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(54) A LOAD CARRIER FOR A FORKLIFT TRUCK

LASTTRÄGER FÜR GABELSTAPLER

SUPPORT DE CHARGE POUR UN CHARIOT ÉLÉVATEUR À FOURCHE

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Description

TECHINICAL FIELD

[0001] The present invention relates to a load carrier for a forklift truck and a forklift truck comprising such a load carrier according to the appended claims.

BACKGROUND

[0002] Forklift trucks are commonly used to handle loads by means of one or more load carrying forks. The fork is typically attached to a load carrier and the load carrier is movably arranged on a mast such that the fork and the load carrier can slide up and down the mast. The load carrier may be configured such that the fork may be moved laterally in relation to the mast. The load carrier is also typically configured such that the fork can pivot in relation to the mast. The pivot movement is suitably actuated by some type of tilt arrangement. One reason why it is desirable to tilt the load carrier relative to the mast is to be able to level the load, e.g. a pallet, horizontally when placing the load in to a rack. Otherwise, if the load carrier is not horizontal, the fork tips risk colliding with the rack and thereby cause serious damages. Various solutions of tilt arrangements for achieving a durable and reliable load carrier exist on the market. Most solutions, however, have complex configurations and comprises a plurality of parts which are easily worn out due to the great loads acting on the load carrier.

[0003] Document GB2266700 A discloses a load lifting carriage where a first actuating means is arranged to move a front part laterally in relation to a rear part and a second actuating means is arranged to tilt the front part in relation to the rear part. The second actuating means comprises two hydraulically operated tilt jacks. Each tilt jack has a cylinder and a piston rod, where the piston rod has a hemispherically shaped end acting on the front part. The end may be capped with a material for reducing friction during lateral movements (sideshift-ing). Document GB1151889 discloses an industrial truck with a load carrier which can be moved laterally relative to a support member and which can be tilted. The load carrier comprises a portion that slides relatively to a ball formed at the end of a tilt piston. The tilt piston can project in order to effect tilt of the load carrier. Document EP0386344 A1 discloses a load carrier for a forklift truck according to the preamble of claim 1. The load carrier comprising a pressure plate fixedly arranged on a piston rod of a tilting cylinder, wherein the pressure plate is movably arranged in relation to the front part of the load carrier, such that when the front part is moved laterally, the pressure plate remains aligned with the tilting cylinder.

SUMMARY OF THE INVENTION

[0004] Despite known solutions in the field, there is still a need to develop a load carrier for a forklift truck, which facilitates manufacturing and assembly and which is durable and reliable.

[0005] An object of the present invention is to achieve a load carrier for a forklift truck which is durable and reliable.

[0006] Another object of the present invention is to achieve a load carrier for a forklift truck, which facilitates manufacturing and assembly.

[0007] A further object of the present invention is to achieve a load carrier for a forklift truck, which facilitates service and maintenance.

[0008] Another object of the present invention is to achieve an advantageous forklift truck, which is durable and reliable and which is easier to manufacture and assemble.

[0009] The herein mentioned objects are achieved by a load carrier for a forklift truck and a forklift truck comprising such a load carrier according to the appended claims.

[0010] According to an aspect of the present invention a load carrier for a forklift truck is provided, the load carrier comprising a front part, a rear part and a tilt device, wherein the front part is adapted to carry at least one fork and the rear part is adapted to be movably arranged on a mast of a forklift truck, wherein the front part is movably attached to the rear part, such that the front part is pivotable in relation to the rear part around a pivot axis, and wherein the tilt device comprises a movable component arranged for pivoting the front part. The tilt device further comprises at least one contact member arranged on the movable component, wherein the at least one contact member is movably mounted in relation to the movable component, and wherein the at least one contact member comprises a flat contact surface. The tilt device is preferably arranged on the rear part and the at least one contact member is thus arranged for interaction with the front part. The contact surface is thus adapted to abut the front part. Forklift trucks are adapted to carry loads on at least one fork. The at least one fork is arranged on a load carrier which may slide up and down a mast or mast of the forklift truck. When transporting loads on a forklift truck the fork may be tilted upwards in order to ensure that the load doesn't fall off the fork. According to the invention a fork may be tilted by tilting the front part of the load carrier in relation to the rear part. The at least one contact member of the tilt device is thus affected by large forces from the load on the front part when tilting the front part. With a flat contact surface according to the invention, the contact area between the front part and the at least one contact member increases and the at least one contact member is thereby able to carry larger forces. When the tilt device affects the front part such that it pivots around the pivot axis, the front part will be inclined relative the rear part. By arranging the at least one contact member movably in relation to the movable component of the tilt device, the contact member is capable of adapting to the front part. The flat contact surface will thus be in parallel with and abut the front part of the

load carrier irrespective of the position of the front part. A load carrier is thereby achieved, which is durable and reliable.

[0011] Alternatively, the tilt device is arranged on the front part and the at least one contact member is thus arranged to interact with the rear part in order to tilt the front part. The contact surface is in such case adapted to abut the rear part of the load carrier.

[0012] The movable component of the tilt device is suitably movable along a direction essentially perpendicular to the pivot axis.

[0013] The tilt device may comprise at least one tilt cylinder with a piston, wherein the piston constitutes the movable component of the tilt device. The at least one contact member is thus arranged on the piston. The piston of the tilt cylinder is suitably movable along a direction essentially perpendicular to the pivot axis. The at least one contact member is suitably movably arranged in relation to the piston. The piston of the tilt cylinder suitably comprises a piston rod protruding towards the front part of the load carrier. The at least one contact member is thus suitably arranged on the piston rod end facing the front part.

[0014] Alternatively, the tilt device comprises an electric actuator with a component movable in a direction essentially perpendicular to the pivot axis. The at least one contact member is thus suitably movably arranged in relation to the movable component of the electric actuator. The tilt device may thus be hydraulic, pneumatic or electric.

[0015] The front part of the load carrier suitably comprises an upper horizontal section, a lower horizontal section and two side sections. Each side section is suitably connected to an end of the upper horizontal section and the lower horizontal section respectively. The side sections extend longitudinally between the upper horizontal section and the lower horizontal section. The longitudinal extension of the front part is thus in a direction parallel with the longitudinal extension of the side sections. The longitudinal extension of the respective side section is perpendicular to the longitudinal extension of the upper horizontal section and the lower horizontal section. The rear section preferably comprises two vertical side sections arranged in parallel. The two vertical side sections are suitably connected to each other by a horizontal section at a lower end of each vertical section. The longitudinal extension of the rear part is in the vertical direction, in parallel with the longitudinal extension of the mast on which the rear part is adapted to be arranged. The longitudinal extensions of the upper horizontal section and the lower horizontal section of the front part are parallel with the longitudinal extension of the horizontal section of the rear part. The front part and the rear part are suitably connected to each other by means of a pivot arrangement at the upper end of the front part respective the rear part. The upper horizontal section of the front part is suitably connected to the pivot arrangement. The tilt device is suitably arranged at the lower end of the rear part. The tilt device typically interacts with the lower horizontal section of the front part such that the front part pivots around the pivot axis at the upper horizontal section.

