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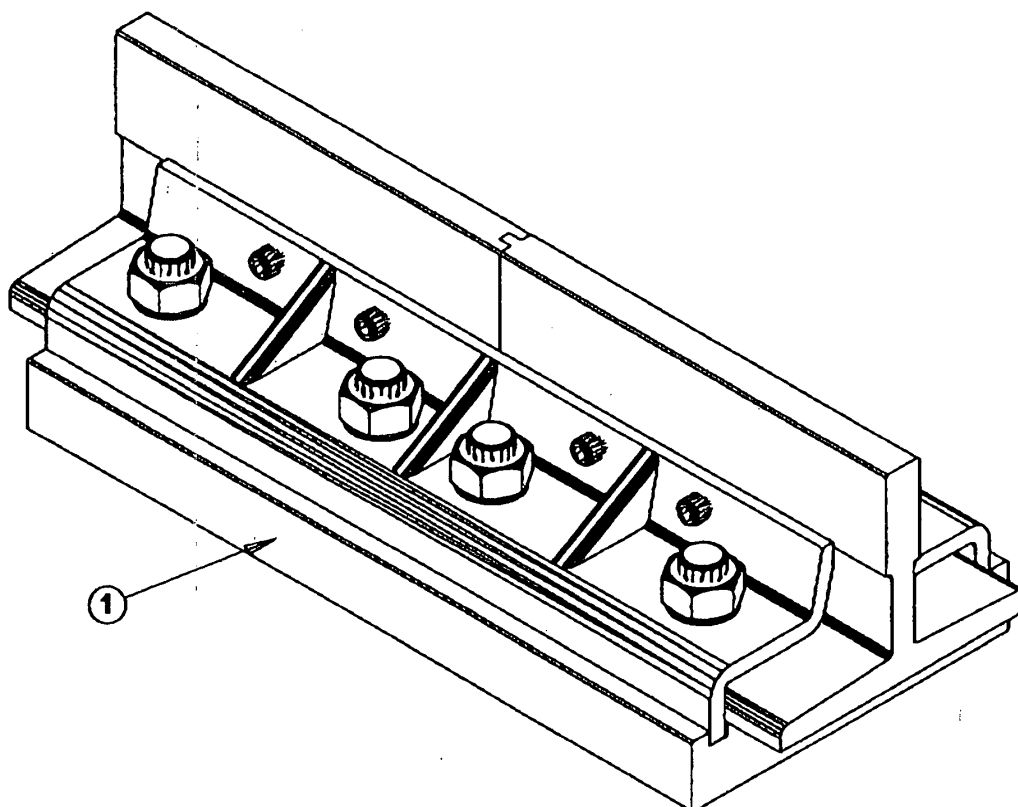
(54) Positioning device for elevators guides

(57) A device for maintaining the position of guides for lifts, elevators and the like is disclosed, in which a connecting plate (5) is brought into engagement with the lower part of the base (3) of a guide (2). Also present is at least one position-maintaining element (6) consisting of a central body (7) interposed between two end portions (8, 9).

The first one (8) of said end portions faces the por-

tion (4) emerging from the guide (2), whereas the second end portion (9) engages with the connecting plate (5) to generate, following displacements of the guide (2) from the original position, at least one elastic reaction aiming at bringing the guide (2) back to said original position. The position-maintaining element (6) helps in constituting an absolute reference for the guides and, in the presence of misalignment actions, generates reactions for position recovery.

Fig. 4



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Description

[0001] The present invention relates to a device for maintaining the position of guides already aligned during the assembly step, in particular guides for lifts, elevators and the like.

[0002] It is known that lifts and elevators travel on suitable straight guides defining the elevator path. Generally these guides are defined by metal bars of a length of some metres which are mounted in succession during installation of the elevator to define the straight path followed by said elevator. These guides generally have an inverted-T section in which from a base or bottom a jutting-out element centrally emerges that will define the runway along which the lift moves.

[0003] It is clear that the geometry of the guide way or path directly affects the lift performance in a substantial manner in particular as far as travel comfort is concerned. Consequently, a correct installation of the guides during the lift assembly step is of the greatest importance for maintenance of high qualitative standards above all in terms of vibrations transmitted to the persons present in the elevator car.

[0004] In order to ensure alignment during assembling, the standard guides have male-female couplings of mating shape at their ends and at the runway. In other words, the installer, once the first guide has been mounted, aligns the second guide with the first one causing the male-shaped end portion to be received in the corresponding end portion of the subsequent female-shaped guide.

[0005] Since, as already mentioned, alignment of the guides is of the greatest importance as regards the elevator performance, some devices exactly designed to enable and ensure a better alignment of the guides themselves have had a wide spread.

