

- [54] **LIFT TRUCK FORK RETAINING PINS**

3,027,033 3/1962 Schuster 214/750

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Related U.S. Application Data

- [62] Division of Ser. No. 225,811, Feb. 14, 1972, Pat. No. 3,780,896.

- [52] **U.S. Cl.**..... **214/731; 214/750**

- [51] Int. Cl..... B66f 9/06

- [58] **Field of Search**..... 214/730, 731, 750

[56] References Cited

UNITED STATES PATENTS

- 2,975,924 3/1961 Kopanski 214/750

[57] **ABSTRACT**

A lift truck fork carriage construction is provided with fork positioning retainers that are securely mounted on the carriage structure whereby said retainers cannot be jolted off or misplaced from the fork carriage during lift truck operations.

2 Claims, 8 Drawing Figures

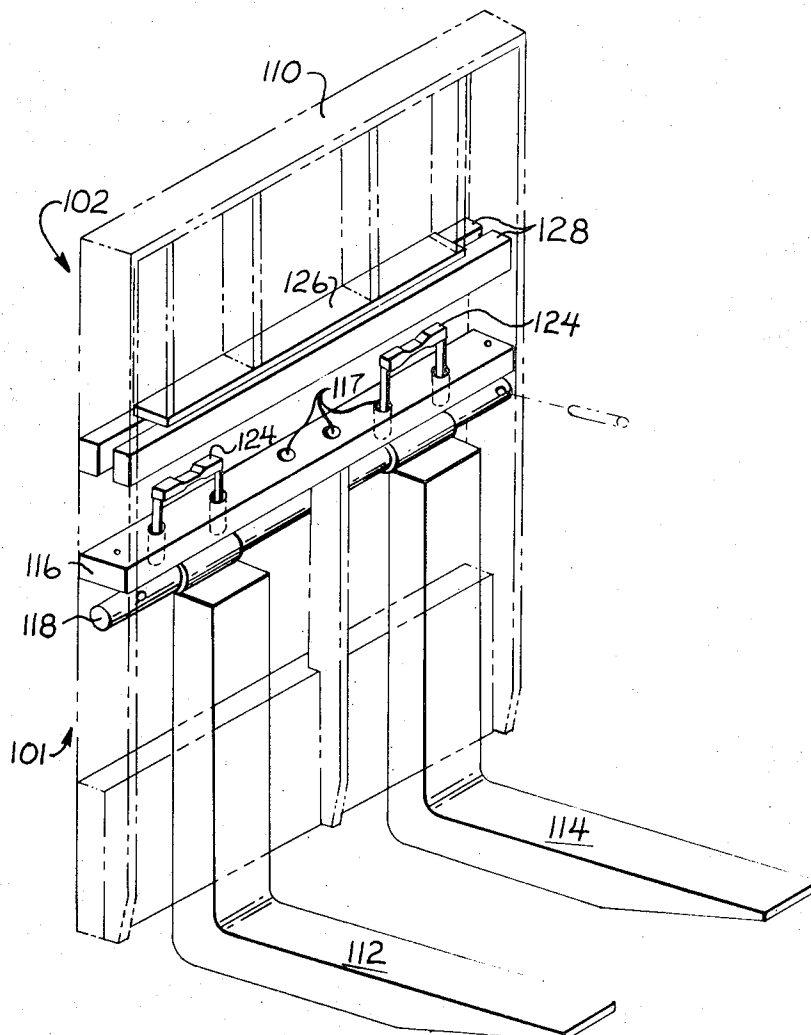


Fig. 1

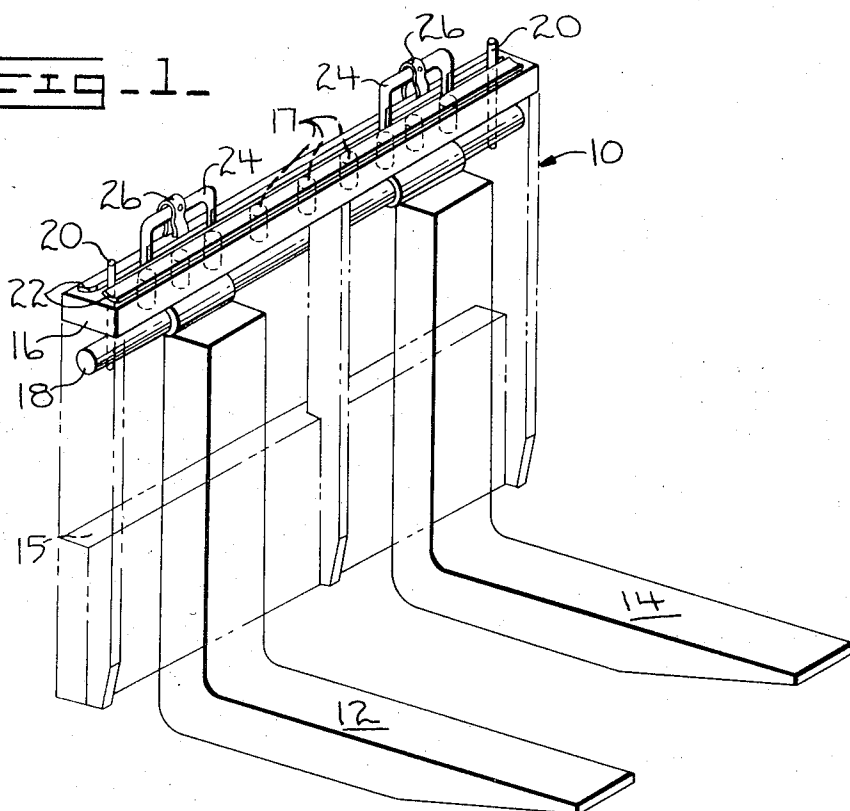
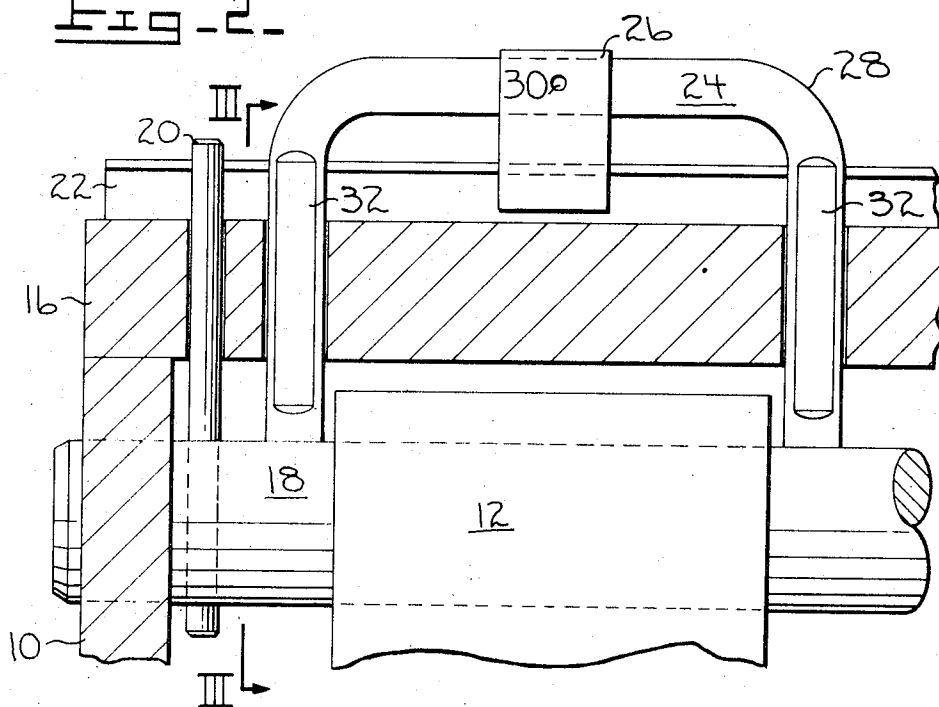