[0016] The pivot arrangement suitably comprises an elongated pivot part fixedly connected to the vertical side sections of the rear part. The pivot part extends longitudinally in parallel with the upper and lower horizontal sections of the front part. The pivot part suitably comprises a semi-cylindrical top portion. The upper horizontal section of the front part preferably comprises a hook portion which is adapted to be positioned over the semi-cylindrical top portion of the pivot part. The front part is thus hanged on the pivot arrangement. The front part thereby pivots around the top portion of the pivot part. The pivot axis thus coincides with the centre line of the top portion. According to an aspect of the invention the front part is movable sideways relative to the rear part. The pivot arrangement suitably comprises at least one displacement means arranged in a recess in the pivot part. The pivot arrangement may comprise two displacement means, each arranged in recesses at each end of the elongated pivot part. The displacement means are movably arranged inside the pivot part and protrude from the recesses of the pivot part. The displacement means may be controlled to move relative to the pivot part, in the direction of the longitudinal extension of the pivot part. By for example controlling the pressure inside the recesses the respective displacement means may be moved in relation to the pivot part. The displacement means will act on the upper horizontal section of the front part and the front part will move sideways on the top portion of the pivot part. This way, the front part is movable sideways relative to the pivot part and thus the rear part. The load carrier thus enables a so called sideshift movement. A control unit on the forklift truck is suitably adapted to control the sideshift movement of the front part. When moving the upper horizontal section of the front part laterally along the longitudinal extension of the pivot part of the pivot arrangement, the lower horizontal section of the front part will move laterally relative to the at least one contact member. The at least one contact member thus preferably comprises a material which results in a desired friction force between the front part and the at least one contact member, such that the at least one contact member is not unnecessarily worn. Alternatively or additionally, a plate/strip adapted to reduce the friction against the at least one contact member may be arranged on the lower horizontal section of the front part.

[0017] The movable component of the tilt device is movable along a direction essentially perpendicular to the pivot axis and essentially perpendicular to the longitudinal extension of the rear part. The longitudinal extension of the rear part is parallel with the longitudinal extension of the mast on which the load carrier is adapted to be mounted. When the movable component is in an idle position, the front part is in an essentially vertical position relative to the surface on which the forklift truck

is operated. The front part is thus positioned essentially perpendicularly to the direction of movement of the movable component. The front part and the rear part are thus essentially parallel with each other in the longitudinal direction. This way, the prong of the at least one fork arranged on the front part will be positioned essentially perpendicularly to the rear part. When the movable component is moved in the direction towards the front part the at least one contact member pressed against the front part will pivot the front part around the pivot axis and the front part will be tilted upwards. This way, the prong of the at least one fork arranged on the front part will be positioned with an angle smaller than 90 degrees relative to the rear part. When the movable component is in an extracted position the front part may be tilted such that the prong of the at least one fork is positioned with an angle between 85-89 degrees in relation to the rear part. Similarly, if the movable component is moved towards a fully retracted position, the front part will be tilted downwards. This way, the prong of the at least one fork arranged on the front part will be positioned with an angle larger than 90 degrees relative to the rear part. When the movable component is in a retracted position the front part may be tilted such that the prong of the at least one fork is positioned with an angle between 91-95 degrees in relation to the rear part. The front part of the load carrier may thus pivot to positions between +5 degrees and -5 degrees in relation to the rear part, wherein the zero position is when the front part and the rear part are parallel with each other in the longitudinal direction.

[0018] The control unit on the forklift truck is suitably adapted to control the tilt device and thus the movement of the movable component between the different positions.

[0019] According to an aspect of the invention the at least one contact member is movably mounted, such that it can rotate around an axis essentially parallel with the pivot axis. This way, the at least one contact member will follow the front part when the front part is pivoted and the contact area will be maintained regardless of the position of the front part.

[0020] According to an aspect of the invention the at least one contact member is elongated in a direction parallel with the rotational axis. The at least one contact member is suitably elongated along the rotational axis. By having an elongated contact member, the contact surface of the at least one contact member is increased. The contact area between the at least one contact member and the front part is thus increased, which results in a more durable and resistant load carrier.

[0021] According to an aspect of the invention the at least one contact member is movably mounted in a bracket, which is fixedly arranged on the movable component of the tilt device. The bracket will thus not move in relation to the movable component. The bracket is suitably elongated in a direction parallel with the rotational axis of the at least one contact member. The length of the bracket may be essentially the same as the length of the at least one contact member. The tilt device is suitably configured such that when the at least one contact member is arranged in the bracket, the flat surface of the at least one contact member extends beyond the bracket in direction towards the front part. This way, only the contact surface of the contact member will abut the front part, not the bracket. The bracket thus partly surrounds the at least one contact member. By arranging the at least one contact member movably in a bracket the at least one contact member may easily be exchanged without having to dismantle the whole tilt device. This facilitates assembly of the load carrier and also service and maintenance. Alternatively, the tilt device comprises two or more contact members. All contact members are suitably movably mounted in the bracket and the combined length of the contact members may be essentially the same as the bracket.

[0022] The bracket preferably comprises a groove corresponding to the shape of the at least one contact member. This way, the at least one contact member may be securely positioned in the bracket. Stop members may be attached at short ends of the bracket in order to restrict the movement of the at least one contact member along its longitudinal direction.

[0023] According to an aspect of the invention the at least one contact member has an essentially semi-cylindrical shape. The rotational axis may thus coincide with the centre line of the semi-cylindrical contact member. The at least one contact member is arranged such that the flat surface is facing the front part of the load carrier. The cross-section of the groove of the bracket may thus also be semi-cylindrical.

[0024] According to an aspect of the invention the bracket comprises at least one recess adapted for arranging the bracket on the movable component of the tilt device. The recess is thus facing away from the front part of the load carrier. The recess is suitably adapted for receiving the end of the movable component, such as the piston rod end. The shape of the recess suitably corresponds to the shape of the movable component such that the bracket may be easily mounted on the movable component. This way, the bracket may easily be removed and replaced if needed. The tilt device may further comprise at least one guiding pin attached to the bracket and the movable component. The guiding pin is thus attached to the bracket on the side facing away from the front part. The tilt device may comprise at least two guiding pins, each attached to a respective end of the bracket. The guiding pin prevents the bracket from rotating around the axis of the movable component.