[0006] The European Patent No. EP 381852 discloses an assembling system in which the end portions of guides in succession are fastened by suitable screws to a connecting plate disposed below and on either side of the guides themselves.

[0007] In order to ensure alignment during the assembling step a further metal shell is also present that is disposed below the connecting plate and has a C-shaped section embracing the connecting plate on three sides thereof and also containing the guide bottom by means of the two end arms of the C-shaped configuration. This alignment system at all events uses common guides with a male-female fitting.

[0008] Also experienced in recent times is a system for guide alignment during the assembly step as described in patent WO 0147796. This assembly system uses guides having dedicated working operations different from the standard ones, devoid of the male-female couplings.

[0009] In particular, the last-mentioned typology of alignment systems during the assembly step utilises two plates that are opposite to the central core of the guide

and disposed on either side of the end portions of two guides in succession.

[0010] During the assembly step these plates are tightened by appropriate screws fastened by a nut directly to the guide bottom so that a wing emerging at the central core abuts against said core and exerts a high pressure thereon.

[0011] Due to the presence of two of the above plates disposed in opposite position at the junction region, as well as to the relative arrangement of the wing under pressure on the central core and the high tightening force utilised, alignment, during assembly, of the two non-standard guides devoid of the male-female fitting is allowed.

[0012] The previously described assembly systems, while substantially ensuring a good alignment during installation of the guides, could be improved under different points of view.

[0013] In particular, the assembly system using the two plates placed on either side of the central core of the guide could not be able to maintain alignment of the guides in a reliable manner after installation of the latter. In particular, in the presence of settlements of the structure where the lift is installed or also due to vibrations transmitted by the lift or the elevator, or to possible further external actions connected with small seismic events or the like, the tightening forces ensured by the screws are not always sufficient to control misalignment actions on the guides.

[0014] Once the guides have become misaligned with respect to each other, the system in accordance with patent WO 0147796 is deemed no more in a position to exert any realigning force and the structure reaches a new static balance in which the following guides arrange themselves like a broken line formed of segments of the length of some metres.

[0015] This configuration of the column is however the one damaging the elevator's running quality the most. In fact this configuration commonly referred to as "skew" necessarily involves transmission of a trouble of the "triangular" type to the elevator car and the resulting vibrations have particularly annoying amplitude and frequency for the persons present in the elevator.

[0016] The trouble typology highlighted above in fact involves an almost instantaneous inversion of the horizontal component of the elevator speed bringing about a very high deceleration/acceleration value.

[0017] On the other hand, use of the alignment system during the assembly step as briefly described above involves use of guides for lifts of the non-standard type so that the product has higher costs and assembly operations of the non-standard type as well are involved.

[0018] Accordingly, it is an object of the present invention to substantially solve all the above mentioned drawbacks.

[0019] It is a main aim of the invention to develop a device for maintaining the position of guides already aligned during the assembly step by means of conven-

tional assembly operations which is capable of offering a reaction of the elastic type to misalignment forces generated during movement of the lift or elevator, or also due to settlings or external forces.

[0020] Therefore the invention aims at preventing formation of a cusp at the junction regions between different guides, by promoting a guide arrangement in the form of arcs of a circumference tending to a straight configuration as much as possible.

[0021] The invention further aims at making available a device particularly adapted in all applications for lifts/elevators intended for regions with seismic risks.

[0022] A still further aim of the invention is to maintain the geometries of the junction region after assembling, which assembling takes place following substantially standard procedures of a type hitherto known and common in the lift-manufacture industry.

[0023] It is another aim of the device to constitute an absolute reference and generate recovery actions only in the presence of corresponding misaligning actions on the guides.

[0024] Another aim of the invention is to enable use of standard guides made in accordance with the UNI regulations 7465:1997 (E) and subsequent ones, so as to enable application of same to already existing structures which however need an improvement in the running performance.

[0025] Among the auxiliary aims of the invention there is offering a greater resistance to bending and enabling micrometric adjustment of the positioning of the different components.

[0026] The foregoing and further aims that will become more apparent in the course of the present description are substantially achieved by a device for maintaining the position of guides, in particular guides for lifts, elevators and the like, in accordance with the features set out in the appended claims.

[0027] Further features and advantages will be best understood from the detailed description of a preferred but not exclusive embodiment of a device for maintaining the position of guides in accordance with the present invention. This description will be made hereinafter with reference to the accompanying drawings given by way of non-limiting example, in which:

- Fig. 1 is a view partly in section of the device for maintaining the position of guides in accordance with the invention;
- Fig. 2 shows a stud bolt used in the device in Fig. 1;
- Fig. 3 is a sectional view of an alternative embodiment of the device in Fig. 1;
- Fig. 4 is a perspective view of the device in accordance with the invention;
- Fig. 5 shows a position-maintaining element;
- Fig. 6 is an exploded view of the invention; and
- Fig. 7 is an exploded view of an alternative embodiment in accordance with the invention.