Fig. 2



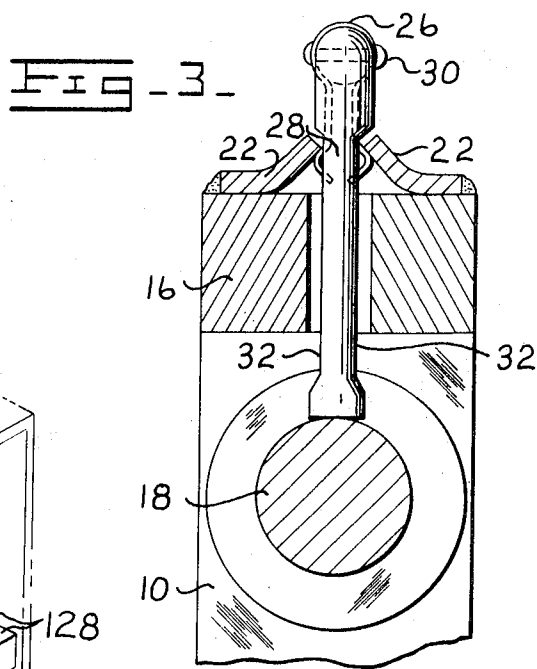
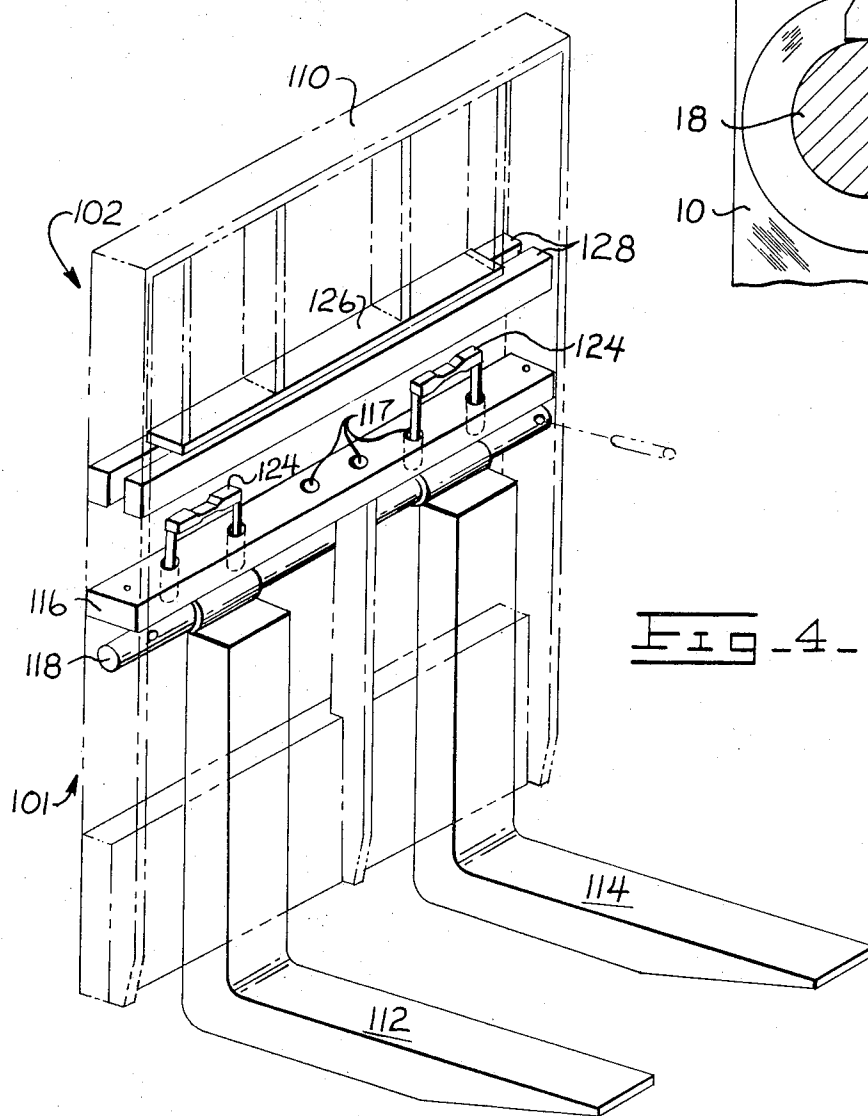


