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(54) **Improved means for adjusting the horizontal axle base of equipments for lift trucks or the like**

Mittel zum Verstellen von der horizontalen Basisachse von Vorrichtungen für Gabelhubwagen oder ähnlichem

Moyens pour ajuster l'axe de base horizontale d'équipements pour chariots à fourche ou similaire

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(56) References cited:

DE-A- 19 805 791	GB-A- 2 207 414
NL-A- 9 200 588	US-A- 2 746 630
US-A- 2 782 065	US-A- 2 920 775
US-A- 5 336 039	

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Description

[0001] The present invention proposes improved means that are in particular suitable to adjust the horizontal axle base of equipments for lift trucks or the like.

[0002] In general, such means are used on lift trucks to adjust in particular the horizontal axle base of front groups. These groups are for instance taking units with a horizontal grip or fork units for transporting pallets or other units. The present invention falls within the field of the devices for lift trucks and has the advantage that it improves the control of the working front units because the visibility of the operative zone is larger. In addition, there is the possibility of protecting the actuating parts since these parts remain included within particularly shaped guides which avoid any possibility for said parts to be damaged by protecting them from the impacts.

[0003] As it is known, the lift trucks are used to lift heavy loads in storehouses, warehouses or other places where there is an exchange of wares. These lift trucks are formed by a movable vehicle on the fore part of which an operative equipment or unit is mounted. The operative unit consists for instance of forks or side gripping elements or any other assemblies shaped according to the characteristics of the loads to be moved.

[0004] In general, the operative unit of a lift truck is arranged on a movable frame which is adjustable horizontally to set the lateral position of the equipment in respect to the centre of the lift truck. In addition, actuating devices are mounted on the movable frame to permit the axle base to be adjusted between the gripping tools, namely, to adjust their respective distance.

[0005] The said actuating devices are formed by two opposite double-acting hydraulic jacks which are positioned in parallel to one another and one over the other in a central area of the movable frame so that it is possible to translate the one gripping tool or the other gripping tool or both gripping tools in both directions because the cylinder is mounted on the frame on one side while the rod is fixed to one of the tools on the other side.

[0006] However, such an arrangement of the parts has some inconveniences: above all the position of the jacks in the centre of the frame prevents the operator from a visual control of the tools during the gripping phases because the jacks occupy most or the whole central free space of the frame and this space is the only area from which it is possible to visually follow the tools while sitting on the driver's seat of the truck.

[0007] In addition, the jacks are arranged in the central part of the frame, as already described, and are subjected to accidental impacts or thrusts which are provoked by the load to be transported, for instance while drawing the load itself, or by other factors, because both the rod and the cylinder are not inserted in any protection. As a matter of fact, the presence of a protection will obstruct the remaining poor visibility.

[0008] The patent US-A-5,336,039 discloses a load-handling parallel arm clamp structure for a lift truck com-

prising a slide guide frame having upper and lower pairs of elongate, parallel transverse guides. Although the upper and lower pairs of guides are separated by a wide central vertical space through which the operator can view, this apparatus can present difficult manoeuvrability due to the absence of appropriate means such as slides or other mechanisms, suited to make the guides slide in a smooth manner.

[0009] The above described inconveniences are removed or at least reduced by using the present invention according to which the actuating unit for the operative trucks is carried out by taking some practical measures which make it possible to visually follow the movement of the tools while sitting on the driver's seat of the truck on the one hand, and to protect the actuating parts from accidental impacts or other damaging factors on the other hand.

[0010] Besides the present invention is easily manoeuvrable thanks to the presence of slides on which runners, positioned on guides, are mounted, in order to make the sliding smoother.

[0011] The immediate advantages of the present invention are an easier use of the truck with improved working conditions for the operator, in particular during the loading and unloading of the parcels to be transported and a longer duration of the actuating parts, the cost of repairs and replacements being thus reduced.

[0012] All the above indicated particular aims and advantages are reached according to the present invention with improved means for adjusting the horizontal axle base of equipments of lift trucks or the like, characterized for consisting of at least a couple of particularly shaped parallel guides which are mounted on the upper and lower part of a frame forming the support of the equipment, which parallel guides are provided with a longitudinal hollow fore part in which double-acting oil-pressure jacks or the like, opposite to each other, are positioned and inserted with their section in the interior of the hollow part of the guides without projecting from the same; on the said guides there being positioned runners for supporting and sliding two sets of tools forming an operative unit; both sets of tools are adjustable horizontally for their inter-distance by operating the said jacks.

[0013] Further features and details of the present invention will be better understood from the following detailed description with reference to the accompanying drawing wherein:

- figure 1 shows a schematic axonometric view of an equipment according to the present invention on the whole, referred to a fork unit;
- figure 2 shows a schematic axonometric view of an equipment according to the present invention, referred to a lateral gripping unit;
- figures 3, 4 and 5 show a side view, a front view and a plan view, respectively of the equipment according to the invention in the version of the lateral grip-

ping unit;

- figures 6, 7 and 8 show a side view, a front view and a plan view, respectively of the equipment according to the invention in the version of the fork unit;
- figures 9, 10 and 11 show a side view, a front view and a plan view, respectively of an equipment according to a variant with double forks;
- figures 12-14 show schematic sectional views of three possible variants as regards the arrangement of the jacks in relation to the guides.

[0014] With reference to the accompanying drawing, number 1 denotes an equipment according to the present invention on the whole. This equipment consists of a frame 2 which is shaped according to a usual form. More precisely, the frame 2 is obtained by connecting couples of vertical and horizontal plates in such a way as to form a structure which is essentially rectangular and is open in the middle.

[0015] As it appears from the sections represented in figures 6 and 9, the frame 2 is mounted behind a support 3 and is adjustable according to horizontal translations in relation to the support itself in order to set out the lateral position of the equipment in relation to the centre of the truck.