[0028] With reference to the drawings, a device for maintaining the position of guides, in particular guides for lifts, elevators and the like has been generally identified by reference numeral 1.

[0029] As can be seen from the accompanying drawings, the device first of all comprises two guides 2 of the standard type in accordance with the UNI regulations 7465:1997 (E) and subsequent ones, each guide having a base 3 and a portion 4 emerging from said base.

[0030] Looking at Fig. 2 it is possible to see that the section in a plane normal to the extension axis of the guides has a substantially inverted-T shape where the emerging portion 4 consists of the guide neck 4a (a generally unworked coarse surface) directly supporting the runway 4b of the guide itself.

[0031] As viewed from the drawings normal male-female fitting elements are present exactly at the emerging portions 4 at the opposite ends of each guide (Figs. 4 and 6).

[0032] As previously mentioned these male-female fitting elements perform the function of enabling alignment of the guides during the assembly steps thereof.

[0033] The device further comprises a connecting plate 5 engaged at the lower part of base 3 of said guides 2. In particular, the connecting plate 5 is longitudinally interposed between two guides in succession (to be joined together) and has such a width that it laterally projects on both sides from the overall dimensions of the guide base 3.

[0034] As also shown, the connecting plate 5 has at least one, and preferably two, grooves 10 having an extension substantially parallel to the guide axis when guide 2 is in engagement with plate 5. These grooves 10 are symmetrically opposite to the emerging portion 4 of the guides and are also external to the overall dimensions of base 3.

[0035] Further included in the present device are two position-maintaining elements 6 defined by a plate-like central body 7 interposed between two end portions 8, 9. The two position-maintaining elements 6 are positioned on either side of the two guides symmetrically disposed in mirror image relationship with respect to the longitudinal axis of the guides themselves.

[0036] Said elements are suitably shaped and sized so that the first of the end portions 8, during the assembly step, faces the runway of the guide without substantially exerting any pressure thereon. The second end portion 9 of each position-maintaining element 6 is on the contrary in engagement with the connecting plate 5 to generate, as better specified in the following and as a result of displacements of the guides, at least one elastic reaction tending to bring guide 2 back to the original position.

[0037] In particular, the second end portion 9 is defined by a wing with a major extension transverse to the extension of the central body 7.

[0038] In particular this wing is designed to be directly engaged in the respective groove 10 present in the con-

necting plate 5 (Figs. 1 and 4). In other words, an abutment surface 9a of the wing abuts and rests against a side wall 10a of groove 10 still for generating said counter-reaction to a possible displacement of guides 2 from the original position.

[0039] It is also to be noted that the present device can be provided with adjusting means 16 to precisely define the faced position of the first end portion 8 with respect to the emerging portion 4 of guide 2. In particular, this adjusting means will comprise micrometric screws 17 engaged in threaded seats present in the first end portion 8. This lateral micrometric-adjustment system will allow checking and adjustment of the horizontal guide alignment.

[0040] Also generally present are further adjusting means 18 interposed between the guides 2 and connecting plate 5 to establish position thereof relative to a vertical alignment. This further adjusting means 18 too are generally defined by appropriate micrometric screws.

[0041] Finally, also provided is the presence of engagement means 11 between the central body 7 and the connecting plate 5 to be preferably defined by a stud bolt 12.

[0042] As shown in the accompanying figures, the stud bolt 12 is provided with a first portion 12a designed to rigidly pack the base 3 of guide 2 together with the connecting plate 5 by means of tightening nuts as shown. The second portion 12b (opposite to the first portion 12a of the stud bolt 12) will pass through a through seat 13 present in the central body 7 of the position-maintaining element 6. This through seat 13 will generally have greater radial sizes than the second portion 12b of the stud bolt 12 and will be devoid of any threading because its function is substantially to constitute a passage point for engagement of the position-maintaining elements 6 with the connecting plate 5.

[0043] In this connection it is to be pointed out that a vibration-damping bush 14 made of synthetic material can be also directly inserted between the second portion 12b of the stud bolt 12 and the position-maintaining element 6. The bush will be for example at least partly inserted in the through seat 13 so as to reduce spreading of vibrations between the position-maintaining elements 6 and connecting plate 5.

[0044] In preferred embodiments of the position-maintaining elements 6 the presence of a given number of stiffening ribs 15 directly interposed between the first end portion 8 and central body 7 may be also provided.