Fig. 5.

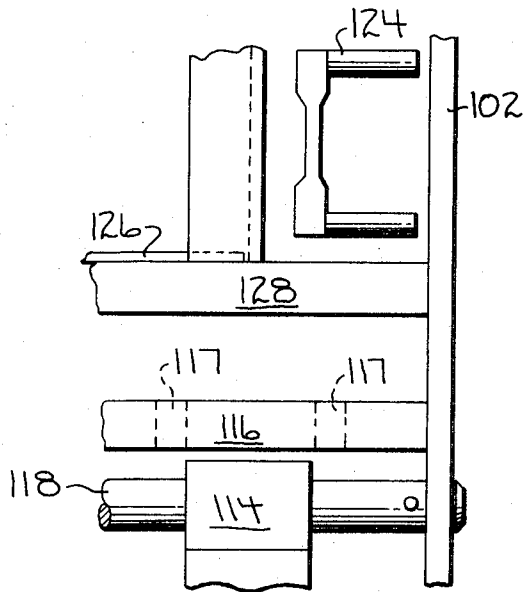


Fig. 6.

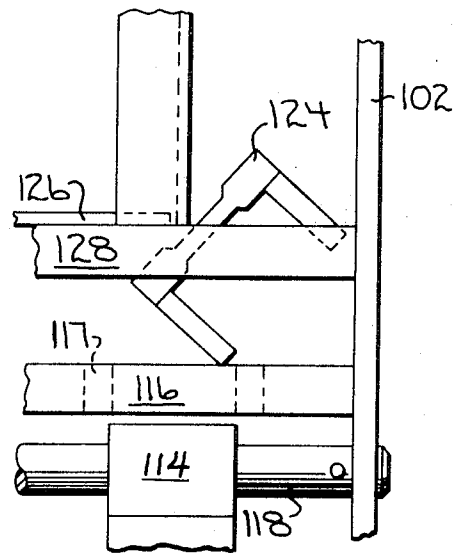


Fig. 7.

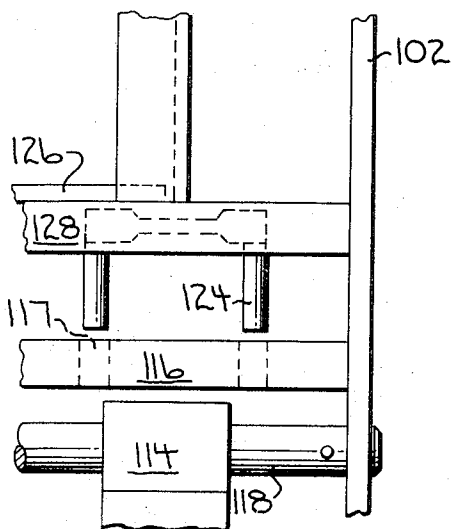
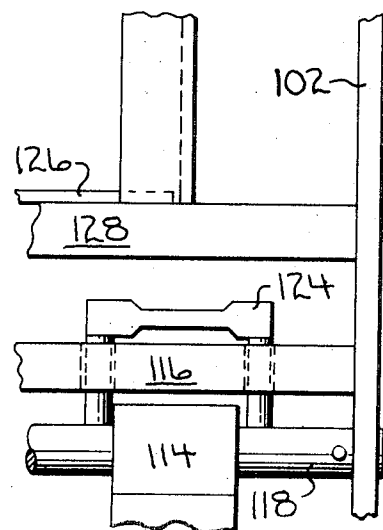


Fig. 8.



