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(54) Arrangement for fastening an accessory device onto a fork-lift truck

(57) The invention concerns an arrangement for fastening of an accessory device onto a fork-lift truck, which is provided with lifting forks (4), which forks can be pivoted between a working position and an upright position, in which upright position the lifting forks (4) can be locked by means of a locking latch or equivalent. In view of fastening of the accessory device, the lifting forks (4) of the truck are pivoted to the vertical position and locked in their place. The fastening mechanism (10) of the accessory device is provided with a load-bearing peg (16) for each lifting fork (4), and each lifting fork (4) is provided with a through hole, into which the load-bearing peg (16) has been fitted to pass so as to support the accessory device. The fastening mechanism (10) is further provided with a back-up face (12) or equivalent, against which the lifting forks (4) rest when the accessory device has been fastened, as well as with locking means (14, 15) for locking of the fastening mechanism (10) on the lifting forks (4).

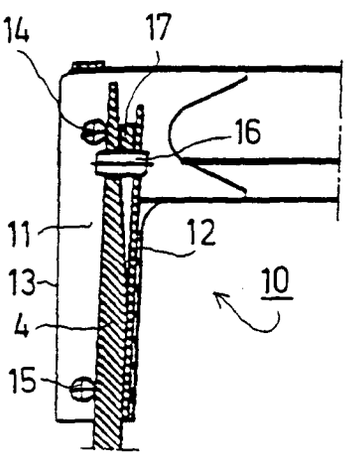

FIG. 3B

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Description

[0001] The invention concerns an arrangement for fastening of an accessory device onto a fork-lift truck, which truck is provided with a vertical lifting mast and with a lifting carriage displaceable along guides provided on said mast, on which carriage lifting forks have been mounted, which can be pivoted between a substantially horizontal working position and a substantially vertical upright position, in which upright position the lifting forks can be locked by means of a locking latch or equivalent.

[0002] For handling of loads, trucks are conventionally provided with a vertical lifting gear, and the lifting carriage has been mounted so that it is vertically displaceable along guides provided on said lifting gear. A necessary load handling device has been mounted on the lifting carriage for lifting and transfer of the load. Most commonly, forks are used as the load handling device, because they can be employed for most varied applications of lifting and transfer. However, a situation may arise in which the truck must be used, temporarily or in the long run even permanently, for lifting and transfer of a load for which the forks of the truck are not suited. One such application of use is the use of a truck for transfer and lifting of containers, in which case the truck ought to be provided with a particular container grasping device, for example with a side lift or a top lift, by whose means it is possible to grasp the container from fastening points formed on the container. In such a case, it has been a normal procedure that the forks of the truck have been removed from the lifting carriage, and a load handling device suitable for the application of use, such as a container grasp, has been installed on the front face of the lifting carriage of the truck by means of a particular fastening mechanism. It is understandable that this is a relatively awkward and time-consuming operation, for which reason the convertibility of the truck within short notice is not very good, because the fastening of the load handling device onto the truck requires the use of particular tools. It is a second important drawback that the fastening mechanism of the accessory, which is attached to the front face of the lifting carriage. has such measures and dimensions that it shifts the centre of gravity of the load quite considerably outwards from the lifting carriage. It is a consequence of this that the payload of the truck becomes lower, or, if it is desirable to keep the payload as high as earlier, for example, in the case of a counterweight truck, the counterweight must be increased considerably. This is also an extra operation that deteriorates the convertibility of the truck.

[0003] The object of the present invention is to provide a novel arrangement for fastening of an accessory device onto a fork-lift truck, by means of which arrangement the convertibility of the truck for different applications of use is improved and an improvement is also otherwise achieved over existing arrangements. In view of carrying this into effect, the invention is mainly characterized in that, in view of fastening of the accessory device, the lifting forks of the truck have been pivoted to the upright position and locked in their place, that the fastening mechanism of the accessory device is provided with a load-bearing peg for each lifting fork, and, in a corresponding way, each lifting fork is provided with a through hole, into which the load-bearing peg has been fitted to pass so as to support the accessory device, and that the fastening mechanism is further provided with a back-up face or equivalent, against which the lifting forks have been fitted to rest when the accessory device has been fastened, as well as with locking means for locking of the fastening mechanism on the lifting forks.