[0025] The at least one contact member preferably comprises a plastics material. This way, the friction between the at least one contact member and the front part may be minimized. By minimizing the friction the service life of the at least one contact member may be increased and a durable load carrier is thus achieved. The at least one contact member may comprise any material which results in an optimal friction force between the at least

one contact member and the front part. The bracket may comprise metal, plastics, composites or any durable material suitable for the purpose.

[0026] According to an aspect of the invention the tilt device is arranged laterally centered at a lower end of the rear part. In the case where the tilt device comprises at least one tilt cylinder, the at least one tilt cylinder is suitably arranged on the horizontal section of the rear part. The at least one contact member thus abuts the front part laterally centered, such that the load of the front part is evenly distributed on the at least one contact member. Alternatively, the tilt device comprises two tilt cylinders, each attached to the at least one contact member. The two tilt cylinders are thus suitably arranged next to each other at the lower end of the rear part. In such cases, the bracket holding the at least one contact member suitably comprises two recesses, such that the bracket can be mounted on each of the respective piston rod. Alternatively, the tilt device comprises two tilt cylinders and two brackets. Each bracket is thus attached to a respective piston rod and each bracket holds at least one contact member.

[0027] According to an aspect of the invention a forklift truck is provided, the forklift truck comprising at least one fork attached to a load carrier as mentioned herein. The forklift truck thus comprises a mast on which the rear part of the load carrier is movably attached. The forklift truck may be any industrial truck comprising at least one fork, such as a stacker truck, a counterbalance truck or similar.

[0028] Further objects, advantages and novel features of the present invention will become apparent to one skilled in the art from the following details, and also by putting the invention into practice.

BRIEF DESCRIPTION OF THE DRAWINGS

[0029] For fuller understanding of the present invention and further objects and advantages of it, the detailed description set out below should be read together with the accompanying drawings, in which the same reference notations denote similar items in the various diagrams, and in which:

Figure 1 schematically illustrates a forklift truck according to an embodiment of the invention;

Figure 2 schematically illustrates an exploded view of a load carrier according to an embodiment of the invention;

Figure 3a-c schematically illustrates views of details of a load carrier according to an embodiment of the invention;

Figure 4a schematically illustrates a side view of a load carrier in an idle position according to an embodiment of the invention;

Figure 4b schematically illustrates a side view of a load carrier in a tilted position according to an embodiment of the invention; and

Figure 4c schematically illustrates a side view of a load carrier in a tilted position according to an embodiment of the invention;

DETAILED DESCRIPTION OF THE DRAWINGS

[0030] Figure 1 shows a side view of a forklift truck 10 according to an embodiment of the invention. The forklift truck 10 comprises at least one fork 12 attached to a load carrier 14. The load carrier 14 is movably arranged on a mast 16, such that the forks 12 may be moved along the mast 16. The forklift truck may comprise any numbers of forks 12 attached to the load carrier 14. The load carrier 14 is suitably configured as described in Figure 2-4. The forklift truck 10 may be any forklift truck comprising at least one fork 12, such as an electric stacker truck, a counterbalance truck or similar.

[0031] Figure 2 shows an exploded view of a load carrier 14 for a forklift truck 10 according to an embodiment of the invention. The load carrier 14 comprises a front part 20, a rear part 22 and a tilt device 24, wherein the front part 20 is adapted to carry at least one fork 12 and the rear part 22 is adapted to be movably arranged on a mast 16 of a forklift truck 10, wherein the front part 20 is movably attached to the rear part 22, such that the front part 20 is pivotable in relation to the rear part 22 around a pivot axis A, and wherein the tilt device 24 comprises a movable component 28' arranged for pivoting the front part 20. The tilt device 24 further comprises at least one contact member 30 arranged on the movable component 28', wherein the at least one contact member 30 is movably mounted in relation to the movable component 28', and wherein the at least one contact member 30 comprises a flat contact surface 32. The tilt device 24 is in this embodiment arranged at the rear part 22 and further comprises at least one tilt cylinder 26 with a piston 28', wherein the piston 28' constitutes the movable component. The piston 28' is movable along a direction essentially perpendicular to the pivot axis A. The contact member 30 is arranged on the piston 28' for interaction with the front part 20. The contact surface 32 is thus adapted to abut the front part 20.The contact member 30 is suitably movably arranged in relation to the piston 28'. The forks 12 attached to the front part 20 of the load carrier 14 may be tilted by tilting the front part 20 of the load carrier 14 in relation to the rear part 22. The front part 20 is thus pivoted about the pivot axis A when the tilt device 24 affects the front part 20. The contact member 30 of the tilt device 24 may be affected by large forces from the load on the front part 20 when tilting the front part 20. With a flat contact surface 32 according to the invention, the contact area between the front part 20 and the contact member 30 increases and the contact member 30 is thereby able to carry larger forces. By arranging the contact member 30 movably in relation to the piston 28', the contact member 30 is capable of adapting to the position of the front part 20. The contact member 30 is suitably movably mounted, such that it can rotate around a rota-

tional axis B essentially parallel with the pivot axis A. This way, the contact member 30 will follow the front part 20 when the front part 20 is pivoted and the contact area will be maintained regardless of the position of the front part 20.The flat contact surface 32 will thus always be in parallel with the front part 20 of the load carrier 14. A load carrier 14 is thereby achieved, which is durable and reliable. This is further described in Figure 4b and 4c.

[0032] The piston 28' of the tilt cylinder 26 suitably comprises a piston rod 28" protruding towards the front part 20 of the load carrier 14. The contact member 30 is thus suitably arranged on the piston rod end 29 facing the front part 20. The contact member 30 is movably mounted in a bracket 34, which is fixedly arranged on the piston rod 28". The bracket 34 will thus not move in relation to the piston rod 28". The contact member 30 and the bracket 34 are further described in Figures 3a-3c.