LIFT TRUCK FORK RETAINING PINS

CROSS REFERENCE TO RELATED APPLICATIONS

This application is a division of application Ser. No. 225,811, filed Feb. 14, 1972, now U.S. Pat. No. 3,780,896 which issued on Dec. 25, 1973.

BACKGROUND OF THE INVENTION

To increase the versatility of fork lift vehicles, fork carriages have been developed wherein the distance between the forks may be arbitrarily varied so that loads of different widths may be lifted and handled. One current method of spacing the forks on the carriage is to provide a cross shaft on the carriage structure with the upper portion of the forks being slidably mounted thereon for transverse movement with relation to the fore and aft axis of the vehicle. In such a construction the forks are slid from side to side on the carriage cross shaft until the desired spacing thereof is obtained.

Retainer devices are thereupon engaged with the forks and/or the carriage cross shaft to fixedly retain the forks in the desired spacing. Such retainer devices or spacers are generally U-bolt shaped and extend through holes in the carriage structure to straddle the top of the forks and rest against the top of the cross shaft to thus restrict the forks from any lateral movement on the cross shaft.

Such retainer devices are, however, subject to loss since they may be jolted loose from the vehicle carriage or otherwise lost. Losing such retainers is a great inconvenience and may also account for lost work time while new retainers are procured and replaced on the carriage structure.

BRIEF SUMMARY OF THE INVENTION

The present invention provides permanently installed fork retainers which allow for the lateral positioning of the forks to a desired location on the cross shaft and may then be positioned to restrict the lateral movement of the forks when the retainer is in place. However the fork retainers of the present invention cannot be accidentally jolted off the truck or misplaced when the fork positions are being changed, or when the carriage is handling a load. The retainers are a semi-permanent part of the carriage structure, and thus cannot be lost from it thereby eliminating the prior problem of replacing lost retainers.

The fork retainers of the present invention are generally of a configuration similar to prior art retainers however their structure is modified and the fork carriage structure is altered such that the retainers may be moved out of the way to effect repositioning of the forks, but at the same time cannot be removed from the carriage structure itself. Mechanisms are attached to the carriage structure to co-act with the fork retainers in such a way that the retainers may be manipulated as noted above.

Accordingly it is a primary object of this invention to provide lift truck carriage fork retainer means that cannot be lost from the carriage structure.

It is another object of the invention to provide fork retainer devices that allow quick and easy lateral adjustment of the forks but which are at the same time impossible to lose or misplace from the carriage structure.

Additional advantages and features of the present invention will be made apparent from a review of the following specification and the accompanying drawing wherein:

5 FIG. 1 is a perspective view of the preferred embodiment of the lift truck fork carriage structure, the forks and the novel fork retainers of the invention.

FIG. 2 is a front sectional view of the upper left-hand portion of the carriage with the retainer in its fork locking position.

FIG. 3 is a cross sectional view of the upper portion of the carriage with the fork retainer in position as in the case of FIG. 2.

FIG. 4 is a perspective view of an alternate embodiment of the invention.

FIGS. 5, 6, 7 and 8 are views of the alternate embodiment showing the sequence of assembly of the fork retainer into the subject carriage.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now in detail to the drawings, and with a special reference to FIGS. 1, 2 and 3, the lift truck carriage 10 of the present invention is basically similar to the present shaft type carriages with the exceptions as hereinafter noted and described. said carriage 10 comprises a conventional frame structure 15 upon which is mounted load forks 12 and 14 by means of a cross shaft 18 which is secured to the frame transversely and slightly below the carriage top crossbar 16.

