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

(57) Improved means permits to visually follow the movement of the tools while sitting on the driver's seat of a lift truck and to protect the actuating parts from accidental impacts or other factors causing damages.

In general, such means consists of pairs of horizontal guides (4, 5) which are arranged in parallel on a frame (2), the first horizontal guide being arranged over the second one. The guides comprise slides (6, 7) on which pairs of runners (8, 8'; 9, 9') are slideably mounted. The pairs of runners are integral with two operating units (10, 11).

The central part of each guide (4, 5) shows a longitudinal groove, which is delimited by the inner part of the slides (6, 7) and has such dimensions that it comprises double-acting oil-pressure jacks (13, 14), arranged opposite to one another.

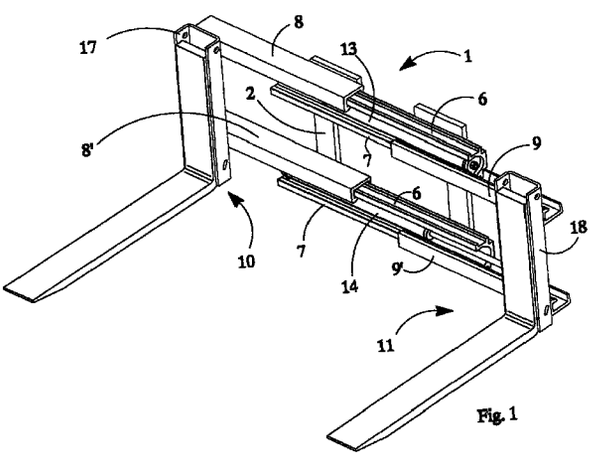

Fig. 1

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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 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.

[0009] 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.

[0010] 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.

[0011] Further features and details of the present invention will be better undertood 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 gripping 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.

[0012] 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.

[0013] 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.

[0014] 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.

[0015] 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.

[0016] 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.

[0017] 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.

[0018] 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.

[0019] 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.

[0020] Antifriction elements are of course put between the runners and the slides to avoid a friction of such parts sliding reciprocally.

[0021] 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.

[0022] 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.

[0023] 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.

[0024] 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.

[0025] 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. Improved means for adjusting the horizontal axle base of equipments for lift trucks or the like, characterized for 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 horizzontally to set out their inter-distance by actuating the said jacks.