[0045] After describing the invention from a structural point of view, operation of the device for maintaining the guide position is the following.

[0046] Pointing out that the procedures for installation of the guides and the device do not greatly differ from those presently used by a great number of installators for standard material, it is also to be noted that under assembly conditions of the device in accordance with the present invention, in the presence of a precise align-

ment of the guides the position-maintaining elements 6 do not exert any reaction on the guides 2 themselves.

[0047] However in the presence of misaligning actions of any nature during use, the two grooves 10 present in the plate of particular manufacture are able to hold wings 9 that in turn exert a holding action on the runway 4 restraining the guides from mutual rotation.

[0048] In other words, following misalignment of the two guides, the latter generate a force on elements 6 and in particular on the end portions 8; these portions, through the central body 7 and the second end portions 9 interact with the connecting plate 5 generating setting up of a reaction of the elastic type aiming at counteracting the misalignment action.

[0049] This elastic reaction is transmitted to wings 8 tending to bring the guides back to the original alignment configuration. Under optimal conditions, the two position-maintaining elements 6 should be able to generate elastic reaction actions of such a nature that the guides are brought back to a condition of perfect alignment.

[0050] At all events the presence of the two opposite elements is capable of avoiding arrangement of successive guides in such a manner as to form a broken line of segments, in favour of an arrangement forming arcs of a circumference. In this way the actions transmitted to the elevator car following passage at the junction regions of the guide appear to be greatly reduced, thereby increasing the elevator performance and passenger comfort.

[0051] The invention achieves important advantages.

[0052] First of all the device of the invention enables use of standard guides in accordance with the previously quoted ISO regulations that do not require either additional working operations on the guides or removal of the male-female fitting elements, therefore enabling application of the present device also to already existing structures for which improved performance is needed.

[0053] The particular operation of the device that constitutes, as already said, an absolute reference and generates recovery actions only and exclusively in the presence of misalignments, makes the device particularly suggested for applications in seismic regions.

[0054] The high moment of inertia of the system, together with the presence of threaded holes for a precise fastening between the plate and guide make the system particularly adapted in all applications in the above mentioned regions. In fact, the device enables the conditions generated during the assembly step to be maintained even after repeated cycles of use of the elevators.

[0055] It is also to be pointed out that such a device is particularly advantageous if used with Monteferro guides called "Match", that are previously coupled at the factory with a dedicated technology.

[0056] Compared with plates of the traditional type, the device offers a greater resistance to bending because the additional wings help in increasing the bending moment of inertia of the whole junction.

[0057] Use of a threaded plate, instead of a plate pro-

vided with holes enables reduction in the effect due to a wrong arrangement of the guides caused by a backlash present between the screws and holes in the standard devices presently on the market making use of holed plates.

[0058] Use of lateral adjusting screws and rear adjusting dowels enables gaps at the junction region to be greatly reduced. In addition, these lateral adjusting screws allow the device in accordance with the invention to be also applied to unrefined surfaces such as the guide neck, for example.

[0059] Finally, due to the presence of a bush of synthetic material, spreading of vibrations at the junction region is also reduced.

Claims

1. A device for maintaining the position of guides, in particular guides for lifts, elevators and the like, comprising:
 - at least one guide (2) having a base (3) and a portion (4) emerging from said base (3);
 - a connecting plate (5) in engagement with the lower part of the base (3) of said guide (2);
 - at least one position-maintaining element (6) having a central body (7) interposed between two end portions (8, 9), the first one (8) of said end portions facing the emerging portion (4) of the guide (2), **characterized in that** the second end portion (9) is in engagement with said connecting plate (5) to generate, following displacement of the guide (2), at least one elastic reaction aiming at bringing the guide (2) back to the original position.
2. A device as claimed in claim 1, **characterized in that** the connecting plate (5) has at least one, and preferably two, opposite grooves (10), the second one of said end portions (9) being engaged in said groove (10).
3. A device as claimed in claim 2, **characterized in that** said grooves (10) have an extension substantially parallel to the guide axis under engagement conditions of the guide (2) with the connecting plate (5).
4. A device as claimed in claim 1, **characterized in that** the second one of said end portions (9) is defined by a wing having a major extension transverse to the extension of the central body (7).
5. A device as claimed in claims 2 and 4, **characterized in that** an abutment surface (9a) of the wing abuts and rests against a side wall (10a) of the groove (10) to generate a counter-reaction to a possible displacement of the guide (2) from the original position.
6. A device as claimed in claim 1, **characterized in that** it comprises two position-maintaining elements (6) opposite to each other with respect to the emerging portion (4) of the guide (2).
7. A device as claimed in claim 1, **characterized in that** it further comprises engagement means (11) between the central body (7) and the connecting plate (5), preferably defined by a stud bolt (12).
8. A device as claimed in claim 7, **characterized in that** said stud bolt (12) has a first portion (12a) designed to rigidly pack the base (3) of the guide (2) and the connecting plate (5) together.
9. A device as claimed in claim 8, **characterized in that** the stud bolt (12) has a second portion (12b) opposite to the first portion (12a) and passing through a through seat (13) present in the position-maintaining element (6).
10. A device as claimed in claim 9, **characterized in that** it further comprises a vibration-damping bush (14) interposed between the second portion (12b) of the stud bolt (12) and the position-maintaining element (6), said bush (14) being at least partly inserted in the through seat (13).
11. A device as claimed in anyone of the preceding claims, **characterized in that** it comprises at least two of said guides (2) and in that the connecting plate (5) joins two end stretches of said guides (2) together.
12. A device as claimed in anyone of the preceding claims, **characterized in that** said position-maintaining element (6) comprises a predetermined number of stiffening ribs (15) between the first end portion (8) and the central body (7).
13. A device as claimed in anyone of the preceding claims, **characterized in that** it comprises adjusting means (16) to precisely define the faced position of the first end portion (8) with respect to the emerging portion (4) of the guide (2), reproducing the same situation as in the standard assembly procedure.
14. A device as claimed in claim 13, **characterized in that** the adjusting means (16) comprises micrometric screws (17) engaged in threaded seats of the first end portion (8), reproducing the same situation as in the standard assembly procedure.
15. A device as claimed in anyone of the preceding