[0033] The front part 20 of the load carrier 14 may comprise an upper horizontal section 40, a lower horizontal section 42 and two vertical side sections 44', 44". Each vertical side section 44', 44" is connected to an end of the upper horizontal section 40 and the lower horizontal section 42 respectively, such that a frame is formed. The side sections 44', 44" extend longitudinally between the upper horizontal section 40 and the lower horizontal section 42. The longitudinal extension of the front part 20 is in a direction parallel with the longitudinal extension of the side sections 44', 44". The longitudinal extension of the respective side section 44', 44" is perpendicular to the longitudinal extension of the upper horizontal section 40 and the lower horizontal section 42. The rear part 22 preferably comprises two vertical side sections 46', 46" arranged in parallel. The two side sections 46', 46" are suitably connected to each other by a horizontal section 48 at a lower end of each vertical section 46', 46". The longitudinal extension of the rear part 22 is in the vertical direction, in parallel with the longitudinal extension of the mast 16 on which the rear part 22 is adapted to be arranged. The longitudinal extension of the upper horizontal section 40 and the lower horizontal section 42 of the front part 20 are parallel with the longitudinal extension of the horizontal section 48 of the rear part 22. The tilt cylinder 26 may be arranged at the horizontal section 48 of the rear part 22. The tilt cylinder 26 may be arranged laterally centered at the lower end of the rear part 22. Although only one tilt cylinder 26, one bracket 34 and one contact member 30 is illustrated, the tilt device 24 may comprise two tilt cylinders 26, each attached to the same bracket 34 and contact member 30 or each attached to a different bracket 34 and contact member 30. The two tilt cylinders 26 are thus suitably arranged next to each other at the lower end of the rear part 22.

[0034] The load carrier 14 further comprises a pivot arrangement 50 connecting the front part 20 and the rear part 22. The pivot arrangement 50 may be arranged at the upper end of the front part 20 and the rear part 22 respectively, wherein the upper horizontal section 40 of the front part 20 is connected to the pivot arrangement 50. The pivot arrangement 50 suitably comprises an elongated pivot part 52 fixedly connected to the vertical side sections 46', 46" of the rear part 22. The pivot part 52 extends longitudinally in parallel with the upper and lower horizontal sections 40, 42 of the front part 20. The pivot part 52 suitably comprises a semi-cylindrical top portion. The upper horizontal section 40 of the front part 20 preferably comprises a hook portion (not shown) which is hanged on the semi-cylindrical top portion of the pivot part 52. The front part 20 thus pivots around the top portion of the pivot part 52. The pivot axis A thereby coincides with the centre line of the top portion. The pivot arrangement 50 suitably comprises two displacement means 54, each arranged in a recess at each end of the elongated pivot part 52. The displacement means 54 are movably arranged inside the pivot part 52 and protrude from the recesses. The displacement means 54 may be controlled to move in relation to the pivot part 52, along the direction of the longitudinal extension of the pivot part 52. The displacement means 54 will then act on the upper horizontal section 40 of the front part 20 to move the front part 20 sideways on the top portion of the pivot part 52. This way, the front part 20 is movable sideways relative the rear part 22.

[0035] A control unit (not shown) on the forklift truck 10 is suitably adapted to control the tilt cylinder 26 and thus the movement of the piston 28'. The control unit is also suitably adapted to control the sideshift movement of the front part 20.

[0036] Figure 3a-c schematically illustrates views of details of a load carrier 14 according to an embodiment of the invention. The load carrier 14 is suitably configured as described in Figure 1 and 2.

[0037] Figure 3a shows a contact member 30 according to an embodiment of the invention. The contact member 30 is elongated in a direction parallel with the pivot axis A. The contact member 30 is suitably elongated along the rotational axis B around which the contact member 30 can rotate. The contact member 30 has an essentially semi-cylindrical shape. The rotational axis B thus coincides with the centre line of the semi-cylindrical contact member 30. By having an elongated contact member 30, the contact surface 32 of the contact member 30 is increased. The contact area between the contact member 30 and the front part 20 is thus increased, which results in a more durable and resistant load carrier 14. The contact member 30 preferably comprises a plastics material. This way, the friction between the contact member 30 and the front part 20 may be minimized. By minimizing the friction, the service life of the contact member 30 may be increased and a durable load carrier 14 is thus achieved. The contact member 30 may comprise any material which results in an optimal friction force between the contact member 30 and the front part 20.

[0038] Figure 3b shows a bracket 34 of a load carrier 14 according to an embodiment of the invention. The bracket 34 is fixedly arranged on the piston 28', such that the bracket 34 does not move in relation to the piston

28'. Even though only a piston 28' is mentioned herein as the movable component of the tilt device 24, it should be noted that any type of corresponding movable component of a tilt device is applicable. The bracket 34 is elongated in a direction parallel with the rotational axis B of the contact member 30. The length of the bracket 34 may be essentially the same as the length of the contact member 30. In the case where multiple contact members 30 are arranged in one bracket 34, the length of the bracket 34 may be essentially the same as the combined length of all contact members 30. The bracket 34 comprises a groove 60 corresponding to the shape of the contact member 30. The cross-section of the groove 60 may thus also be semi-cylindrical. This way, the contact member 30 may be securely positioned in the bracket 34. The bracket 34 further comprises at least one recess 62 adapted for arranging the bracket 34 on the tilt piston 28'. The recess 62 is thus facing away from the front part 20 of the load carrier 14. The recess 62 is suitably adapted for receiving the piston rod end 29. The shape of the recess 62 suitably corresponds to the shape of the piston rod end 29, such that the bracket 34 may be easily mounted on the piston rod 28". This way, the bracket 34 may easily be removed and replaced if needed. The tilt device 24 may further comprise at least one guiding pin 64 attached to the bracket 34 and the piston 28'. Two guiding pins 64 are illustrated herein. The guiding pins 64 are thus attached to the bracket 34 on the side facing away from the front part 20. The guiding pins 64 prevent the bracket 34 from rotating around the axis of the piston rod 28". The bracket 34 suitably comprises metal, plastics, composites or similar.

[0039] Figure 3c shows the contact member 30 described in Figure 3a movably arranged in the bracket 34 described in Figure 3b. The bracket 34 and the contact member 30 are suitably configured such that when the contact member 30 is arranged in the bracket 34, the flat contact surface 32 of the contact member 30 extends beyond the bracket 34 in direction towards the front part 20. This way, only the contact surface 32 of the contact member 30 will abut the front part 20, not the bracket 34. The bracket 34 thus partly surrounds the contact member 30. By arranging the contact member 30 movably in a bracket 34 the contact member 30 may easily be exchanged without having to dismantle the whole tilt device 24. This facilitates assembly of the load carrier 14 and also service and maintenance. Stop members 66 may be attached at the short ends of the bracket 34 in order to restrict the movement of the contact member 30 along its longitudinal direction. The stop members 66 may be plates attached to the bracket 34 by means of fasteners.