2. Improved means as claimed in claim 1, 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).

3. Improved 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).

4. Improved 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.

5. Improved 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).

6. Improved 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.

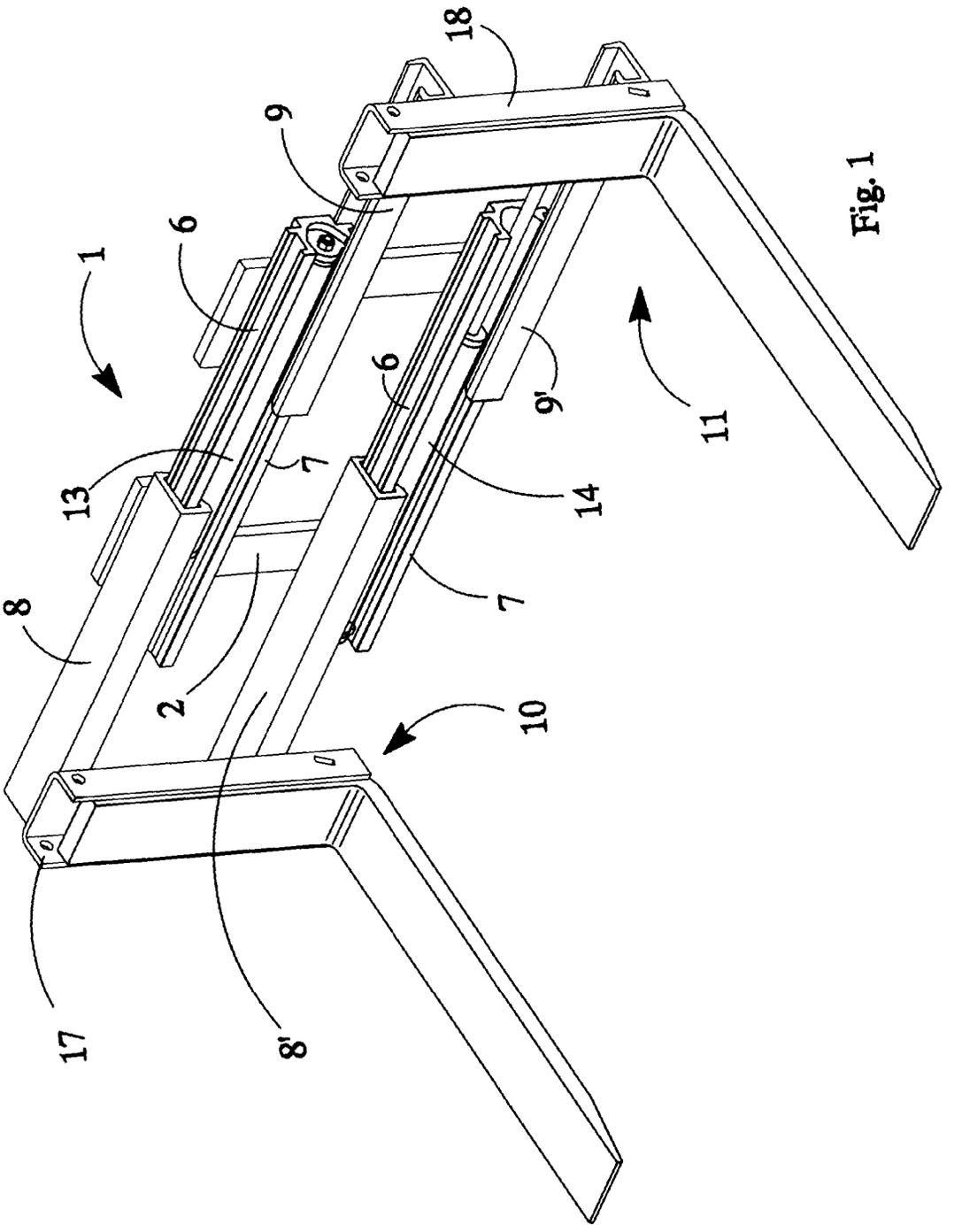


Fig. 1

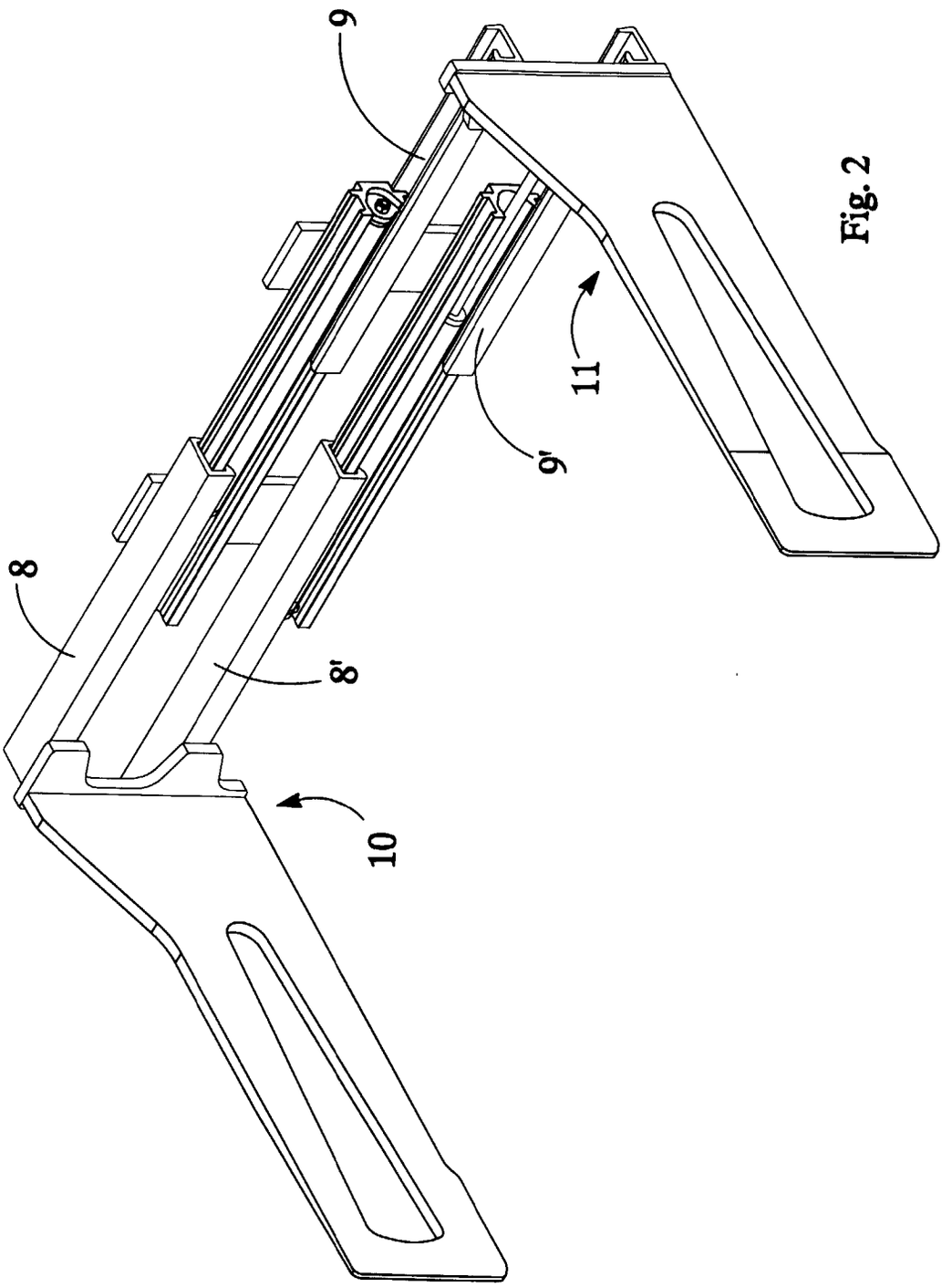


Fig. 2

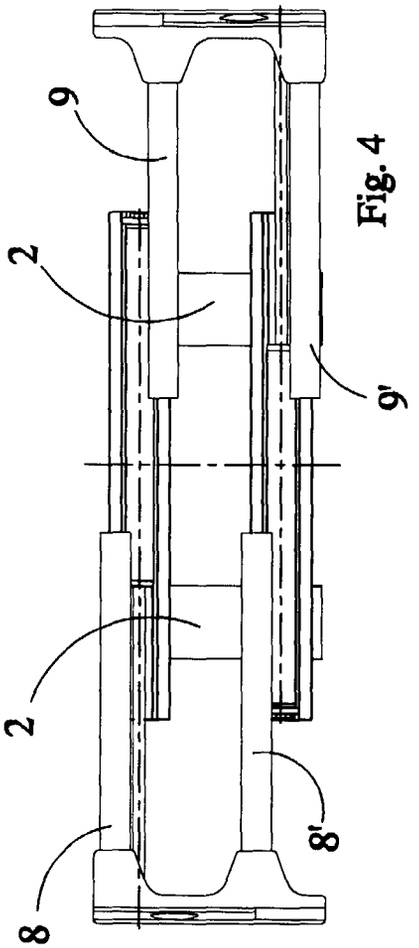


Fig. 4