claims, **characterized in that** it comprises further adjusting means (18) interposed between the guide (2) and the connecting plate (5) to establish the relative positioning thereof.

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16. A device as claimed in anyone of the preceding claims, **characterized in that** it enables a step of pre-coupling at the factory to be reproduced prior to the assembly step *in situ*.

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Fig. 1

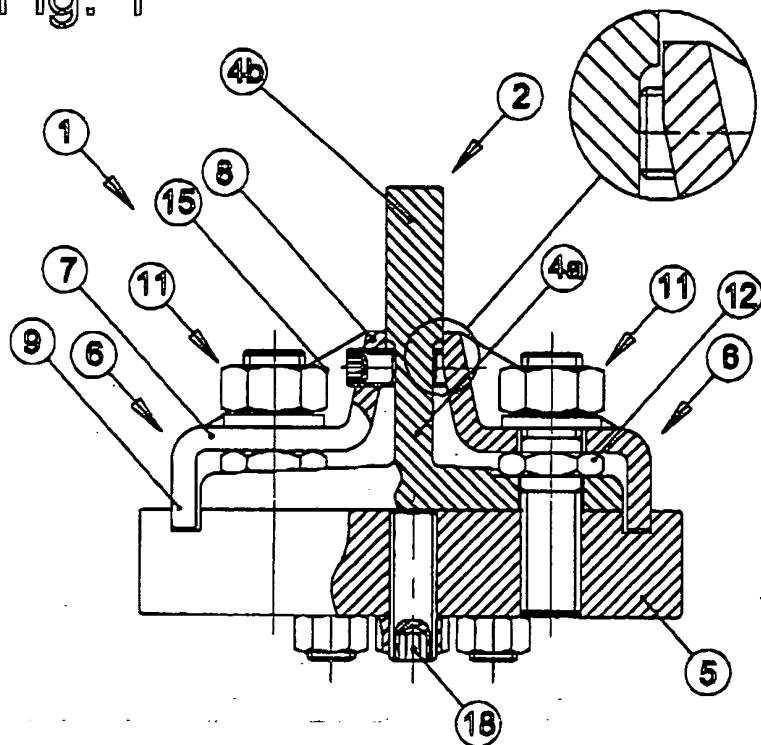


Fig. 2

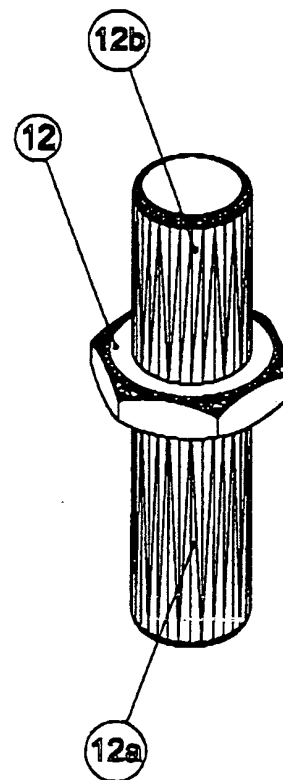


Fig. 3

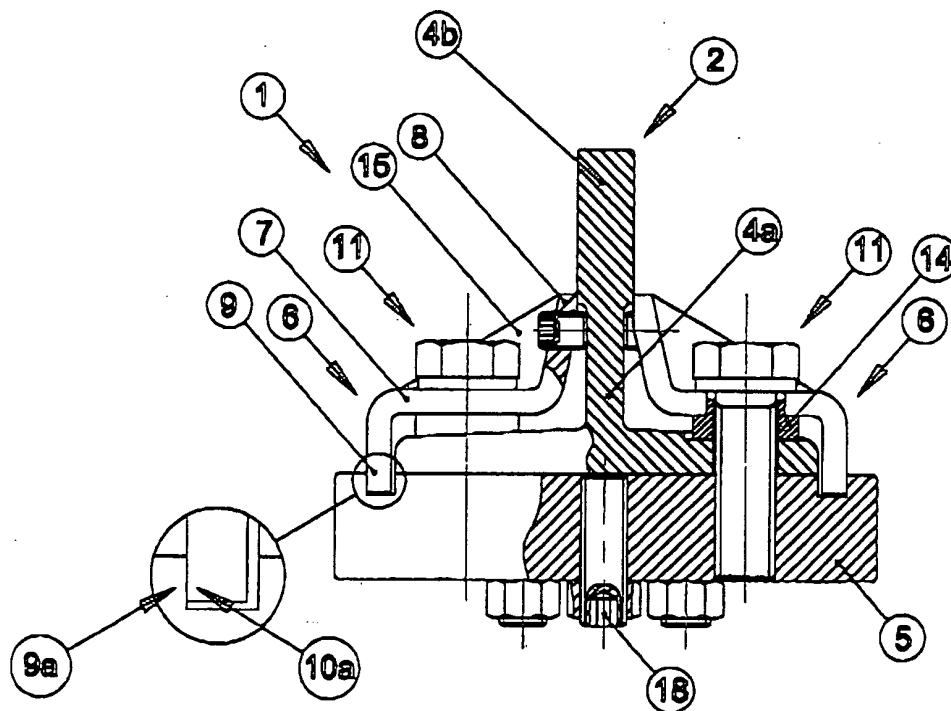


Fig. 4

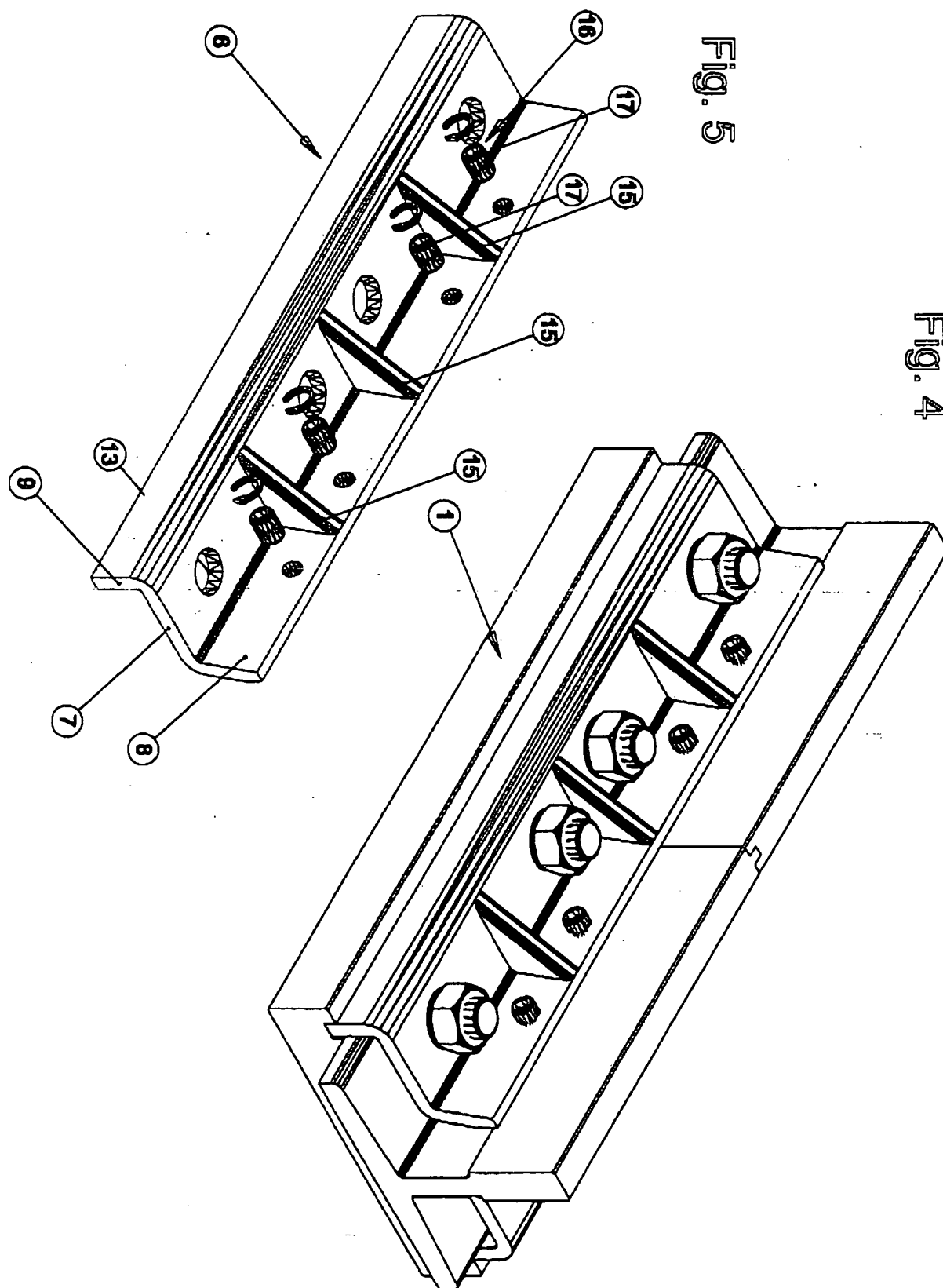


Fig. 6

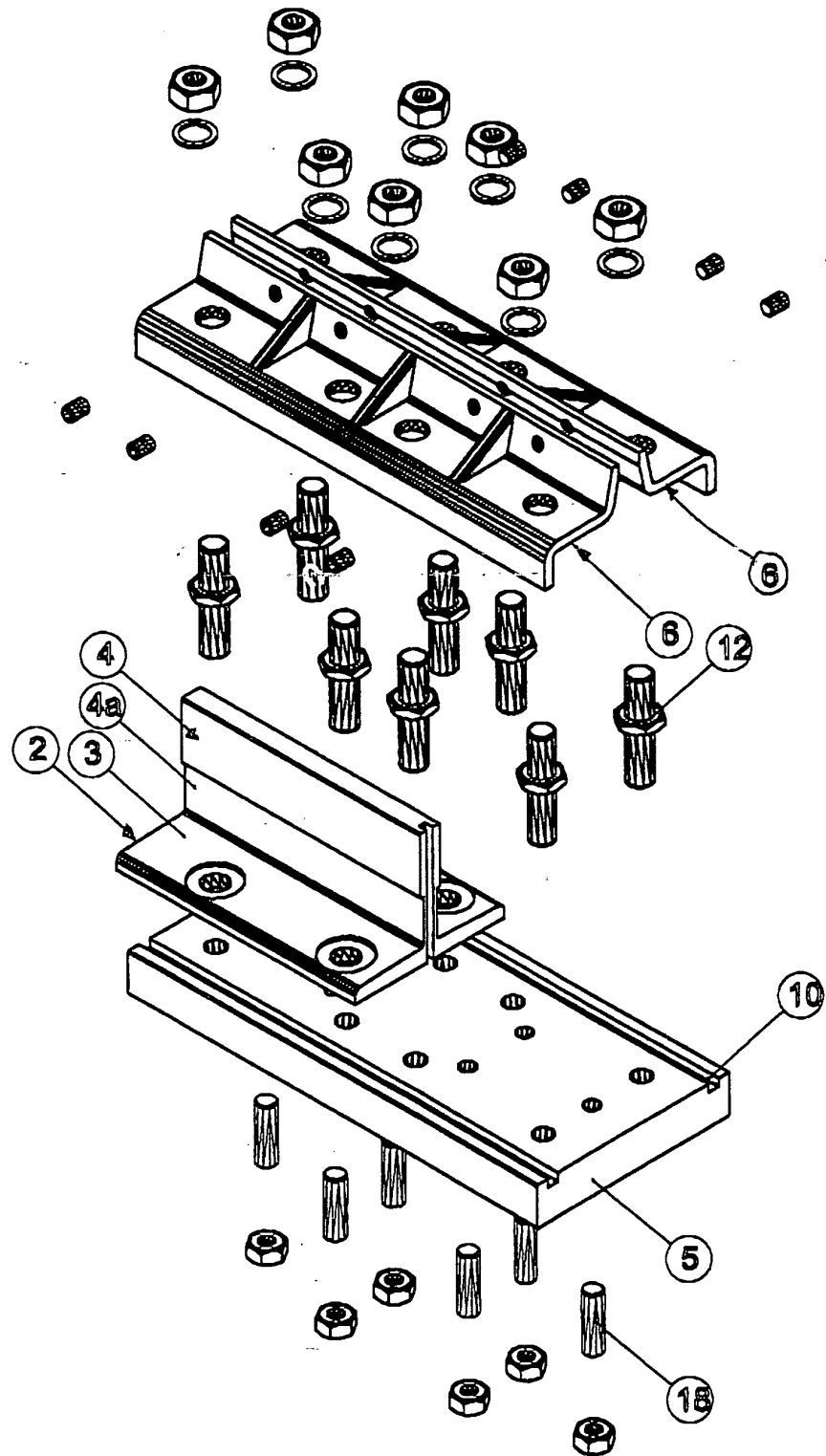
