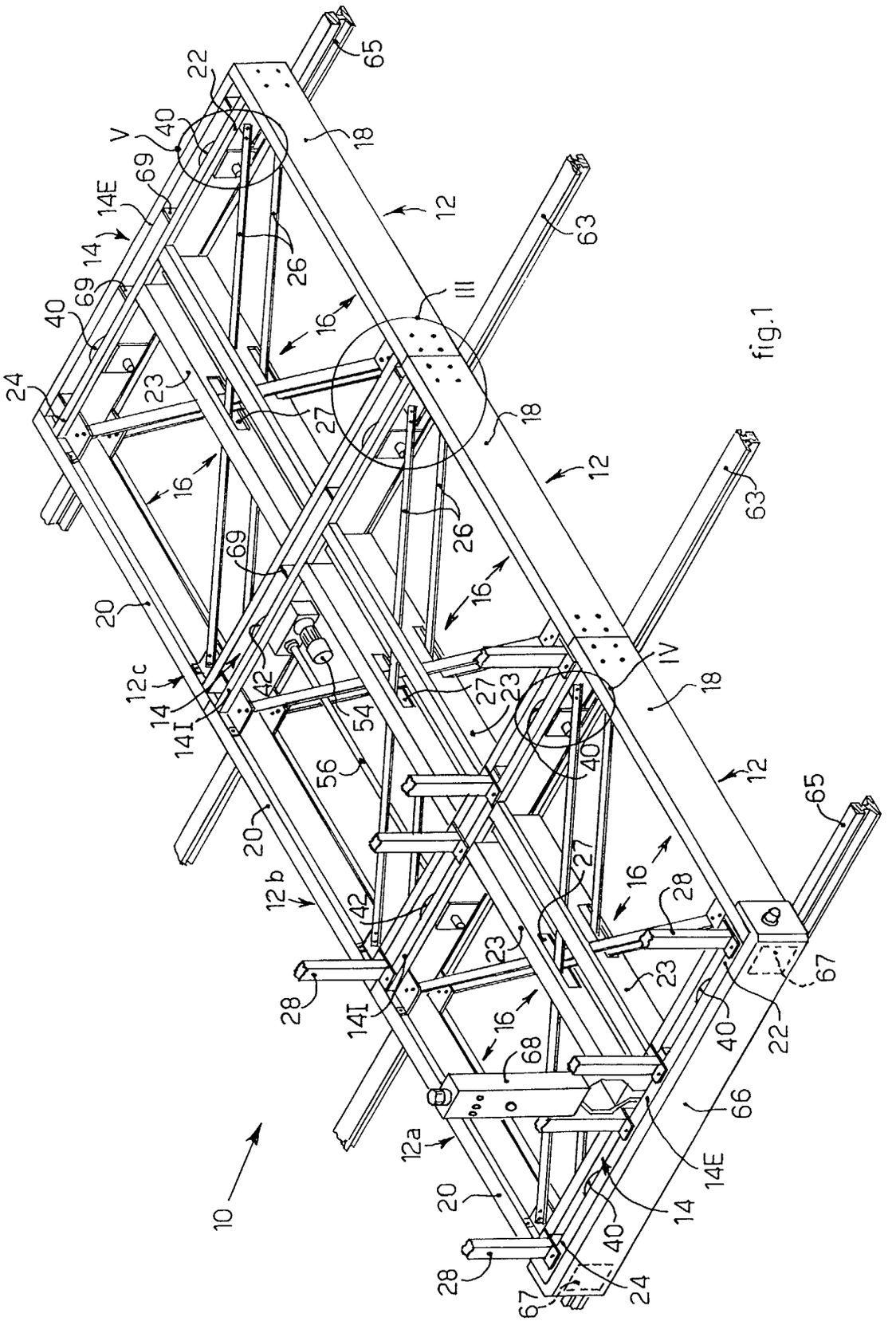
18. Base as in any claim from 13 to 17 inclusive, **characterized in that** it also comprises an anti-knock bar (66) for lateral protection, attached on one of said outer longitudinal elements (14E), arranged substantially orthogonal to said transverse elements (16).

19. Base as in any claim hereinbefore, **characterized in that** it comprises a control unit (68) connected to said drive means (54) to command the actuation thereof.

20. Base as in claims 18 and 19, **characterized in that** inside said anti-knock bar (66) photocells (67) are inserted, connected to said control unit (68) and able to cooperate with a transceiver device to automatically block the frame in a stop position.