[0016] To this end, two horizontal guides 4 and 5 are mounted on the fore side of the frame 2 and are arranged parallelly to one another, the first guide being over the second one. As it can be seen in detail from figure 12, the guides 4 and 5 are provided with slides 6 and 7 at their upper and lower parts, respectively. Couples of runners 8 and 8', 9 and 9' are mounted slideably on the slides 6 and 7. The runners 8, 8' and 9, 9' form part of two operative units 10 and 11, as it appears from figure 1 and 2.

[0017] The couples of runners 8, 8' and 9, 9' are essentially C-shaped in order to include the profile of the slides 6 and 7.

[0018] The central part of each of both guides 4 and 5 shows a longitudinal groove 12 which is delimited by the inner sides of the slides 6 and 7. The dimensions of the longitudinal grooves 12 permit the insertion of double-acting oil-pressure jacks 13 and 14 which are opposite to each other.

[0019] As it can be seen in figure 7, the free end of the cylinder of each of the jacks 13 and 14 is anchored to the frame 2 at coupling points 15 and 16 while the free ends of the rods are fixed to supports 17 and 18 of the operative units 10 and 11.

[0020] Since the rear part of the supports 17 and 18 is in its turn fixed to the runners 8, 8' and 9, 9', it is possible to obtain an equipment in which two operative units 10 and 11 may move away and near reciprocally to adjust their axle base, which is made possible by sliding the runners along the guides, the sliding of the runners being operated by the jacks.

[0021] In fact, the operation of the opposite jacks 13 and 14 provokes a simultaneous displacement of the

operative units 10 and 11, which is made possible by a translation of the runners 8 and 9 on the respective slides 6 and 7.

[0022] Antifriction elements are of course put between the runners and the slides to avoid a friction of such parts sliding reciprocally.

[0023] The peculiarity of the present invention consists in positioning oil-pressure jacks in the interior of guides 4 and 5 in such a way as to let the central space of the frame 2 free so that the operator has the possibility of following visually the loading and unloading phases of the operative units.

[0024] As indicated above, another advantage of the present invention consists in keeping the jacks in a position that is protected from accidental impacts in order to increase the possibility of duration of the jacks.

[0025] The so-described elements of displacement may be mounted on various kinds of equipment. By way of an example, figures 1 and 6-11 show the application of these means of displacement on fork units and double fork units while figures 2-5 show the application of these means of displacement on lateral gripping units.

[0026] Finally, according to a variant as represented in figure 13, the upper guide has smaller dimensions and the relevant jack is put on the lower guide while in a variant as represented in figure 14 both guides have smaller dimensions and the relevant jacks are positioned out of the guides.

[0027] The present invention referring to improved means for adjusting the horizontal axle base of equipments for lift trucks or the like has been described and represented according to preferred solutions but other variants are possible which are to be considered as falling in the scope of protection of the present invention.

Claims

1. Adjusting means for adjusting the horizontal axle base of equipments for lift trucks, consisting of at least a pair of parallel guides (4, 5) which have a particular shape and are mounted on the upper and lower parts of a frame (2) forming a support for the equipment, which guides (4, 5) are provided with a hollow longitudinal part in which double-acting oil-pressure jacks (13, 14) or the like are positioned opposite to each other and are inserted with their section in the interior of the hollow part of the guides (4, 5) without projecting from the guides; runners (8, 8'; 9, 9') being positioned on the said guides for supporting and sliding two tool units (10 11) forming part of the operative unit, which tool units are adjustable horizontally to set out their inter-distance by actuating the said jacks,

characterized in that the said guides (4, 5) are provided at their upper and lower parts with slides (6, 7) on which couples of runners (8, 8'; 9, 9') are mounted with the possibility of sliding, such runners

forming part of both operative units (10, 11).

2. Adjusting means as claimed in the preceding claims, **characterized in that** the said pairs of runners (8, 8'; 9, 9') are shaped essentially like a "C" so as to include the profile of the slides (6, 7).
3. Adjusting means as claimed in the preceding claims, **characterized in that** the central part of each of the two guides (4, 5) is provided with a longitudinal groove which is delimited by the inner part of the slides (6, 7), which part has such dimensions to comprise double-effect oil-pressure jacks (13, 14), opposite to each other.
4. Adjusting means as claimed in the preceding claims, **characterized in that** the free ends of the cylinders of said jacks (13, 14) are anchored to the frame (2) at suitable connecting points (15, 16) while the free ends of the rods are fixed to the supports of both operative units (10, 11).
5. Adjusting means as claimed in the preceding claims, **characterized in that** the rear part of the supports of both operative units (10, 11) is in its turn fixed to the said runners (8, 8'; 9, 9') so that both operative units may move away from or closer to each other to adjust their axle base.

Patentansprüche

1. Regelvorrichtungen für die Einstellung des waagerechten Achsabstands von Hubwagenausrüstungen, bestehend aus mindestens einem Paar speziell geformter Parallelführungen (4, 5), die oben und unten am Rahmen (2), der die Halterung der Ausrüstung darstellt, anzubringen sind. Die Führungen (4, 5) haben eine hohle Längsseite, in die einander gegenüberstehenden ölhydraulische Winden mit Zweifachwirkung (13, 14) oder Ähnliches eingesetzt werden, deren Durchschnitt in den Hohlraum der Führungen (4, 5) passt, ohne darüber vorzustehen. Auf diesen Führungen laufen Gleitschuhe (8, 8', 9, 9') für die Halterung und die Gleitbewegung der beiden Werkzeugaggregate (10, 11), die zu dem Arbeitsgerät gehören, die zur Einstellung ihres Abstands durch Betätigung der Winden waagerecht verstellt werden können, **dadurch gekennzeichnet, dass** diese Führungen (4, 5) an den oberen und unteren Elementen über Schlitten (6, 7) verfügen, auf denen Gleitschuhpaare (8, 8', 9, 9'), die zu den beiden Arbeitsaggregaten (10, 11) gehören, angebracht sind und gleiten können.
2. Regelvorrichtungen gemäß dem vorangehenden Anspruch, **dadurch gekennzeichnet, dass** die Gleitschuhpaare (8, 8', 9, 9') im Wesentlichen in

"C"-Form gestaltet sind, die das Schlittenprofil (6, 7) umschließt.