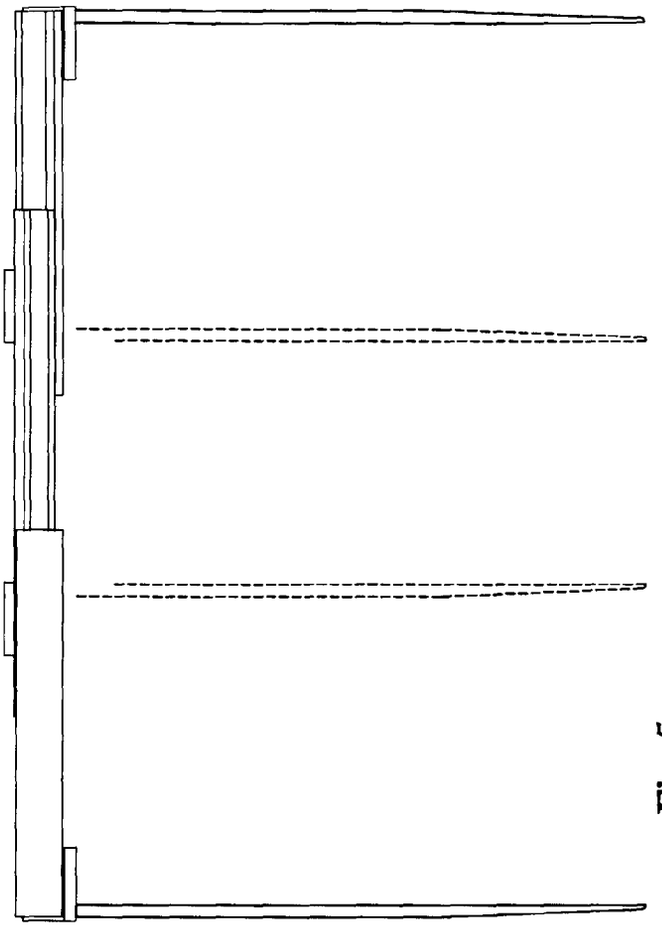


Fig. 5

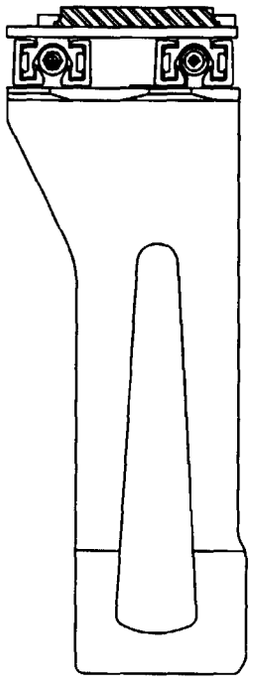


Fig. 3

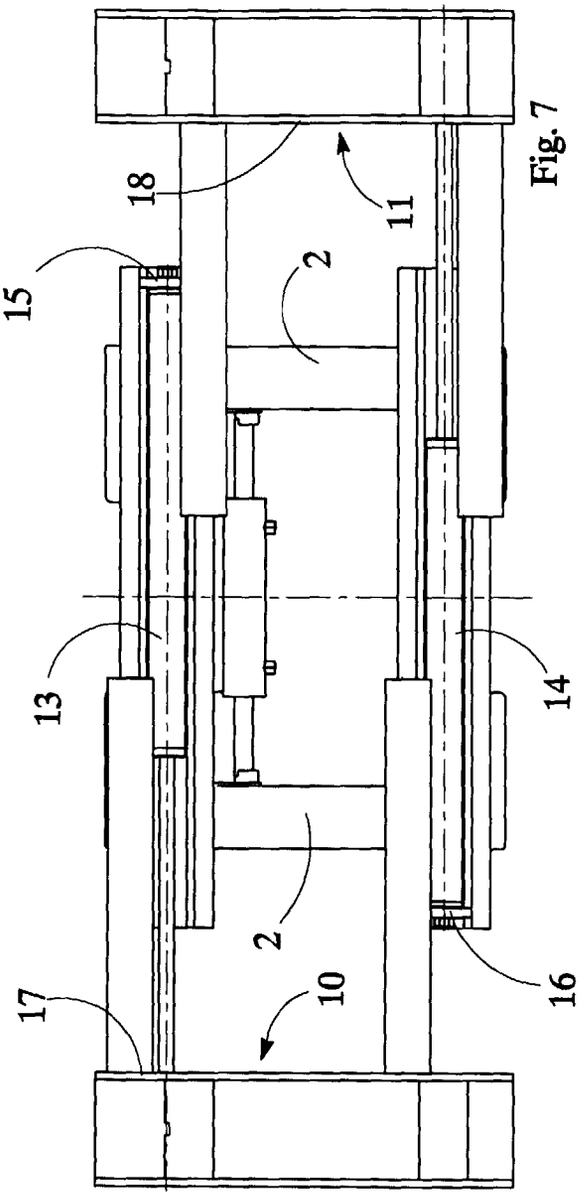


Fig. 7

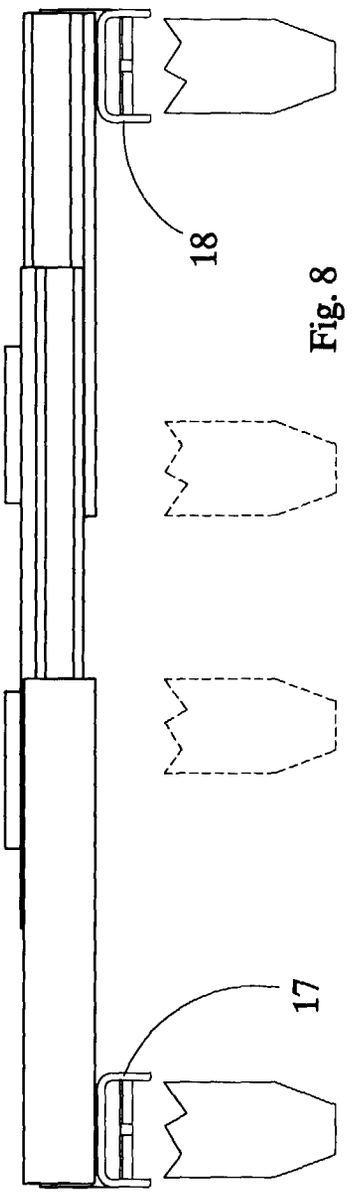


