

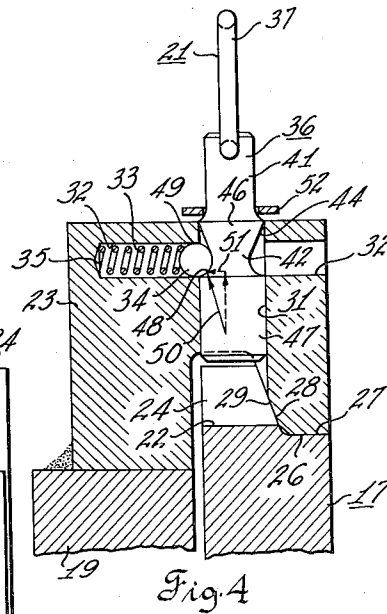
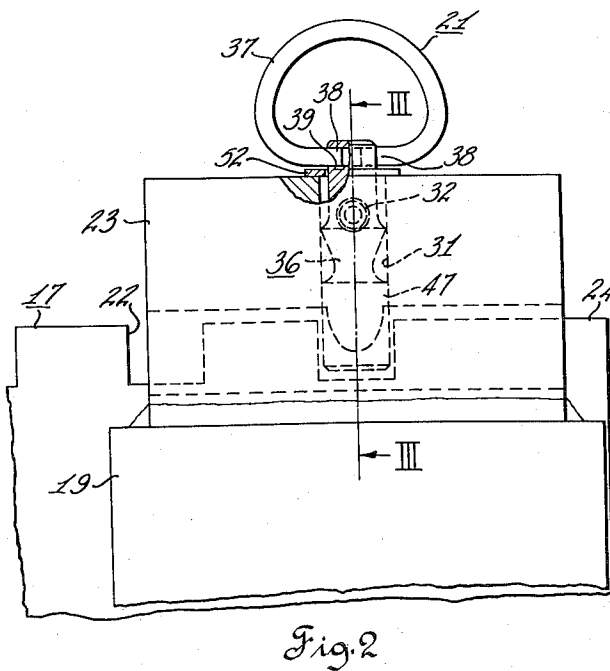
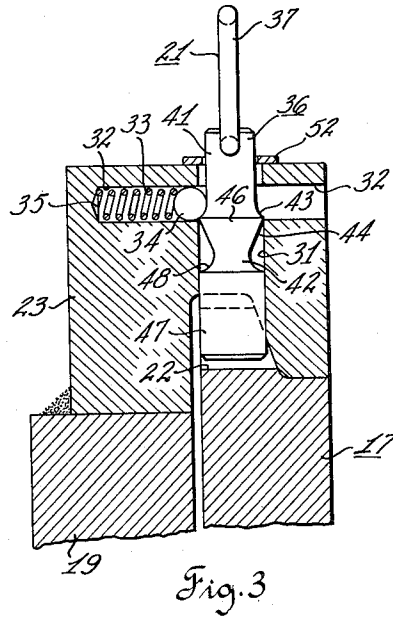
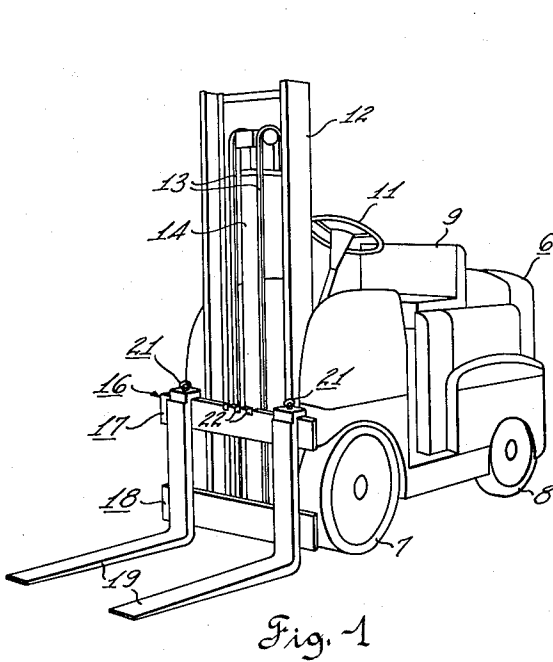
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FORK POSITION LOCKING DEVICE

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FORK POSITION LOCKING DEVICE

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This invention relates to means for releasably locking the forks of an industrial lift truck relative to the carriage whereby the lateral position of the forks relative to the truck axis may be varied as desired.