3. Regelvorrichtungen nach den vorangehenden Ansprüchen, **dadurch gekennzeichnet, dass** im Mittelteil jeder Führung (4, 5) eine Längsrille vorliegt, die vom Innenteil der Schlitten (6, 7) begrenzt wird und deren Abmessungen die einander gegenüberstehenden ölhydraulischen Winden (13, 14) mit Zweifachwirkung umfassen.
4. Regelvorrichtungen nach den vorangehenden Ansprüchen, **dadurch gekennzeichnet, dass** die freien Zylinderenden dieser Winden (13, 14) an geeigneten Befestigungspunkten (15, 16) am Rahmen (2) verankert sind, während die freien Enden der Schäfte an den Halterungen der beiden Arbeitsaggregate (10, 11) befestigt werden.
5. Regelvorrichtungen nach den vorangehenden Ansprüchen, **dadurch gekennzeichnet, dass** die Halterungsrückseite der beiden Arbeitsaggregate (10, 11) ihrerseits auf den Gleitschuhen (8, 8', 9, 9') befestigt ist, so dass sich die beiden Arbeitsaggregate zur Einstellung ihres Achsabstands voneinander entfernen oder einander annähern können.

Revendications

1. Moyens de réglage pour le réglage de l'écartement horizontal d'équipements pour chariots élévateurs, constitués d'une paire au moins de guides parallèles (4, 5) spécialement façonnés adaptables en haut et en bas du châssis (2) constituant le support de l'équipement, guides (4, 5) qui présentent une partie longitudinale creuse où l'on positionne des vérins hydrauliques (13, 14) à double effet ou semblables, opposés entre eux, qui sont compris avec leur section à l'intérieur de la partie creuse des guides (4, 5) sans sortir de ceux-ci; sur ces guides sont positionnés les patins (8, 8', 9, 9') pour le support et le glissement des deux groupes d'outils (10, 11) faisant partie de l'unité opérationnelle, qui peuvent être réglés dans le sens horizontal pour établir la distance entre eux en entraînant ces vérins, **caractérisés par le fait que** ces guides (4, 5) présentent, près de leurs parties supérieures et inférieures, des glissières (6, 7) sur lesquelles on a adapté des paires de patins (8, 8', 9, 9') faisant partie des deux groupes de travail (10, 11) avec la possibilité de glisser.
2. Moyens de réglage suivant la revendication précédente, **caractérisés par le fait que** ces paires de patins (8, 8', 9, 9') ont une forme essentiellement en « C » pouvant comprendre le profil des glissières (6, 7).

3. Moyens de réglage suivant les revendications précédentes, **caractérisés par le fait que** la partie centrale de chacun des deux guides (4, 5) a une rainure longitudinale, bornée par la partie intérieure des glissières (6,7), aux dimensions pouvant comprendre les vérins hydrauliques (13, 14) à double effet opposés entre eux. 5
4. Moyens de réglage suivant les revendications précédentes, **caractérisés par le fait que** les extrémités libres des cylindres de ces vérins (13, 14) sont ancrées au châssis (2) près des points d'accrochage appropriés (15, 16), tandis que les extrémités libres des tiges sont fixées aux supports des deux groupes de travail (10, 11). 10 15
5. Moyens de réglages suivant les revendications précédentes, **caractérisés par le fait que** la partie arrière des supports des deux groupes de travail (10, 11), à son tour, est fixée sur lesdits patins (8, 8', 9, 9') de façon que les deux groupes de travail puissent s'éloigner et s'approcher mutuellement pour le réglage de leur écartement. 20