[0040] Figures 4a, 4b and 4c shows side views of the load carrier 14 in different positions. The load carrier 14 is suitably configured as described in any of Figures 1-3. The movable component 28' of the tilt device 24 may be a piston 28' of a tilt cylinder 26. The piston 28' of the tilt device 24 is movable along a direction essentially perpendicular to the pivot axis A and essentially perpendicular to the longitudinal extension of the rear part 22. The longitudinal extension of the rear part 22 is parallel with the longitudinal extension of the mast 16 on which the load carrier 14 is to be mounted.

[0041] Figure 4a shows the load carrier 14 when the piston 28' is in an idle position. The front part 20 is then in an essentially vertical position relative to the surface on which the forklift truck 10 is operated. The front part 20 is thus positioned essentially perpendicularly to the longitudinal extension of the piston rod 28". The front part 20 and the rear part 22 are thus essentially parallel with each other in longitudinal direction. The flat contact surface 32 of the contact member 30 is in parallel with the front part 20. This way, the prong of the at least one fork 12 arranged on the front part 20 will be positioned with an angle α to the rear part 22, wherein the angle α is essentially 90 degrees. When the piston 28' is moved in the direction towards the front part 20 the contact member 30 pressed against the front part 20 will pivot the front part 20 around the pivot axis A and the front part 20 will thus be tilted upwards. The contact member 30 which is movably arranged in the bracket 34 will rotate around rotational axis B and the flat contact surface 32 will remain in contact with the front part 20. This is illustrated in Figure 4b. This way, the prong of the at least one fork 12 will be positioned with an angle α smaller than 90 degrees relative to the rear part 22. When the piston 28' is in an extracted position the front part 20 may be tilted such that the prong of the at least one fork 12 is positioned with an angle α between 85-89 degrees in relation to the rear part 22.

[0042] Similarly, if the piston 28' is moved towards a fully retracted position, the front part 20 will be tilted downwards. This is illustrated in Figure 4c. This way, the prong of the at least one fork 12 arranged on the front part 20 will be positioned with an angle α larger than 90 degrees relative to the rear part 22. When the piston 28' is in a retracted position the front part 20 may be tilted such that the prong of the at least one fork 12 is positioned with an angle α between 91-95 degrees in relation to the rear part 22.

Claims

1. A load carrier (14) for a forklift truck (10), comprising a front part (20), a rear part (22) and a tilt device (24), wherein the front part (20) is adapted to carry at least one fork (12) and the rear part (22) is adapted to be movably arranged on a mast (16) of a forklift truck (10), wherein the front part (20) is movably attached to the rear part (22), such that the front part (20) can pivot in relation to the rear part (22) around a pivot axis (A), and wherein the tilt device (24) comprises a movable component (28') arranged for pivoting the front part (20),
wherein the tilt device (24) further comprises at least one contact member (30) arranged on the movable

component (28'), **characterized in that** the at least one contact member (30) is movably mounted in relation to the movable component (28') and wherein the at least one contact member (30) comprises a flat contact surface (32).

2. A load carrier according to claim 1, wherein the tilt device (24) is arranged at the rear part (22) and the flat contact surface (32) of the at least one contact member (30) is adapted to interact with the front part (20).

3. A load carrier according to claim 1, wherein the tilt device (24) is arranged at the front part (20) and the flat contact surface (32) of the at least one contact member (30) is adapted to interact with the rear part (22).

4. A load carrier according to any of the preceding claims, wherein the at least one contact member (30) is movably mounted, such that it can rotate around a rotational axis (B) essentially in parallel with the pivot axis (A).

5. A load carrier according to claim 4, wherein the at least one contact member (30) is elongated in a direction parallel with the rotational axis (B).

6. A load carrier according to any of the preceding claims, wherein the at least one contact member (30) is movably mounted in a bracket (34), which is fixedly arranged on the movable component (28') of the tilt device (24).

7. A load carrier according to claim 6, wherein the bracket (34) comprises a groove (60) corresponding to the shape of the at least one contact member (30).

8. A load carrier according to claim 6 or 7, wherein in the bracket (34) comprises at least one recess (62) adapted for arranging the bracket (34) on the movable component (28').

9. A load carrier according to any of the preceding claims, wherein the tilt device (24) comprises at least one tilt cylinder (26) with a piston (28'), wherein the piston (28') constitutes the movable component on which the at least one contact member (30) is arranged.

10. A load carrier according to any of the preceding claims, wherein the at least one contact member (30) has an essentially semi-cylindrical shape.

11. A load carrier according to any of the preceding claims, wherein the at least one contact member (30) comprises a plastics material.

12. A load carrier according to any of the preceding claims, wherein the front part (20) is movable sideways relative to the rear part (22).

13. A forklift truck (100) comprising at least one fork (12), **characterized in that** the at least one fork (12) is attached to a load carrier (14) according to any of the claims 1-12.

Patentansprüche

1. Lastträger (14) für einen Gabelstapler (10), umfassend ein Vorderteil (20), ein Hinterteil (22) und eine Kippvorrichtung (24), wobei das Vorderteil (20) zum Tragen von mindestens einer Gabel (12) angepasst ist, und das Hinterteil (22) zum beweglichen Anordnen an einem Mast (16) eines Gabelstaplers (10) angepasst ist, wobei das Vorderteil (20) an dem Hinterteil (22) beweglich befestigt ist, so dass das Vorderteil (20) bezüglich des Hinterteils (22) um eine Drehachse (A) schwenken kann, und wobei die Kippvorrichtung (24) ein bewegliches Bauteil (28') umfasst, das zum Schwenken des Vorderteils (20) angeordnet ist,
wobei die Kippvorrichtung (24) ferner mindestens ein Kontaktelement (30) umfasst, das an dem beweglichen Bauteil (28') angeordnet ist, **dadurch gekennzeichnet, dass** das mindestens eine Kontaktelement (30) bezüglich des beweglichen Bauteils (28') beweglich montiert ist, und wobei das mindestens eine Kontaktelement (30) eine flache Kontaktfläche (32) umfasst.

2. Lastträger nach Anspruch 1, wobei die Kippvorrichtung (24) an dem Hinterteil (22) angeordnet ist, und die flache Kontaktfläche (32) des mindestens einen Kontaktelements (30) zum Zusammenwirken mit dem Vorderteil (20) angepasst ist.

3. Lastträger nach Anspruch 1, wobei die Kippvorrichtung (24) an dem Vorderteil (22) angeordnet ist, und die flache Kontaktfläche (32) des mindestens einen Kontaktelements (30) zum Zusammenwirken mit dem Hinterteil (22) angepasst ist.