Various devices have been used heretofore for positioning the forks on the carriage of a lift truck. It has been found, however, that these previously known fork position devices have been deficient in one respect or another. For instance some are relatively expensive to manufacture and others have not performed well in service. It is desirable in providing a fork position locking means that the device lend itself to being manufactured without expensive tooling, be low in cost, and be sufficiently sturdy of construction to stand up well in use. It is desirable that a fork positioning lock device be readily releasable so as to permit the operator of the fork truck to shift the forks manually and without resort to use of tools.

It is an object of this invention to provide an improved locking device for positioning a fork of an industrial truck in one of a variety of positions laterally of the truck's axis.

Another object of this invention is to provide an improved fork positioning device which is inexpensive to manufacture.

It is a further object of this invention to provide a fork positioning device wherein a locking pin is releasably maintained in locking and retracted positions.

It is a further object of this invention to provide a locking pin for a fork of an industrial truck of the character hereinbefore outlined wherein the locking pin is prevented from accidental withdrawal from the fork.

Other objects and advantages of this invention will become apparent upon reading the following description in conjunction with the drawings in which:

FIG. 1 is a perspective view of a lift truck in which this invention is incorporated;

FIG. 2 is a front view of the fork locking device of this invention;

FIG. 3 is a section along lines III-III of FIG. 2 showing the fork position locking pin in a locking position; and

FIG. 4 is a section showing the fork locking pin in a retracted position.

Referring to FIG. 1, there is shown an industrial lift truck 6 in which this invention is incorporated. This industrial lift truck has a pair of front driving wheels 7 and a pair of rear steerable wheels 8. The operator sits at the forward end of the truck in a seat 9 and steers the steerable wheels 8 by means of a steering wheel 11. A vertical mast 12 is mounted at the front end of the truck and carriage 16 is raised and lowered on the mast by chains 13 which are reeved over pulleys mounted on the piston of a lift ram 14. The carriage 16 has an upper fork support 17 and a lower fork support 18 extending transversely across the front of the truck. A pair of forks 19 are hooked over the upper fork support 17 and are each held in position by a fork position locking device 21 extending into one of a series of notches 22 formed in the upper edge of the fork support 17.

Referring to FIGS. 2, 3 and 4, fork 19 has a hook portion 23 welded to the upper end of the main body of the fork. The hook portion 23 extends rearwardly and downwardly to hook over an upper guide rail 24 of the upper fork support 17 in which the notches 22 are formed. The

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hook portion has a horizontal surface 26 which is in sliding engagement with a horizontal surface 27 on the fork support behind the guide rail 24. Cooperating bevel surfaces 28 and 29 on the guide rail 24 and hook portion 23, respectively, guide the fork in its lateral movement.

The fork position locking device 21 will now be described. A vertical hole 31 is drilled in hook portion 23 so as to align with the notches 22 formed in the upper fork support. A horizontal hole 32 is drilled to intersect hole 31 and extends beyond a sufficient distance to form a cavity 35 for receiving a coil spring 33 and detent in the form of a ball 34. A pin 36 is installed in the hole 31. The pin 36 is manually movable by a pull ring 37 which is split to present end portions 38 which extend into a horizontally drilled hole 39 in the upper end of pin 36. This pull ring 37 is removable by springing it outward so that the ends 38 are spaced from one another a distance greater than the diameter of the upper end of the pin.