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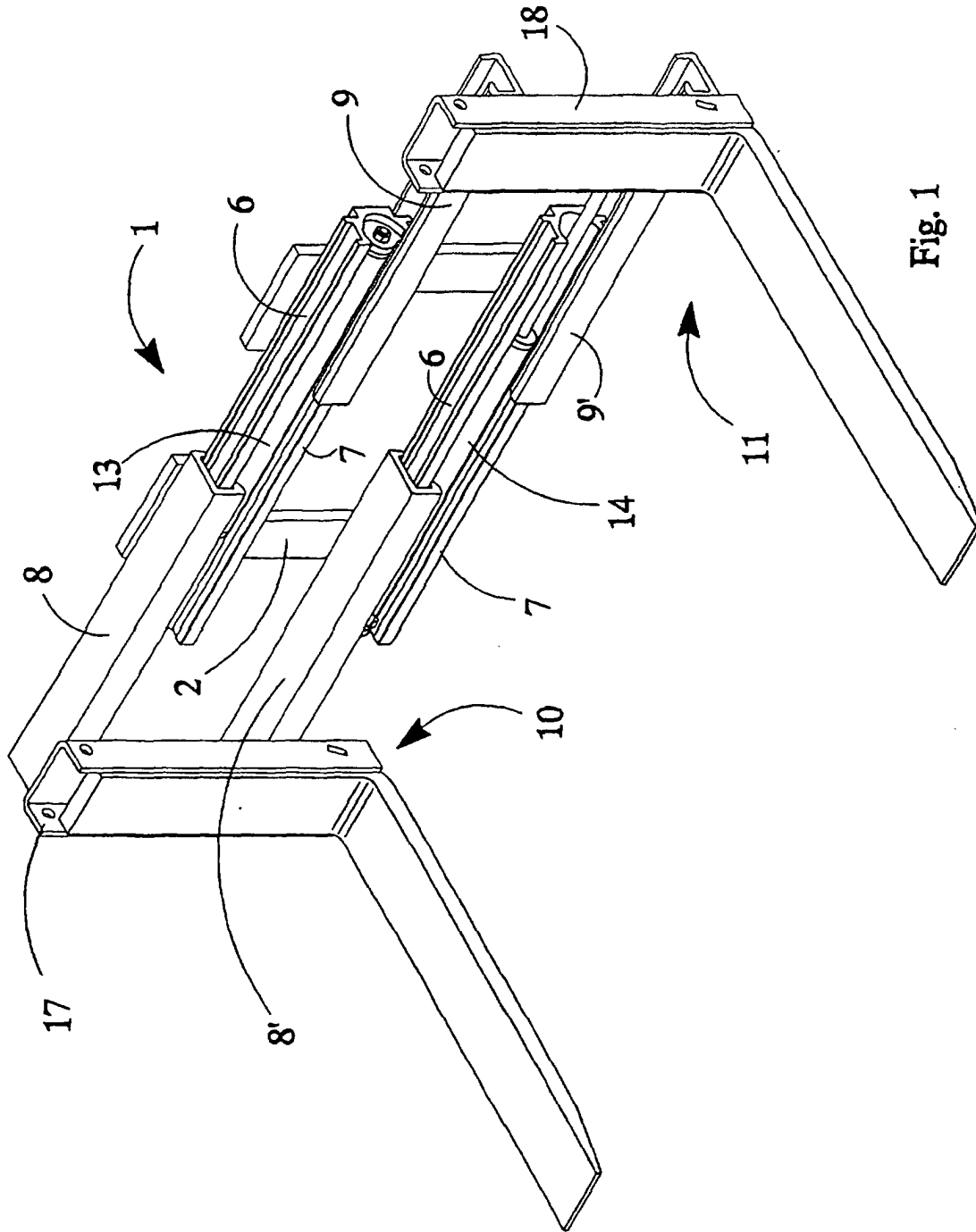
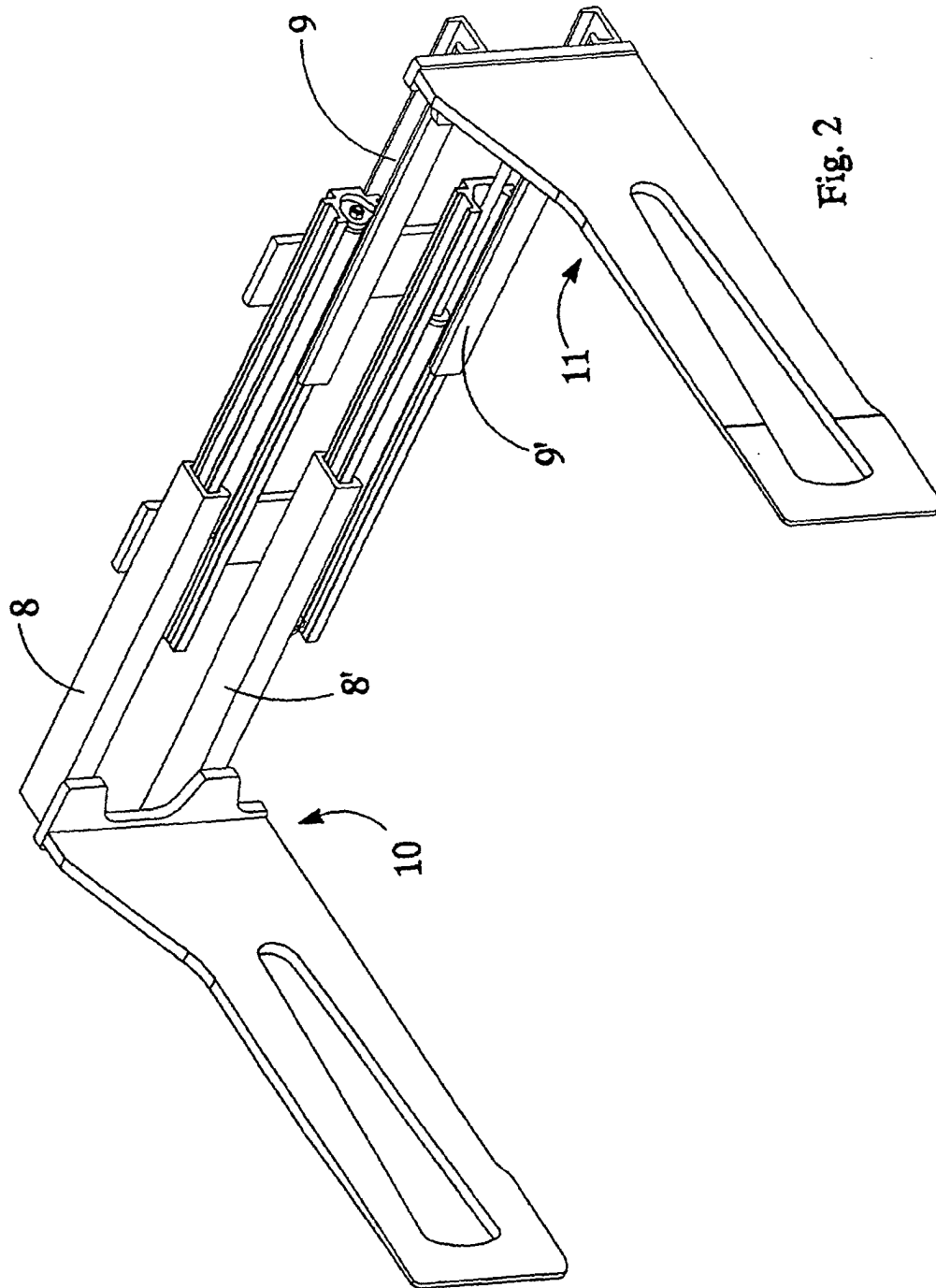