[0004] By means of the fastening arrangement in accordance with the invention, a number of advantages are obtained over the prior art, and of these advantages, in this connection, among other things, the following should be stated. Right at the beginning, it is to be stated that the arrangement in accordance with the invention is suitable for use on such a truck fork at which the forks of the truck are what is called "dual-action" forks, which can be pivoted from the normal working position to a vertical position, for example, for transfer operation. In such a case, in the arrangement in accordance with the invention, truck forks that have been pivoted to the vertical position are employed. onto which forks the accessory device is attached. In such a case, the means of fastening of the accessory device can be made as of substantially lower weight and higher simplicity as compared with the conventional fastening mechanisms to be fitted on the lifting carriage. It is a further advantage, as compared with conventional fastening mechanisms of box construction, that the centre of gravity can be brought considerably closer to the truck, in which case the stability of the truck is improved. Further, since the centre of gravity can be shifted closer to the truck, the payload of the truck becomes higher, or, correspondingly, if necessary, in the case of a counterweight truck, it is possible to use a smaller counterweight. The arrangement of fastening of an accessory device is simple and of low weight, in which case the costs, as compared with conventional solutions, are essentially lower. No particular tools are needed, but the accessory device can be installed simply and readily on support of the vertically pivoted lifting forks. The further advantages and characteristic features of the invention will come out from the following detailed description of the invention.

[0005] In the following, the invention will be described by way of example with reference to the figures in the accompanying drawing.

[0006] Figure 1 is a schematic side view of a part of a truck in the area of its vertical lifting mast and lifting carriage.

[0007] Figure 2 is an enlarged view of the lifting carriage and of an accessory device mounted on support of the vertically pivoted lifting forks fitted on the lifting carriage, which accessory device is a container grasp in the case shown in the figure.

[0008] Figures 3A and 3B are schematic sectional views in the area III in Fig. 2.

[0009] Figure 4 is a general illustration of the suspension of the accessory device, in this case a container grasp, on the forks as viewed in the direction of the truck.

[0010] In Fig. 1, the truck is denoted generally with the reference numeral 1. The truck 1 is, in the normal way, provided with a vertical lifting mast 2, in whose guides a lifting carriage 3 has been installed, being vertically displaceable. The truck 1 is a fork-lift truck, and thus, onto the lifting carriage 3 the lifting forks 4 of the truck have been attached by means of necessary fastening means. The lifting forks 4 are what is called "dual-action" forks, which can be shifted, in the way illustrated in Fig. 1, from the primary working position, in which the forks 4 are substantially horizontal, for example, for transfer operation, into a substantially vertical position around the pivot shaft 5.

[0011] "Dual-action" forks 4 have been used on trucks for quite a long time, but, until now, the possibility of pivoting the forks 4 has been arranged mainly with the purpose that for transfer operation the forks 4 have been pivoted to the vertical position out of reasons of safety. In the way shown in Fig. 2, in the present invention, the vertically pivoted forks 4 of the truck are used for suspension of the accessory device 20. In the case of Fig. 2 and in the case of the subsequent Fig. 4, the accessory device 20 is a container grasp, in particular a top lift. As is shown in Fig. 2, the accessory device 20 is provided with a fastening mechanism 10, by whose means the accessory device 20 is suspended on the vertically pivoted forks 4. In order that this could be done, the forks 4 are provided with a robust locking latch 6 or an equivalent locking device which has an adequate load bearing capacity. Also at the prior-art dual-action forks, a locking latch or equivalent was used, but in such a case, no particular load bearing capacity was required from the latch, because the function of the latch was just to keep the forks 4 in the vertical position.