A series of vertical holes 17 are bored through top crossbar 16. A number of fork retainer assemblies 24 equal to the number of forks retained on the carriage are mounted into the top portion of carriage frame 15. These fork retainer assemblies 24 are of a generally U-shape whose legs are of a width sufficient to pass through any two holes 17 and straddle the upper portions of forks 12 and 14.

Each fork retainer assembly 24 consists of the substantially U-shaped member 28 with a spring clip 26 secured to the upper cross portion of the assembly by a fastening means 30 in the manner as shown in FIGS. 1, 2 and 3. The U-shaped member 28 has flats 32 formed into the opposite sides of each leg whereby the cross sections of such leg portions are narrower than the adjacent circular cross sections thereof. These reduced cross sections of U-shaped member 28 permit the legs thereof to pass freely through holes 17 in crossbar 16, but however restrict the complete removal of members 28 from vertical withdrawal due to the interference posed by retaining strips 22 which are securely fastened to the top surface of crossbar 16. The slot formed by the opposing side surfaces of strips 22 is sufficiently wide to permit the reduced leg portions of members 28 to pass therethrough, but of insufficient width to permit the full circular cross section of such legs to pass in either direction.

The two retaining strips 22 are secured to the crossbar 16 in such a manner that fork retainer assemblies 24 can be raised vertically to a position where the formed flats 32 bear against the undersides thereof and the full round shape of the U-bolt members 28 restrict further vertical movement. In this position the retainer assembly 24 can be moved in a transverse direction to any point above a selected pair of holes 17 in bar 16.

With the retainer assemblies 24 held in their upper and unlatched positions the forks 12, 14 may be shifted from side to side to any desired position on cross shaft 18. When in the desired position the retainers 24 are pushed down through respective selected holes in cross member 16 to straddle the upper portion of the forks and bear against cross shaft 18 whereby further side-to-side movement of the fork is prevented.

With reference to FIG. 3, it will be noted that with retainer assembly 24 in the fork retaining position the spring clip 26 latches into adjacent restraining strips 22 whereby the retainer is securely held in position to prevent sidewise movement of forks 12, 14 and to further prevent the accidental jostling of the retainers out of the holes 17 in cross member 16.

As shown in FIGS. 1 and 2, pins 20 are provided at either end of crossbar 16. These pins 20 are retained by a press fit in holes passing vertically through the ends of crossbar 16 and cross shaft 18. The top portion of pins 20 project upwardly above crossbar 16 and above the upper surface of retainer strips 22. Thus it will be seen that when retainers 24 are pulled out of holes 17, they may be moved transversely in the slot formed between retainer strip 22 from side to side on carriage 15; however they are prevented from being removed therefrom by the upwardly projecting portions of pins 20.

In the event it is necessary to replace any one or all of the retainers 24, one or both of the pins 20 is removed from the carriage whereby the retainer may be simply slipped off of carriage 15 through the openings at the ends of retainer strips 22.

It will be appreciated that the construction shown in the drawings and described hereinabove provides means for securely preventing side-to-side movement of forks 12, 14, and at the same time guards against the loss or accidental removal of retainers 24 from the carriage structure 10. At the same time the forks 12, 14 may be easily repositioned from side to side on the carriage structure 10 and thereafter be securely held in position by the retainers 24.

A second embodiment of the fork retainer assembly is illustrated in FIG. 4 of the drawing. In this instance the carriage frame 101 is generally similar to the carriage frame of previous mention, with the addition, however, of an upwardly extending portion 102 thereof. Such upward extension consists of a topmost crossbar 110 supported by the usual side members which also in turn support an intermediate crossbar 116 having a plurality of holes 117 drilled vertically therethrough at appropriately spaced intervals. Immediately below crossbar 116 is the fork retaining shaft 118 upon which the upper portions of forks 112 and 114 are slidably secured and mounted.

There is provided, a short distance above crossbar 116, a pair of crossbars 128 which are secured to the upright carriage side members and in spaced relation one to the other.