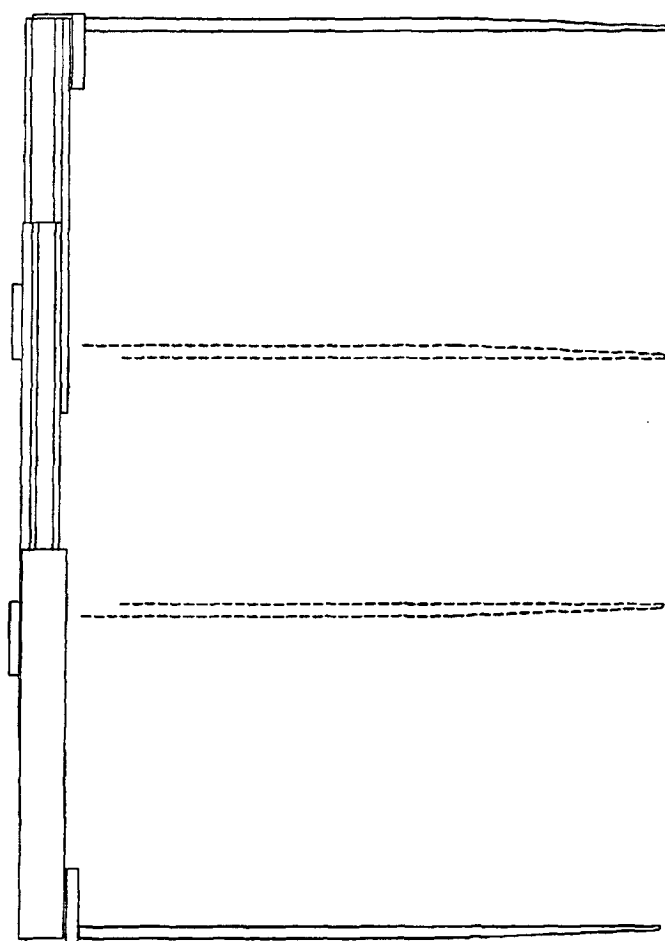
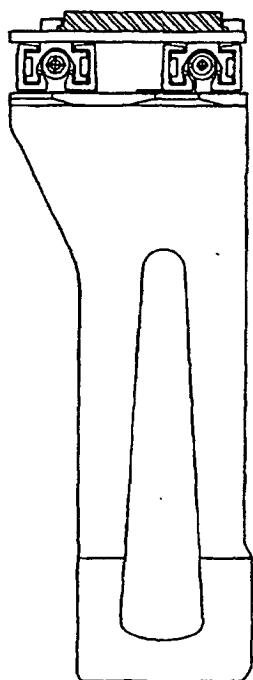
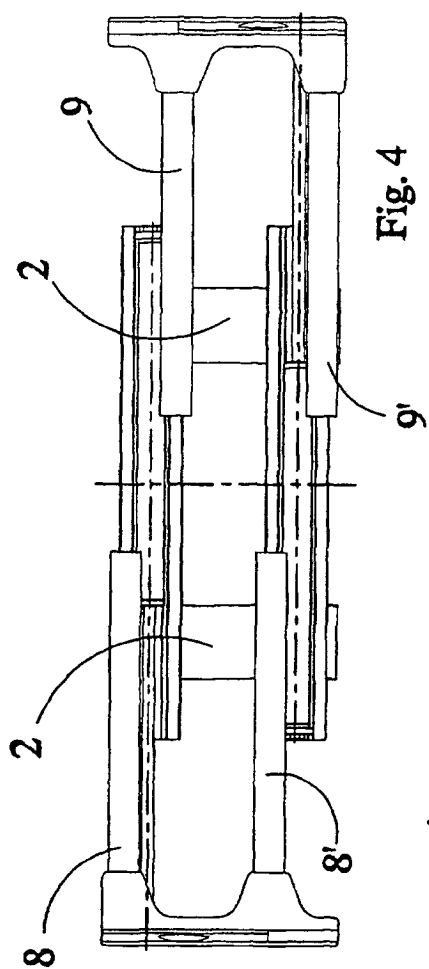