Fig. 8

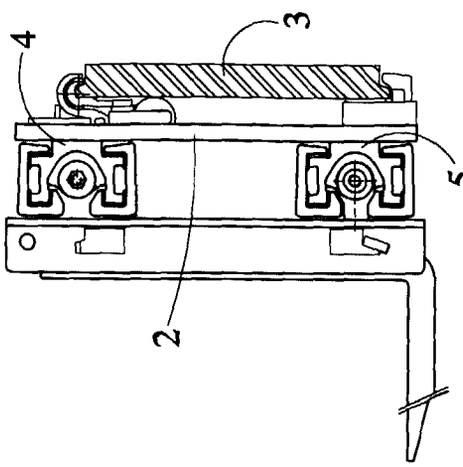


Fig. 6

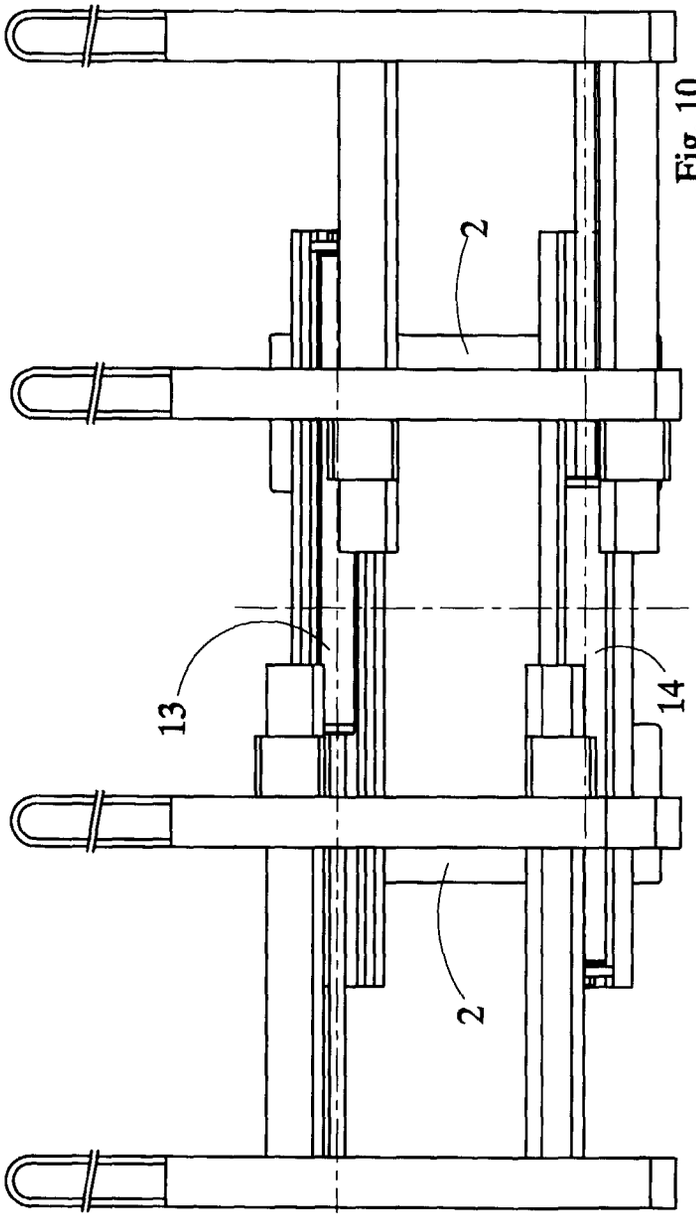


Fig. 10

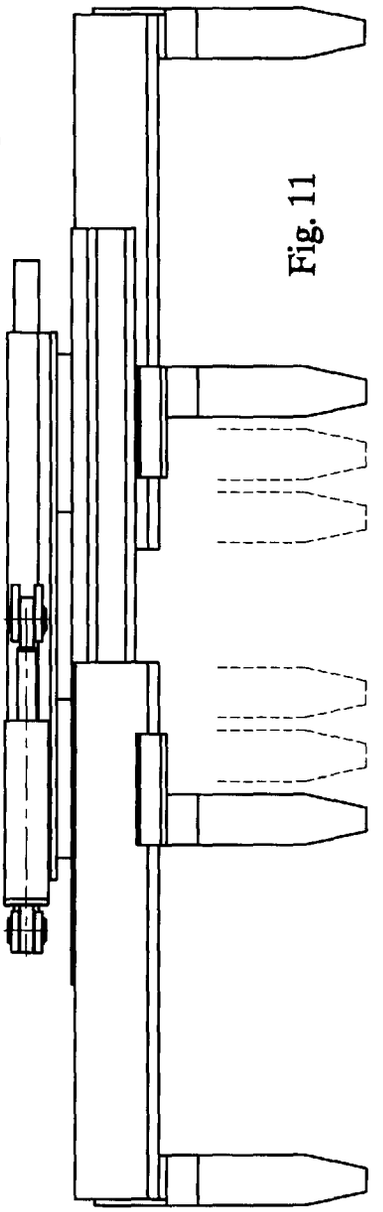


Fig. 11