The pin 36 has a pair of recessed portions 41, 42 formed in axially spaced relation to one another. These axially spaced recessed portions 41, 42 have camming surfaces 43, 44 which converge radially outward to present an area 46 of increased diameter between the recessed portions 41, 42. The lower portion 47 of the pin extends as shown in FIG. 3 into one of the notches 22 thus locking the fork 19 against lateral shifting relative to the support 17. A camming surface 48 forms an abutment on the pin 36 which as shown in FIG. 4 cooperates with the camming surface of ball 34 to prevent upward movement of the pin 36 out of hole 31. The ball 34 will not move to the left since the force exerted by upward pulling of the pin 36 against the ball has too small a horizontal component to overcome the friction between the ball and wall of hole 31 at point 49 and the thrust of spring 33. The force exerted by pin 36 against ball 34 is represented diagrammatically by arrow 50 and its horizontal component by arrow 51.

As shown in FIG. 3 the spring biased detent 34 releasably maintains the pin 36 in a fork locking position. When the fork truck operator inserts his finger in the pull ring 37 and pulls upwardly he moves the pin 36 to a retracted position as shown in FIG. 4. In this position the spring biased detent 34 resiliently maintains the pin in place and as previously mentioned prevents upward withdrawal of the pin from the fork 19. A washer 52 is installed on the pin 36 between the pull ring 37 and the area 46 of increased diameter to prevent debris from falling into the annular opening between hole 31 and the upper portion of the pin 36. The upper portion of the pin 36 is of smaller diameter than the bottom portion so as to minimize wedging of the pin in the hole 31.

In assembling the locking device the spring 33 and ball 34 are inserted in hole 32 and held in cavity portion 35 by a small rod or the like while the pin 36 is inserted from either end of the hole 31. The pin 36 then locks the ball 34 in the cavity 35. If the pin is installed from the bottom of hole 31 the pull ring 37 must first be removed. Once installed the pin is removed by removing the pull ring 37 and then pushing the pin 36 downwardly through the hole 31.

Thus it can be seen that there is provided an inexpensive fork hook locking pin. By cross drilling to form a cavity 35 for the spring and ball, a plug is eliminated that would otherwise be needed if the cavity 35 were formed by drilling only from the exterior of the fork to the vertical hole 31. Also the lower recessed portion 42 cooperates with the detent 34 to form a means for releasably holding the pin in an unlocked position and also serves to prevent upward withdrawal of the pin 36 from hole 31. Thus the pin 36 will not be accidentally lost or misplaced.

It should be understood that it is not intended to limit

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the invention to the embodiment hereinabove described and shown and that the invention includes such other forms and modifications as are embraced by the scope of the appended claims.

What is claimed is:

1. Means for locking a fork in one of a plurality of laterally spaced notches in a lift truck carriage comprising: a vertical opening through said fork, a cavity perpendicular to and communicating with said vertical opening at one side thereof, a horizontal opening in said fork between the exterior of the latter and said vertical opening in alignment with said cavity, a round pin reciprocally disposed within said vertical opening having a lower end registrable with any one of said notches and presenting upper and lower annular recessed portions, camming surfaces in said recessed portions extending toward one another to a portion of relatively greater radius, and a spring biased reciprocable detent disposed within said cavity and registrable, selectively, with said recessed portions in locking and retracted positions respectively, of said pin, said lower recessed portion and said detent being so proportioned in relation to one another that said pin is prevented by their engagement from being withdrawn upwardly from said vertical opening, said detent being insertable into said cavity through said horizontal opening and said pin being manually movable axially between said locking and retracted positions without rotation of said pin.

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2. Means for locking a fork in one of a plurality of laterally spaced notches in a lift truck carriage comprising: a vertical opening through said fork, a cavity perpendicular to and communicating with said vertical opening at one side thereof, a round pin reciprocally disposed within said vertical opening having a lower end registrable with any one of said notches and presenting upper and lower annular recessed portions, camming surfaces in said recessed portions extending toward one another to a portion of relatively greater radius, and a spring biased reciprocable detent disposed within said cavity and registrable, selectively, with said recessed portions in locking and retracted positions, respectively, of said pin, said lower recessed portion and said detent being so proportioned in relation to one another that said pin is prevented by their engagement from being withdrawn upwardly from said vertical opening, said pin being manually movable axially between said locking and retracted positions without rotation of said pin.

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