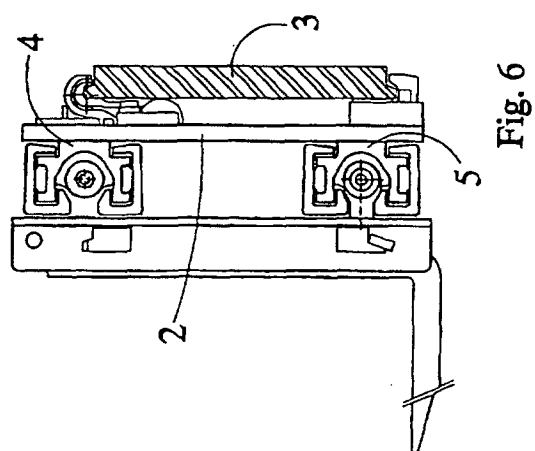
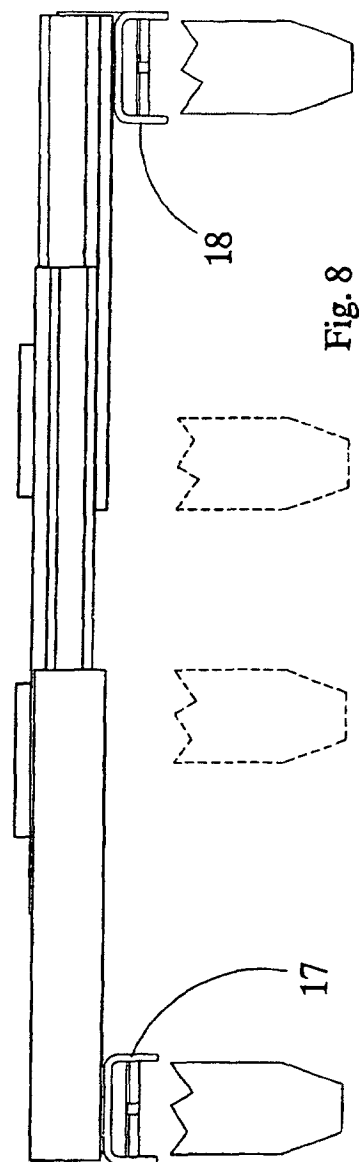
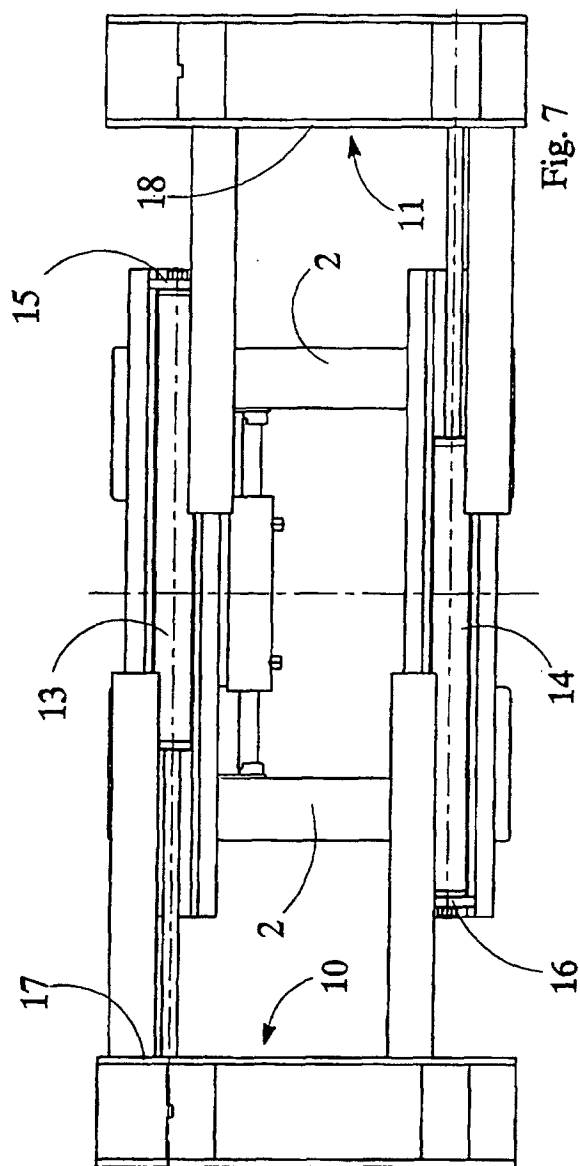