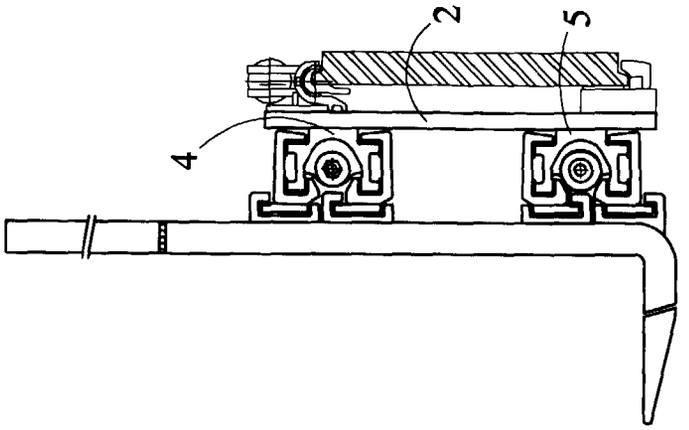
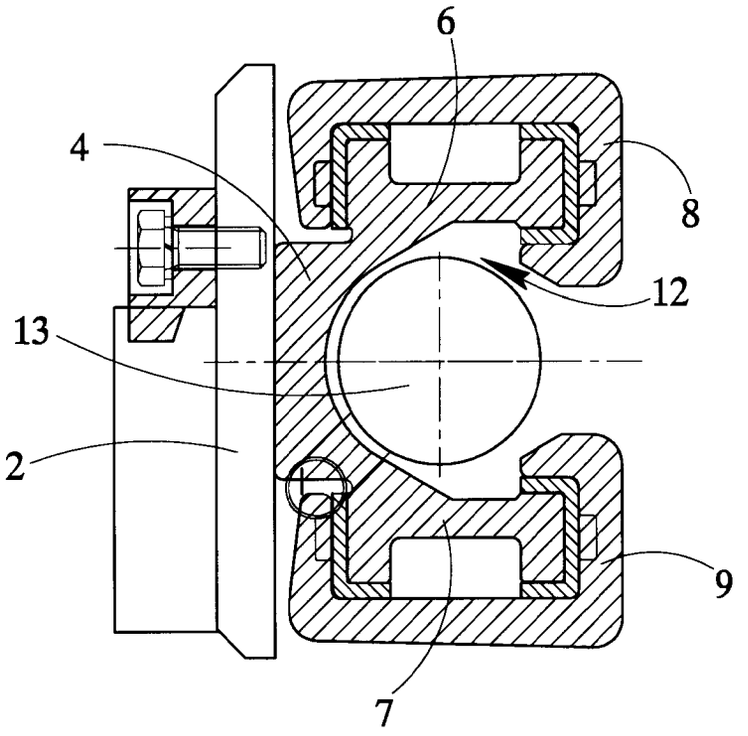


Fig. 9



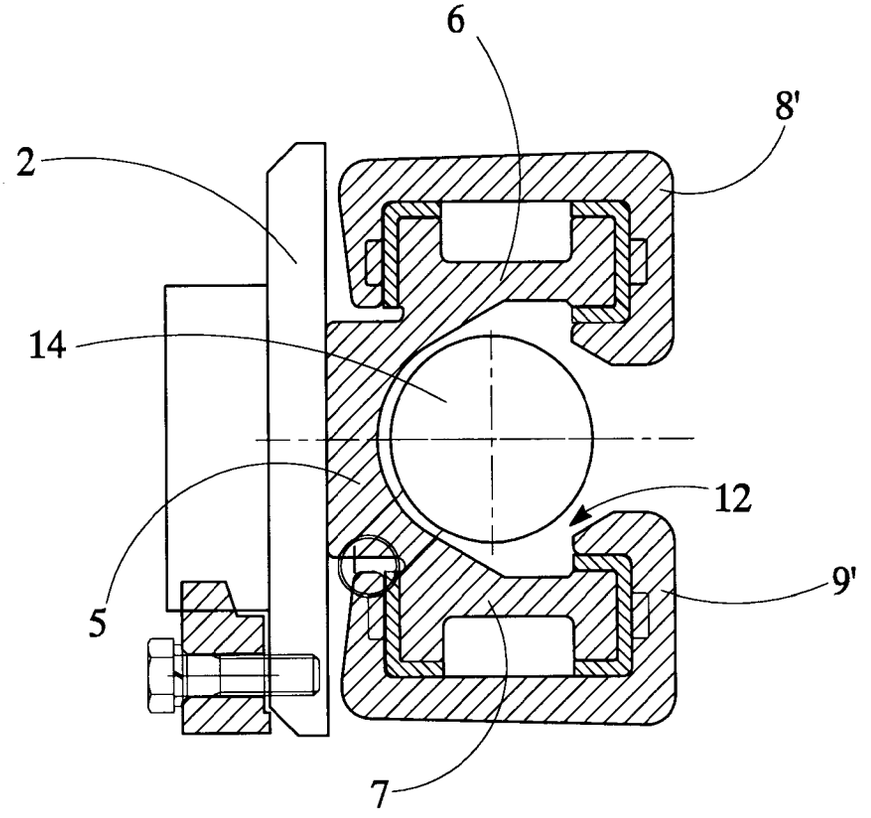
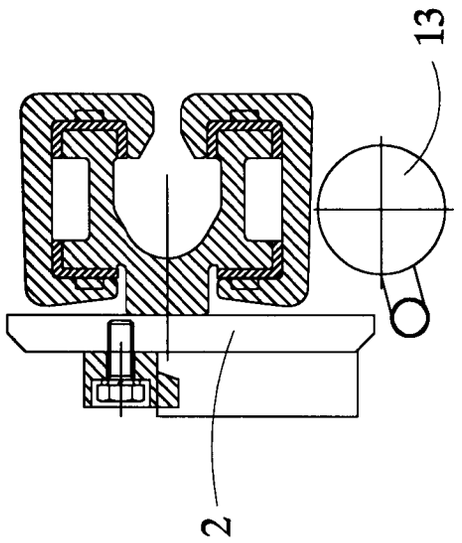