Fork retainers 124 in a number equal to the forks retained on carriage 101 are provided. Each retainer is of a generally U-shaped construction with the leg portions thereof spaced apart by the exact distance between any two adjacent sets of holes 117. The legs of retainers 124 are further sufficiently spaced apart to straddle the upper mounting portion of forks 112 and 114. Thus when a retainer is dropped through the holes 117, the ends of the legs thereof will bear up against cross-shaft 118 in straddling relation to the mounting portion of

the forks. In such position the retainers will prevent the side-to-side movement of the forks in exactly the same manner as previously described above.

If it is desired to move the forks from side to side, pins 124 are manually withdrawn from contact with cross-shaft 118 upwardly until the upper cross portion passes up into the confining space or recess between crossbars 128. Further upward movement of the retainer 124 is prevented by a keeper plate 126 secured across the upper surfaces of crossbars 128.

When the retainers are withdrawn up into the recess between crossbars 128, the bottom portions of the legs thereof are free of holes 117 and the retainer may be moved from side to side into any desired position on the carriage frame. Having moved the forks, the retainers 124 may then be dropped down through the desired set of holes 117 to securely retain the forks in the desired position.

When the retainers 124 are either manually or accidentally withdrawn from crossbar 116, the cross portion between the legs thereof is closely confined between the crossbars 128 and keeper bar 126, whereby it is impossible for the retainer to be lost or removed from the carriage structure.

Keeper plate 126 is somewhat shorter than the distance between the upright side members of frame 101, and is secured atop crossbars 128 such that a free space is left between said bars at each end thereof. This open portion at each end of crossbars 128 is of a dimension such that retainers 124 may be inserted or removed from the carriage structure by following the sequence of operation shown in FIGS. 5 - 8.

The full sequence of retainer assembly into the carriage 101 begins with FIG. 5, showing said retainer 124 poised on end above the bars 128 and with its legs against the end plate of carriage 101. FIG. 6 shows the retainer passing downwardly between the two bars 128 into the space between the bars 128 and 116. FIG. 7 indicates that the retainer has been rotated 90° from that position shown in FIG. 5, and having been moved into the space immediately above crossbar 116. As noted in FIG. 8, the retainer 124 has been dropped down into the final assembled position in crossbar 116 and in straddling relation to the mounting portion of fork 114. The retainers 124 are removed from the carriage frame 101, if desired, by following a sequence exactly in reverse to that shown in FIGS. 5, 6, 7 and 8.

Thus it will be seen that although the retainers 124 cannot be accidentally removed from the carriage frame 101, they can if desired be removed therefrom by following the sequence of operations as shown. Thus broken or damaged retainers can be replaced on the frame, but yet cannot be accidentally lost therefrom.

There has been described above the preferred embodiments of the present invention, but it will be apparent to anyone skilled in the art that various other forms thereof can be provided without departing from the spirit and scope of the invention. All such variations are contemplated herein, so long as they fall within the scope of the following claims.

What is claimed is:

1. In a lift truck of the type having an extensible mast structure, a carriage mounted for travel along said mast, and load forks mounted on said carriage with means for allowing side-to-side adjustment of said forks, the improvement comprising;

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fork retainer means coacting with said carriage and said forks to restrain said forks in a predetermined position on said carriage,

means for permitting at least partial removal of said retainer means from said carriage for adjusting said forks to new positions,

and positive restraining means coacting with said retainers to prevent loss of said retainers from said carriage, said positive restraining means comprising in combination, an upper portion of the carriage extending upwardly beyond the mounting position of said forks and said retainers, crossbar members defining a transverse recess and forming

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part of said carriage upper portion and positioned at a distance above said retainers such that the retainers may be moved upwardly in relation to said carriage and yet are restrained from being removed from said carriage by having the upper portion of said retainers being closely confined by said recess.

2. The combination of claim 1 wherein said recess terminates at a distance from the side of said carriage whereby said retainers can be removed from said carriage by following a tortuous path through the upper portion of said carriage.

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