Fig. 1







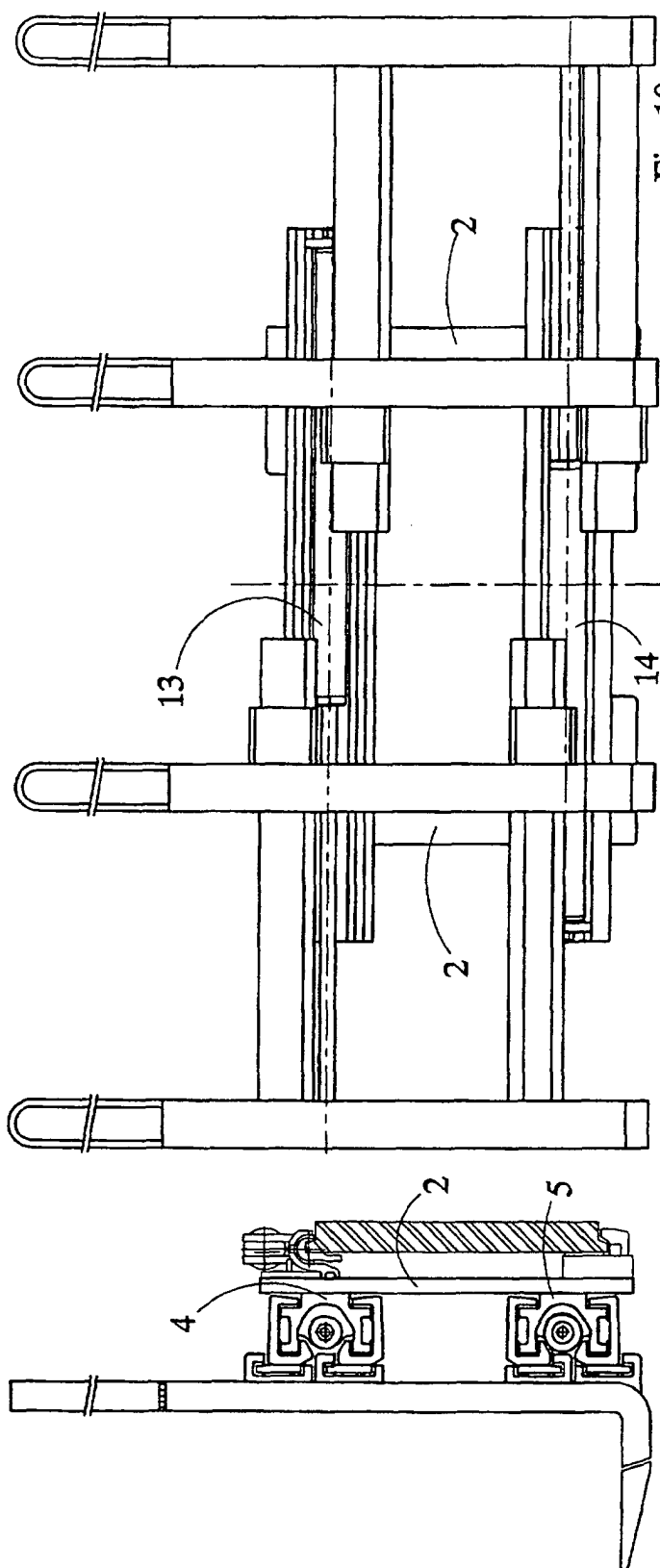


Fig. 9

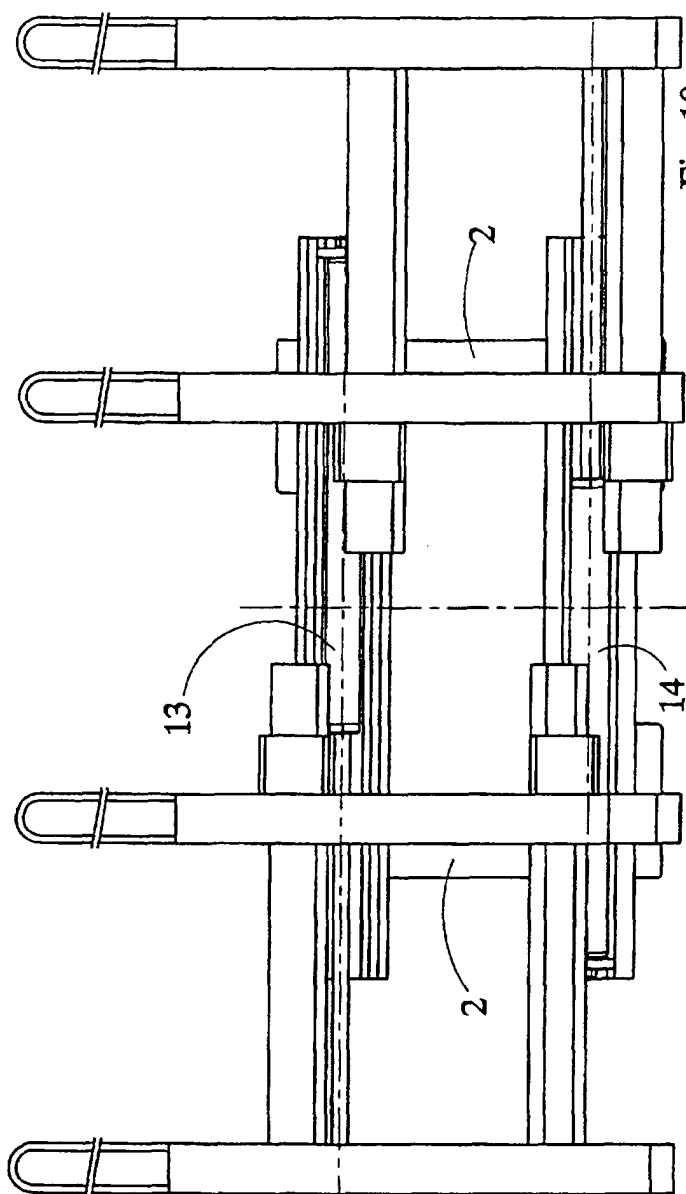


Fig. 10

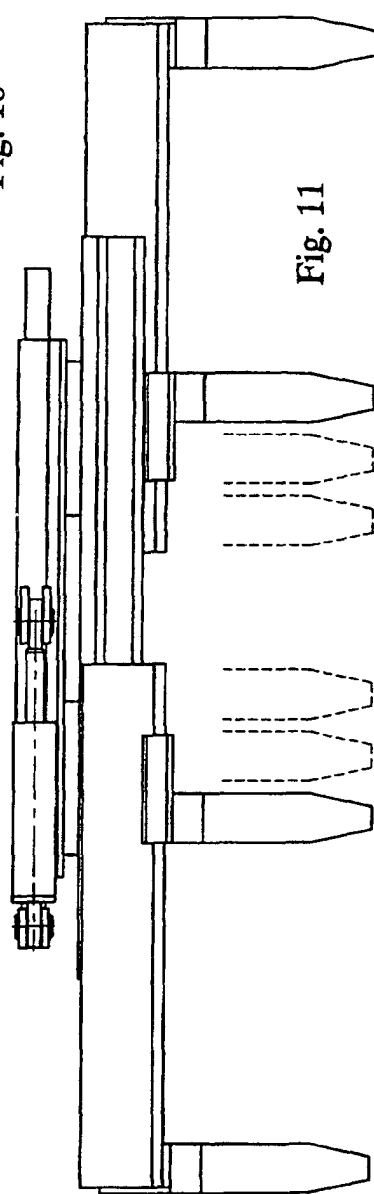


Fig. 11