4. Lastträger nach einem der vorgehenden Ansprüche, wobei das mindestens eine Kontaktelement (30) derart beweglich montiert ist, dass es um eine Drehachse (B) im Wesentlichen parallel zur Schwenkachse (A) rotieren kann.

5. Lastträger nach Anspruch 4, wobei das mindestens eine Kontaktelement (30) in einer zur Drehachse (B) parallelen Richtung länglich ist.

6. Lastträger nach einem der vorgehenden Ansprüche, wobei das mindestens eine Kontaktelement (30) in

einer Halterung (34) beweglich montiert ist, welche an dem beweglichen Bauteil (28') der Kippvorrichtung (24) fest montiert ist.

7. Lastträger nach Anspruch 6, wobei die Halterung (34) eine Nut (60) umfasst, die der Form des mindestens einen Kontaktelements (30) entspricht.

8. Lastträger nach Anspruch 6 oder 7, wobei die Halterung (34) mindestens eine Aussparung (62) umfasst, die zum Anordnen der Halterung (34) an dem beweglichen Bauteil (28') angepasst ist.

9. Lastträger nach einem der vorgehenden Ansprüche, wobei die Kippvorrichtung (24) mindestens einen Kippzylinder (26) mit einem Kolben (28') umfasst, wobei der Kolben (28') das bewegliche Bauteil bildet, auf dem das mindestens eine Kontaktelement (30) angeordnet ist.

10. Lastträger nach einem der vorgehenden Ansprüche, wobei das mindestens eine Kontaktelement (30) eine im Wesentlichen halbzylindrische Gestalt aufweist.

11. Lastträger nach einem der vorgehenden Ansprüche, wobei das mindestens eine Kontaktelement (30) ein Kunststoffmaterial umfasst.

12. Lastträger nach einem der vorgehenden Ansprüche, wobei das Vorderteil (20) bezüglich des Hinterteils (22) seitlich beweglich ist.

13. Gabelstapler (100) umfassend mindestens eine Gabel (12), **dadurch gekennzeichnet, dass** die mindestens eine Gabel (12) an einem Lastträger (14) nach einem der Ansprüche 1-12 befestigt ist.

Revendications

1. Support de charge (14) pour un chariot élévateur à fourche (10), comprenant une partie avant (20), une partie arrière (22) et un dispositif d'inclinaison (24), la partie avant (20) étant conçue pour porter au moins une fourche (12), et la partie arrière (22) étant adaptée pour être agencée de manière mobile sur un mât (16) d'un chariot élévateur à fourche (10), la partie avant (20) étant fixée de manière mobile à la partie arrière (22), si bien que la partie avant (20) peut pivoter par rapport à la partie arrière (22) autour d'un axe de pivotement (A), et le dispositif d'inclinaison (24) comprenant un composant mobile (28') conçu pour faire pivoter la partie avant (20), le dispositif d'inclinaison (24) comprenant en outre au moins un élément de contact (30) disposé sur le composant mobile (28'), **caractérisé en ce que** ledit au moins un élément de contact (30) est monté de manière mobile par rapport au composant mobile (28'), et dans lequel l'au moins un élément de contact (30) comprend une surface de contact plate (32).

2. Support de charge selon la revendication 1, dans lequel le dispositif d'inclinaison (24) est agencé au niveau de la partie arrière (22), et la surface de contact plate (32) de l'au moins un élément de contact (30) est adaptée pour interagir avec la partie avant (20).

3. Support de charge selon la revendication 1, dans lequel le dispositif d'inclinaison (24) est agencé au niveau de la partie avant (20), et la surface de contact plate (32) de l'au moins un élément de contact (30) est adaptée pour interagir avec la partie arrière (22).

4. Support de charge selon l'une quelconque des revendications précédentes, dans lequel l'au moins un élément de contact (30) est monté de manière mobile, de sorte qu'il puisse tourner autour d'un axe de rotation (B) essentiellement parallèlement à l'axe de pivotement (A).

5. Support de charge selon la revendication 4, dans lequel l'au moins un élément de contact (30) est allongé dans une direction parallèle à l'axe de rotation (B).

6. Support de charge selon l'une quelconque des revendications précédentes, dans lequel l'au moins un élément de contact (30) est monté de manière mobile dans un support (34) qui est agencé de manière fixe sur le composant mobile (28') du dispositif d'inclinaison (24).

7. Support de charge selon la revendication 6, dans lequel le support (34) comprend une rainure (60) correspondant à la forme de l'au moins un élément de contact (30).

8. Support de charge selon la revendication 6 ou 7, dans lequel le support (34) comprend au moins un évidement (62) adapté pour disposer le support (34) sur le composant mobile (28').

9. Support de charge selon l'une quelconque des revendications précédentes, dans lequel le dispositif d'inclinaison (24) comprend au moins un cylindre d'inclinaison (26) avec un piston (28'), le piston (28') constituant l'élément mobile sur lequel au moins un élément de contact (30) est agencé.

10. Support de charge selon l'une quelconque des revendications précédentes, dans lequel l'au moins un élément de contact (30) a une forme essentiellement semi-cylindrique.

11. Support de charge selon l'une quelconque des revendications précédentes, dans lequel l'au moins un élément de contact (30) comprend un matériau plastique.

12. Support de charge selon l'une quelconque des revendications précédentes, dans lequel la partie avant (20) est mobile latéralement par rapport à la partie arrière (22).

13. Chariot élévateur à fourche (100) comprenant au moins une fourche (12), **caractérisé en ce que** ladite au moins une fourche (12) est fixée à un support de charge (14) selon l'une quelconque des revendications 1 à 12.