Fig. 12



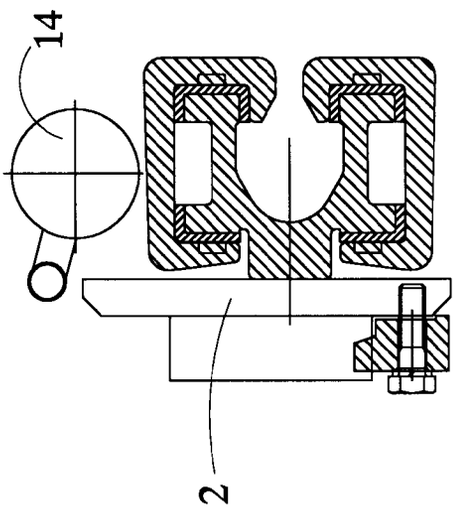
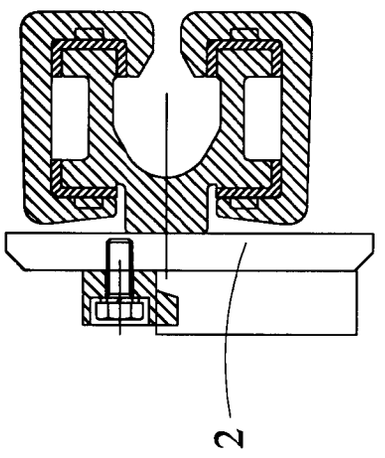


Fig. 14



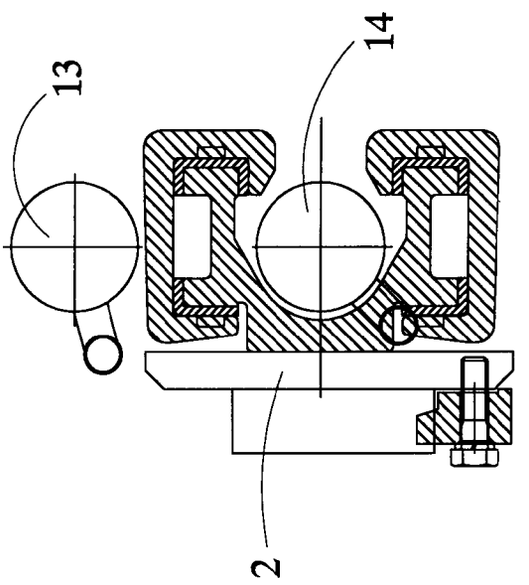


Fig. 13