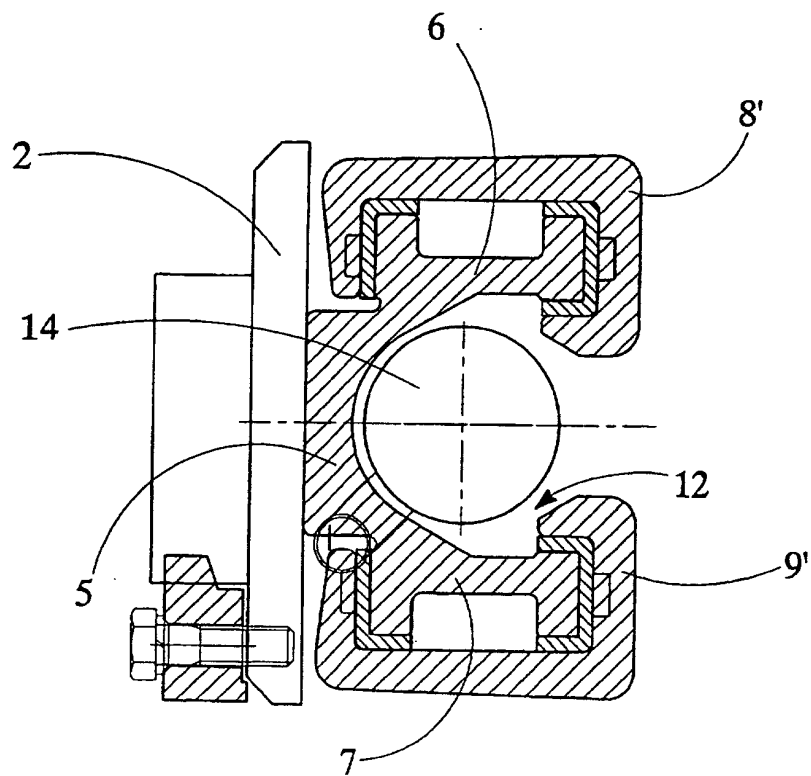
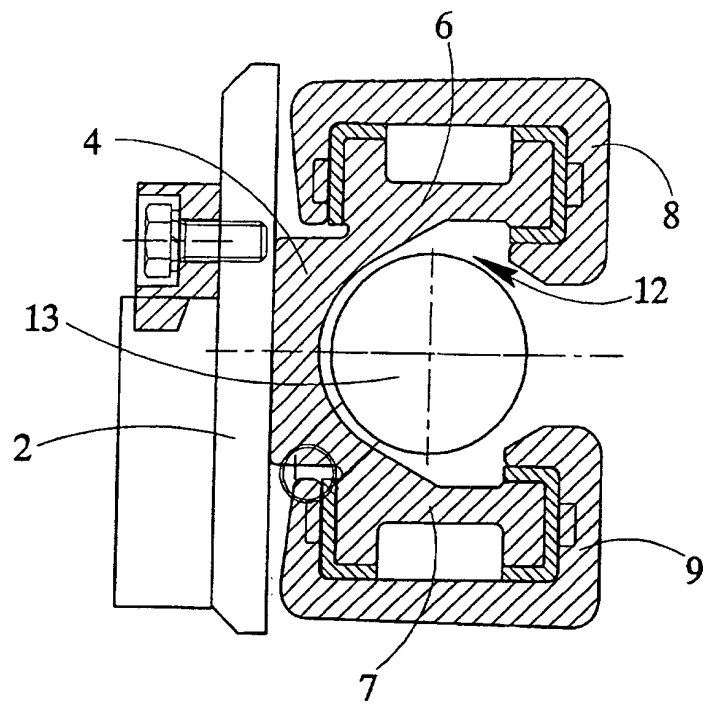


Fig. 12

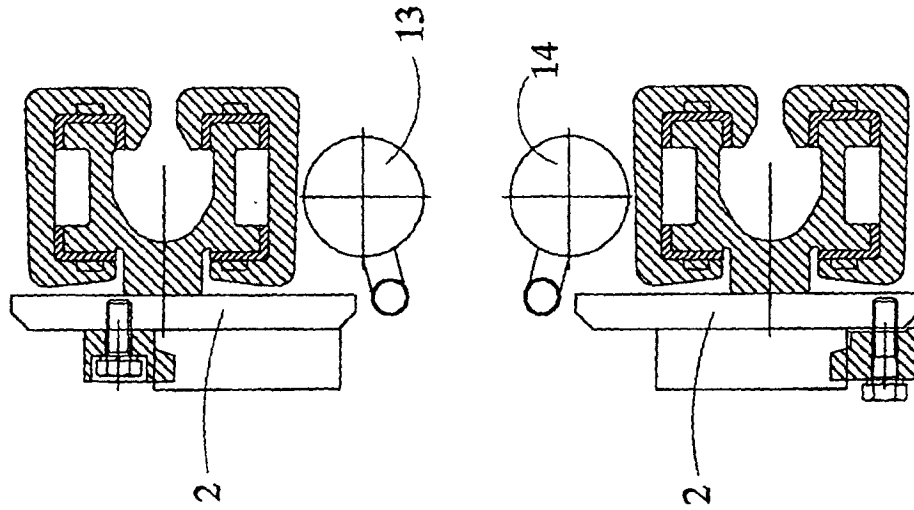


Fig. 14

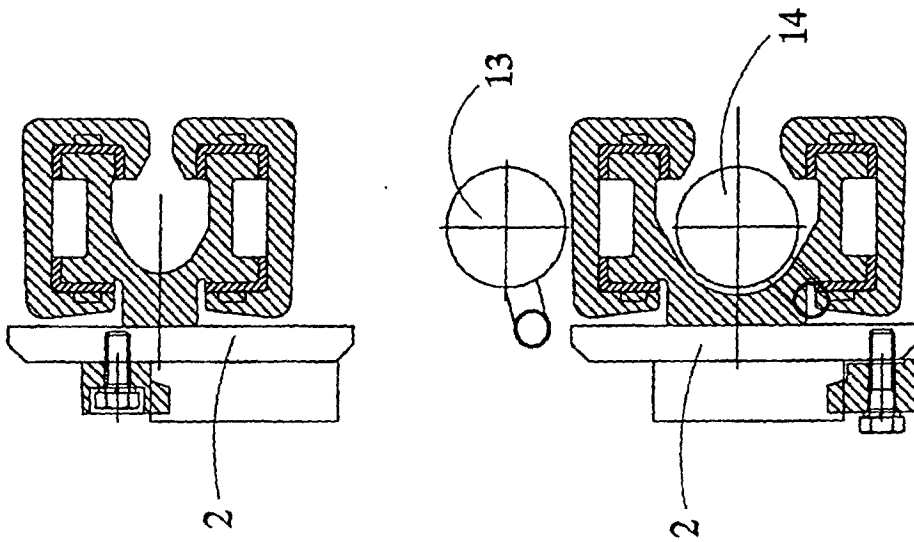


Fig. 13