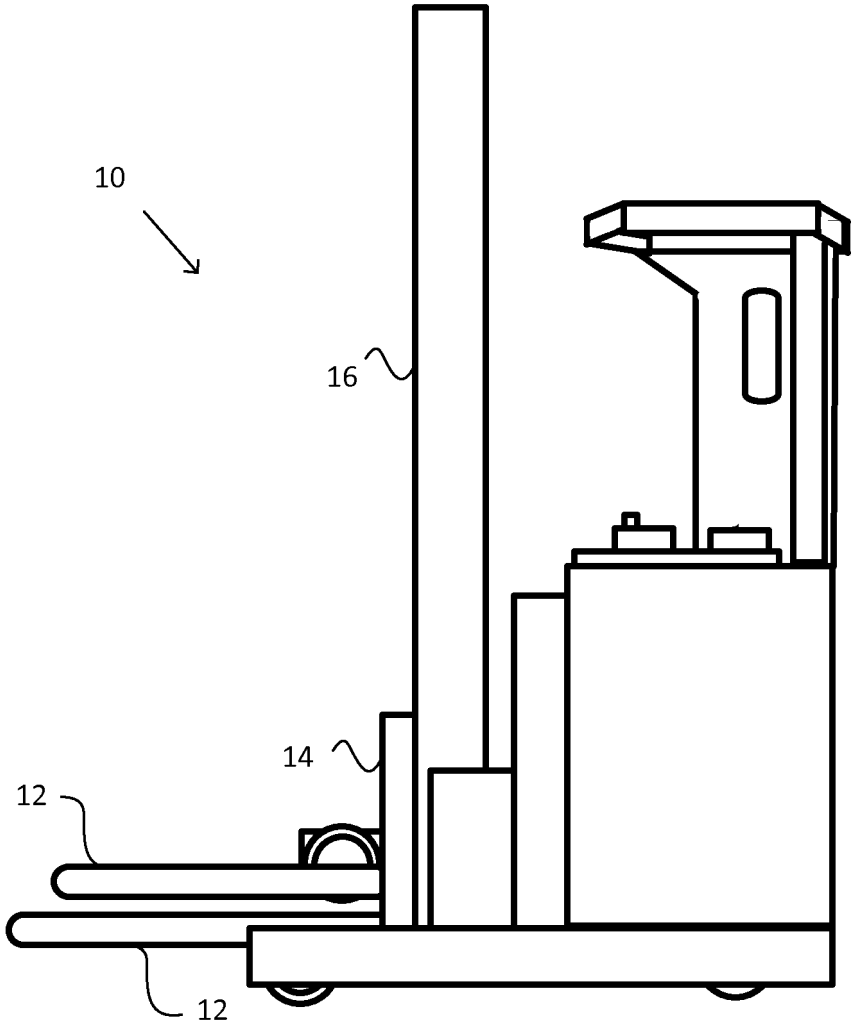


FIG. 1

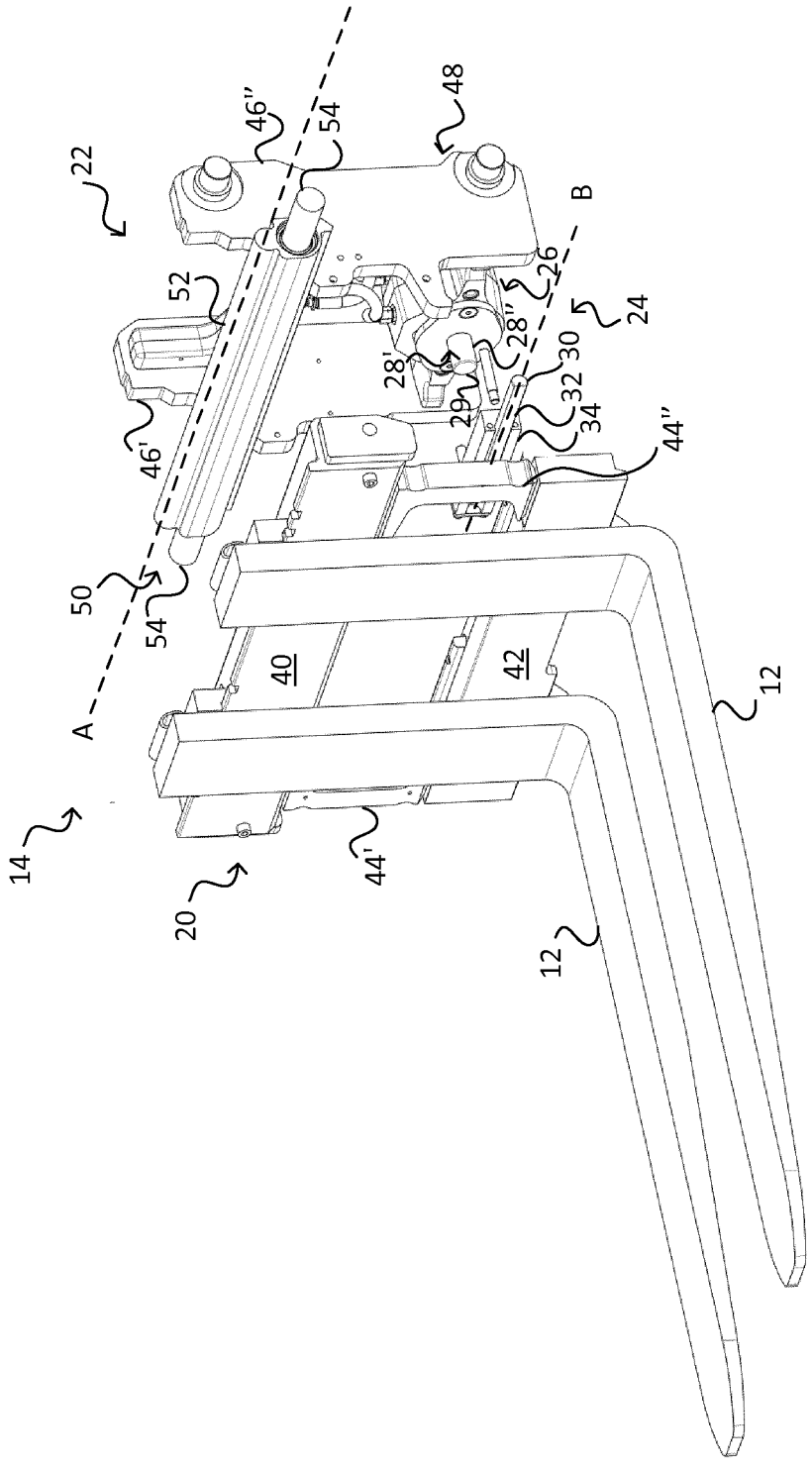

22
46''
54
48
B
52
26
24
28''
28'
30
32
29
34
44''
46'
50
54
A
40
42
12
14
20
44'
12

FIG.2

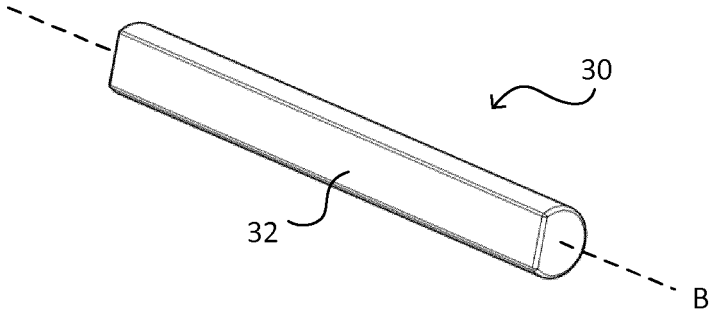


FIG.3a

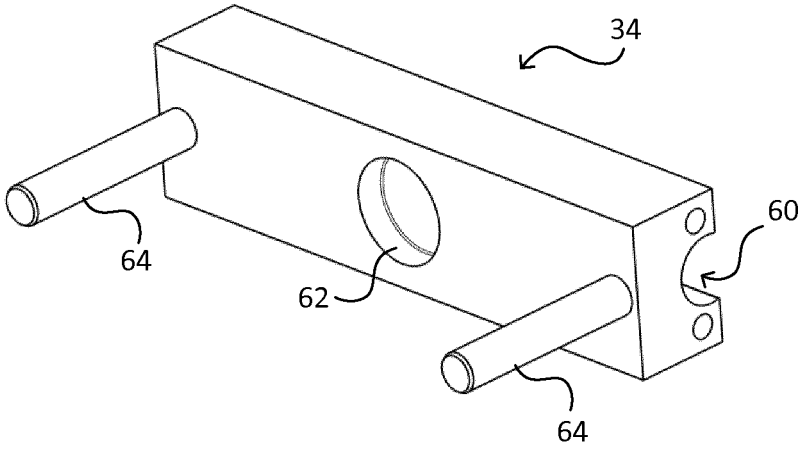


FIG.3b

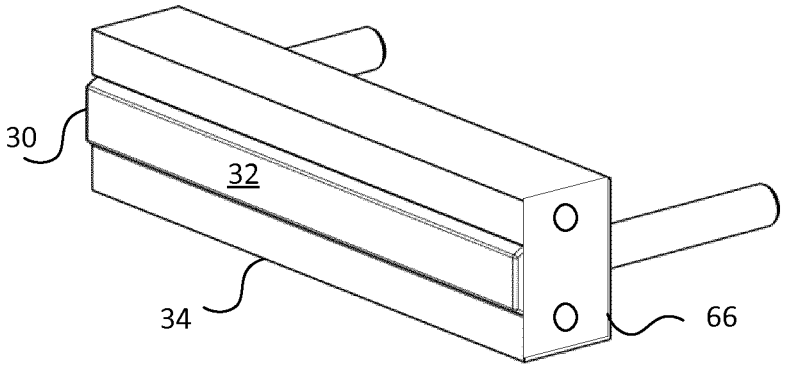