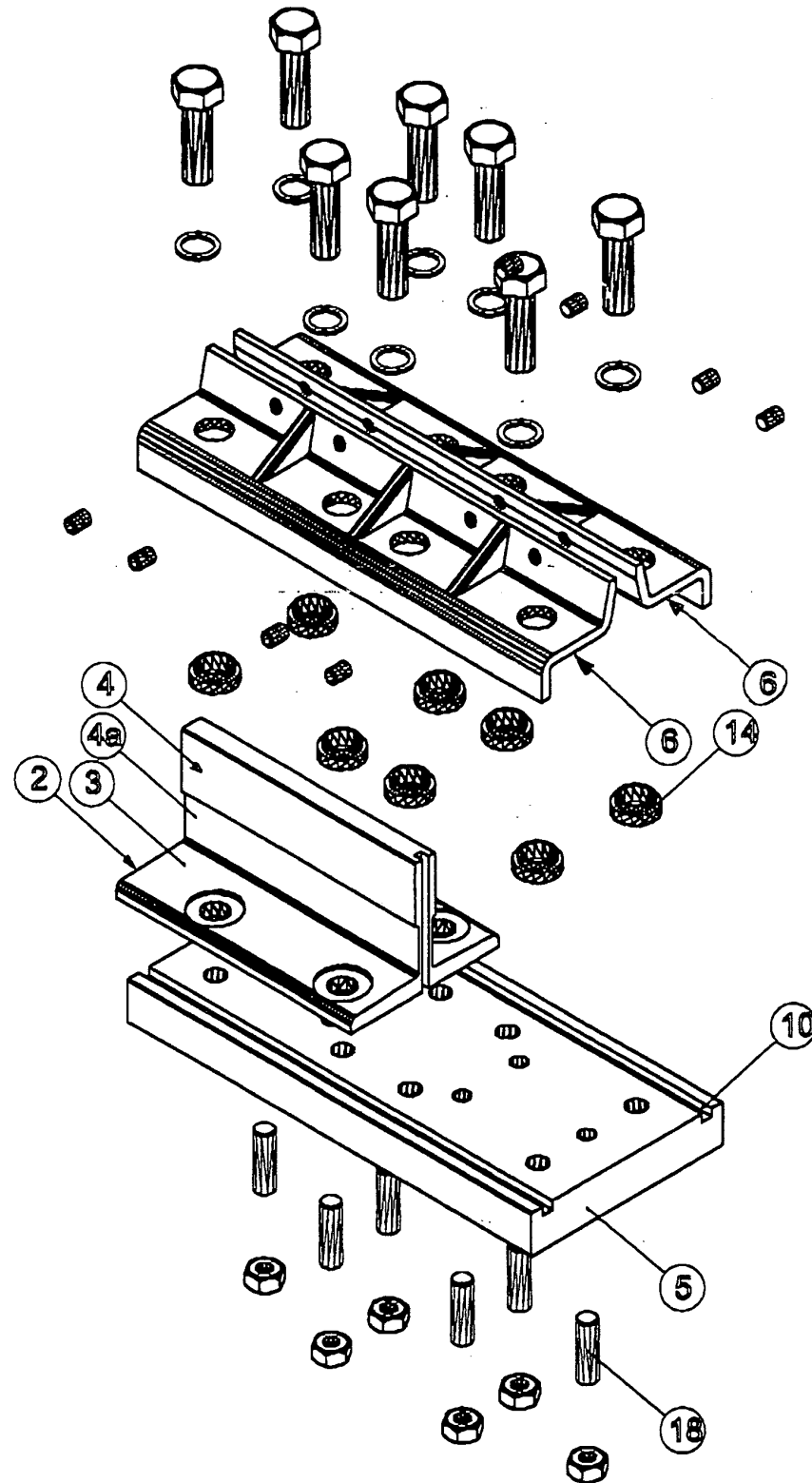


Fig. 7





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EUROPEAN SEARCH REPORT

Application Number
EP 03 42 5469

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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