21. Base as in any claim hereinbefore, **characterized in that** the particular conformation of the individual components of each longitudinal element (14) allows a precise and perfect fit thereof for an easy assembly and subsequent welding of the whole, without needing to use particular attachment elements, such as templates or clamps.

22. Movable shelving to contain goods in a closed space, such as a storage warehouse or similar, **characterized in that** it comprises a base (10) according to any one of the previous claims.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12c
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fig.1

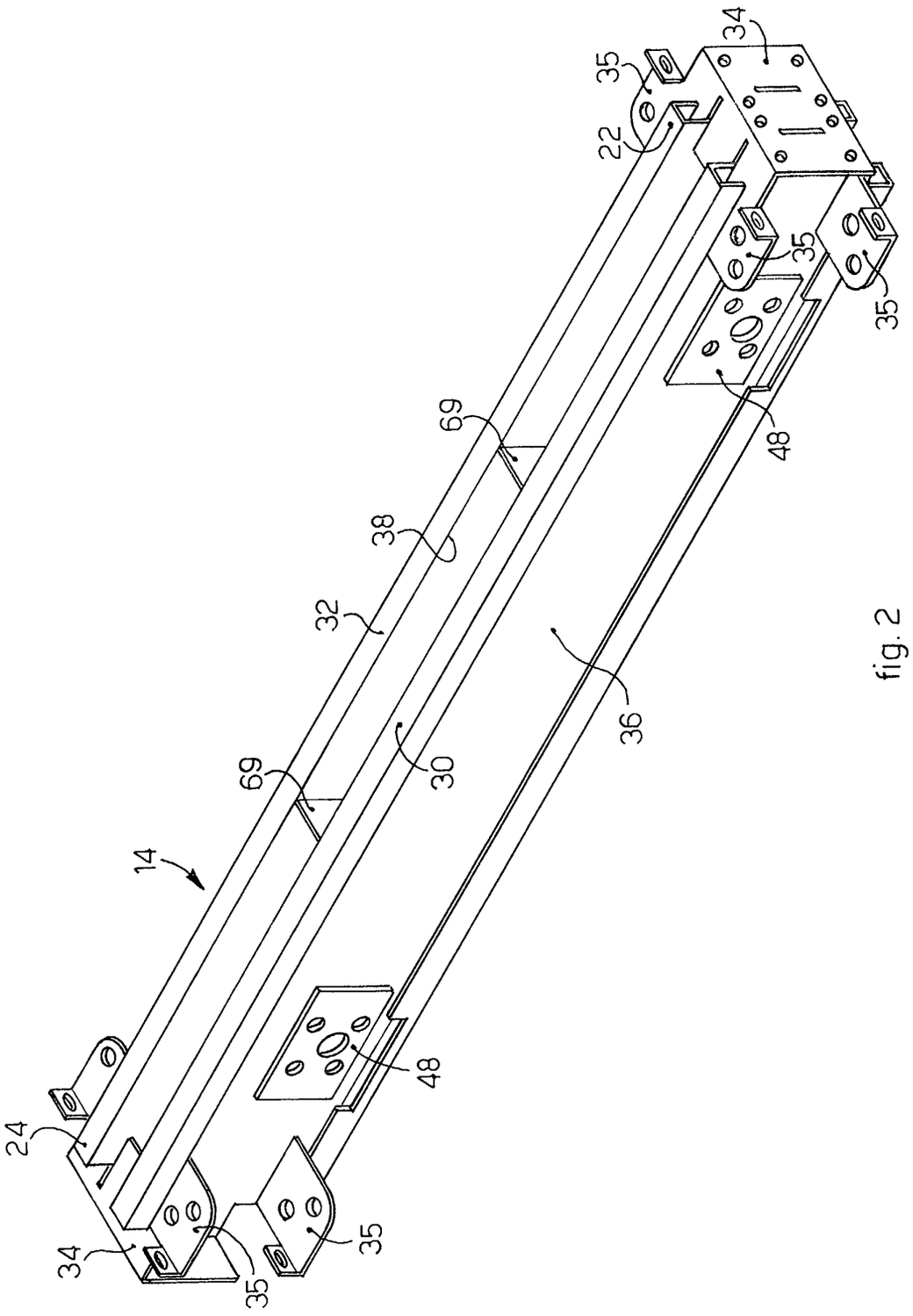

fig. 2

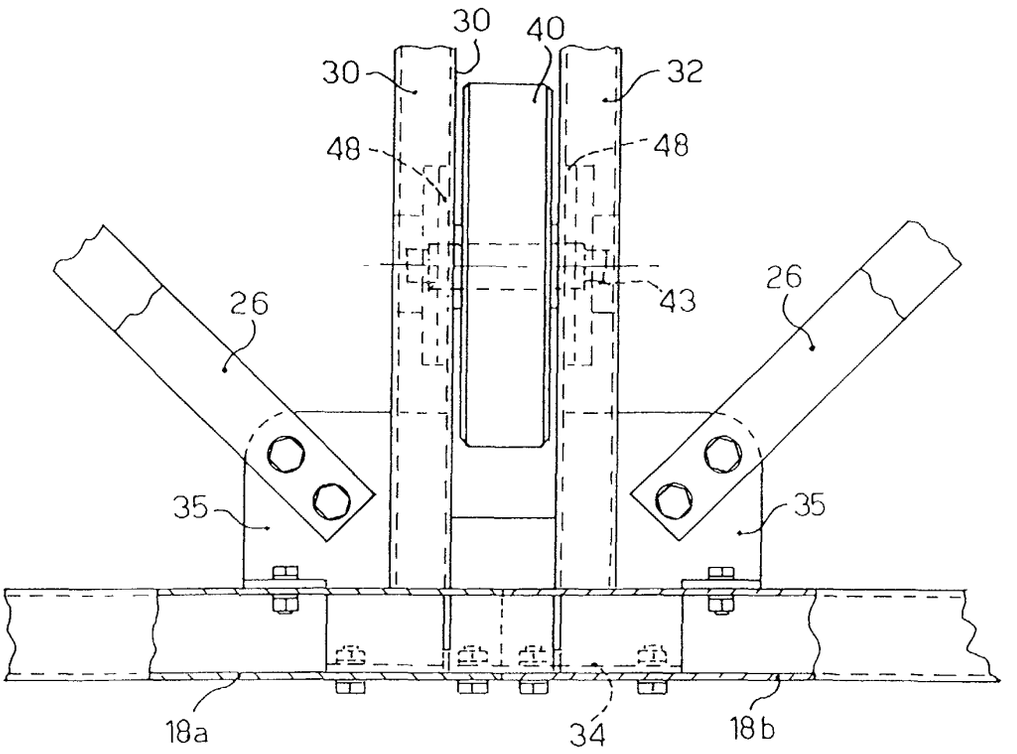