FIG.3c

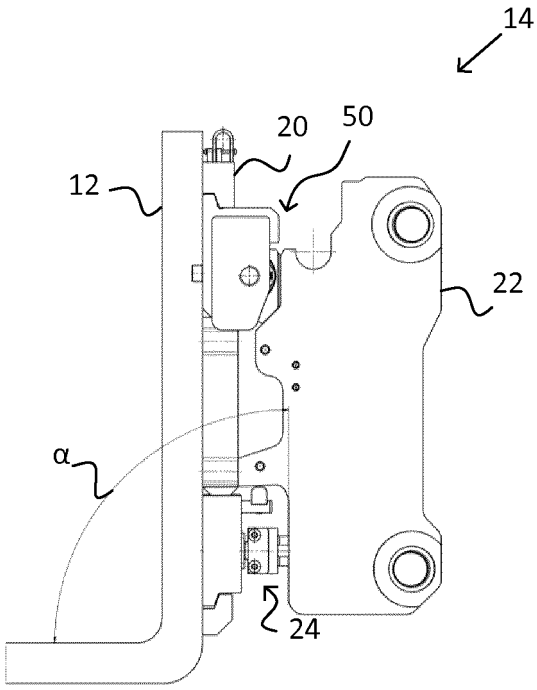


FIG.4a

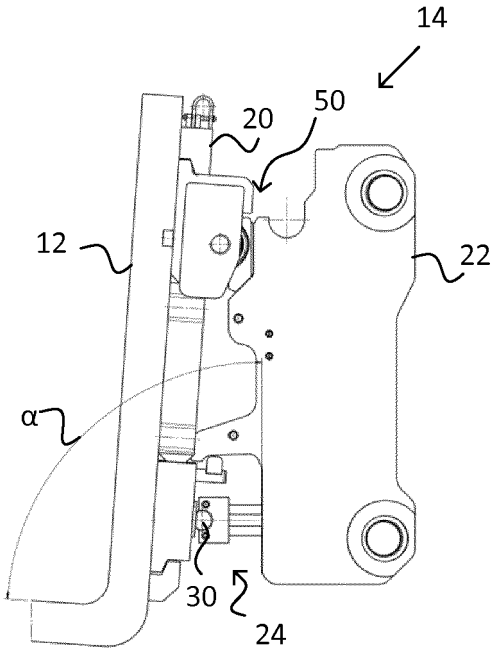


FIG.4b

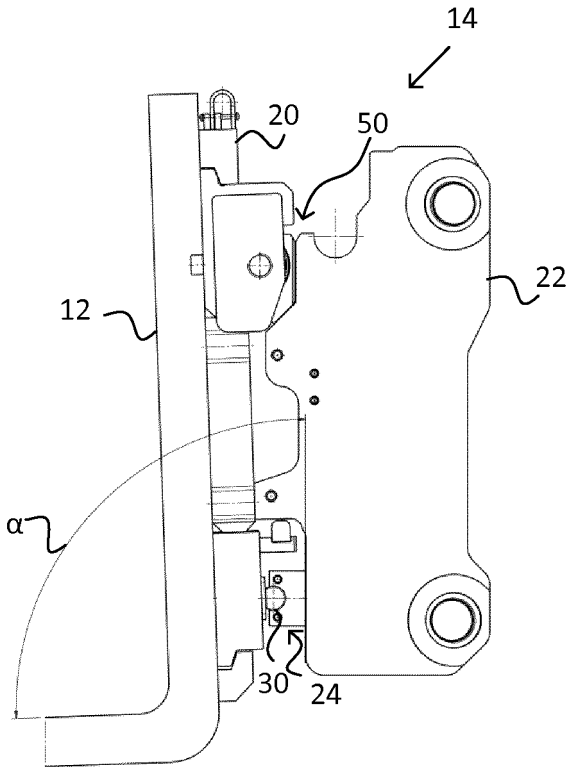


FIG.4c

REFERENCES CITED IN THE DESCRIPTION

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- GB 1151889 A **[0003]**
- EP 0386344 A1 **[0003]**