[0012] As is shown in Fig. 2, in the sectional views in Figs. 3A and 3B, and in the general illustration in Fig. 4, the fastening mechanism 10 comprises, for each fork 4 of the truck (the truck typically comprises two lifting forks), box constructions that are open towards the rear, i.e. towards the truck 1, which box constructions are composed of side walls 11 and of a transverse, vertical backup face 12. Thus, the rear side 13 of the box construction is open, as was already stated above. Into the fastening mechanism, in the interior of the box construction meant for each fork 4 of the truck, a load bearing peg 16 has been installed, which has been attached to the backup face 12, for example, in the way shown in Figs. 3A and 3B, and the fastening has been reinforced further by means of a transverse support 17. However, it is essential that the load bearing peg 16 is directed at the open rear edge 13 of the box construction. The fastening system further requires that through holes 4a have been formed into the forks 4 of the truck, into which holes the load bearing pegs 16 have been fitted to pass when the accessory device 20 is installed in its place. The fastening mechanism 10 further comprises through openings 14a, 15a that have been formed into the side walls 11, the fastening mechanism 10 being locked on the forks 4 of the truck by means of locking pegs 14, 15 fitted into said through openings 14a, 15a.

[0013] The fastening of the accessory device 20 onto the forks 4 of the truck is carried out as follows. For fastening, the forks 4 of the truck must have been raised to the vertical position and locked in the position by means of the locking latch 6. Further, for fastening, the accessory device is first raised to a suitable level, and, for example. in the case of a top lift for a container, the accessory device 20 is lifted, for example, onto a container for the time of fastening. The fastening of the forks 4 to the accessory device 20 is carried out simply so that the lifting forks 4, which have been locked in the vertical position, are driven against the accessory device 20, in which connection the load bearing peg 16 provided in the fastening mechanism 10 of the accessory device is aligned into the hole 4a provided in the lifting fork 4. After this the accessory device 20 is locked into connection with the lifting forks 4 so that the locking pegs 14, 15 are fitted into their place into the openings 14a, 15a provided in the side walls 11 of the fastening mechanism. Thus, no tools are needed for fastening of the accessory device 20. The first locking peg 14 and the area of the backup face 12 receive the torque arising from the accessory device 20 and from the load attached to the accessory device, and, similarly, the second locking peg 15 operates as a securing device and keeps the fastening in its place when the accessory device 20 is lowered, for example, onto some base. The removal of the accessory device from the lifting forks is carried out in the reverse order so that the accessory device 20 is placed at a suitable level onto some base. for example on the top of a container, the locking pegs 14, 15 are removed, and the lifting forks 4 are driven apart from the accessory device 20.

[0014] In stead of the peg 16 that bears the load. the weight of the accessory device 20 and of the load might also be supported on the tips of the forks 4, in which case the forks must, in fact, have an adequately large area. However, for example, in the case of a top lift, this would involve the drawback that, when resting on a container, the forks 4 would glide away from their fastenings when the lifting carriage 3 is run down while the top lift is supported on a container placed on the ground or in a stack. Further, the tips of the forks 4 are usually worn in operation, in which case such a support would be highly unreliable and might result in excessively high surface pressures between the support faces.

[0015] Above, the invention has been described by way of example with reference to the figures in the accompanying drawing. The invention is, however, not confined to the exemplifying embodiments shown in the figures in the drawing alone, but different embodiments

of the invention can show variation within the scope of the inventive idea defined in the accompanying patent claims.

Claims

1. An arrangement for fastening of an accessory device onto a fork-lift truck, which is provided with a vertical lifting mast (2) and with a lifting carriage (3) displaceable along guides provided on said mast, on which carriage lifting forks (4) have been mounted, which forks can be pivoted between a substantially horizontal working position and a substantially vertical upright position, in which upright position the lifting forks (4) can be locked by means of a locking latch (6) or equivalent, **characterized** in that, in view of fastening of the accessory device (20), the lifting forks (4) of the truck have been pivoted to the vertical position and locked in their place, that the fastening mechanism (10) of the accessory device is provided with a load-bearing peg (16) for each lifting fork (4), and, in a corresponding way, each lifting fork (4) is provided with a through hole (4a), into which the load-bearing peg (16) has been fitted to pass so as to support the accessory device (20), and that the fastening mechanism (10) is further provided with a back-up face (12) or equivalent, against which the lifting forks (4) have been fitted to rest when the accessory device (20) has been fastened, as well as with locking means (14, 15) for locking of the fastening mechanism (10) on the lifting forks (4).