fig. 3

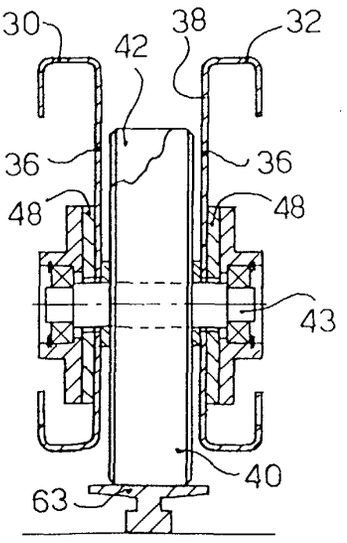

fig. 4

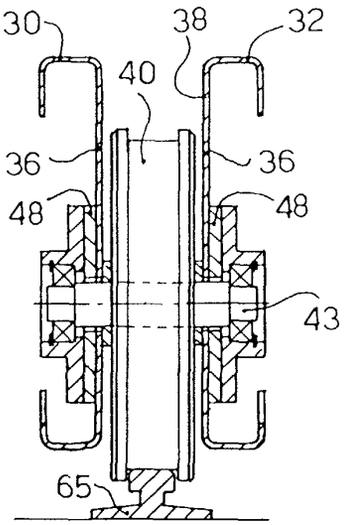

fig. 5

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EUROPEAN SEARCH REPORT

Application Number
EP 02 42 5458

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TECHNICAL FIELDS SEARCHED (Int.Cl.7)

A47B
B65G

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	19 December 2002	Ottesen, R

CATEGORY OF CITED DOCUMENTS

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EUROPEAN SEARCH REPORT

Application Number
EP 02 42 5458

DOCUMENTS CONSIDERED TO BE RELEVANT

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The present search report has been drawn up for all claims

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