2. An arrangement as claimed in claim 1, **characterized** in that the fastening mechanism (10) comprises a box construction open towards the rear, i.e. towards the truck, which box construction consists of side walls (11) and of a rear wall that comprises a backup face (12).

3. An arrangement as claimed in claim 2, **characterized** in that the locking means comprise cross-direction locking pegs (14, 15), for which through holes or openings (14a, 15a) have been formed into the side walls (11) of the fastening mechanism (10), into which holes or openings the locking pegs (14, 15) can be inserted so that, when the accessory device (20) has been fastened to the lifting forks (4), the lifting forks (4) remain between the backup face (12) and the locking pegs (14, 15).

4. An arrangement as claimed in claim 3, **characterized** in that, in the fastening mechanism (10), there are two locking pegs (14, 15) for each lifting fork (4) so that, in relation to the vertical direction, the pegs are placed at opposite sides of the load-bearing peg (16).

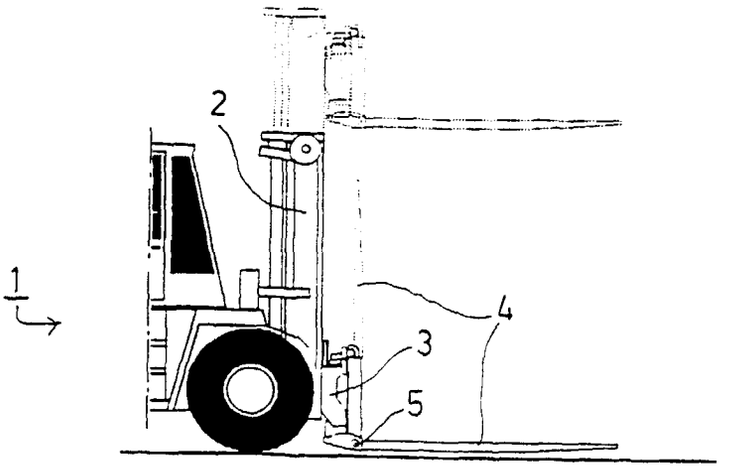

FIG. 1

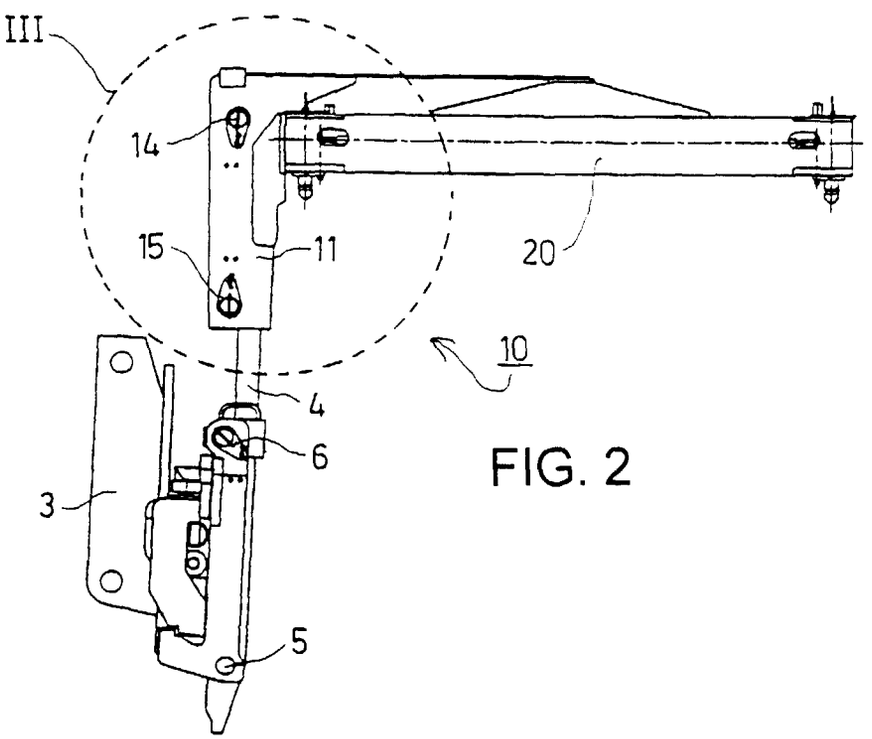

FIG. 2

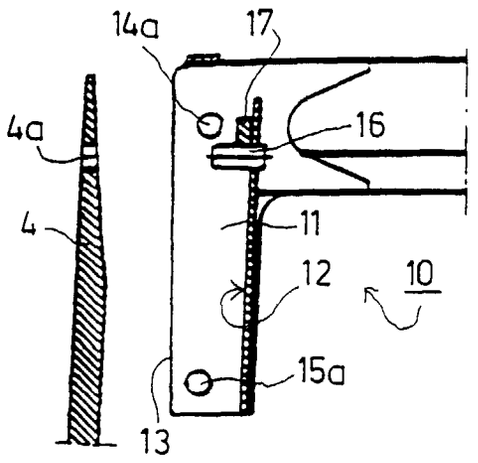

FIG. 3A

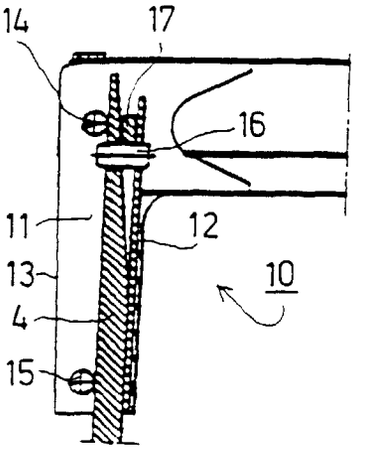

FIG. 3B

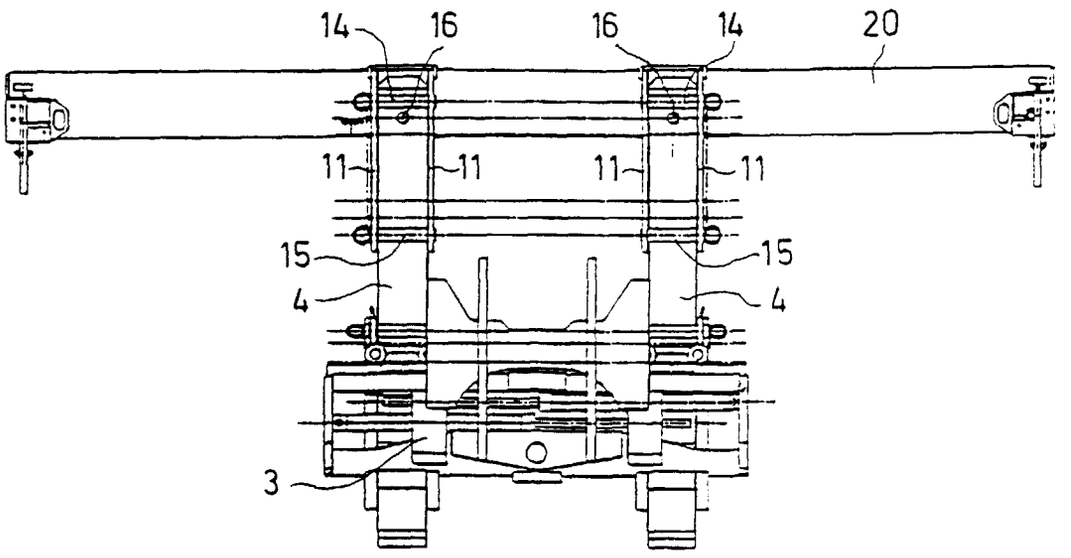

FIG. 4