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2,847,138

LATCH ADJUSTMENT FOR FORK TINES OF INDUSTRIAL LIFT TRUCKS

Filed April 11, 1956

4 Sheets-Sheet 1

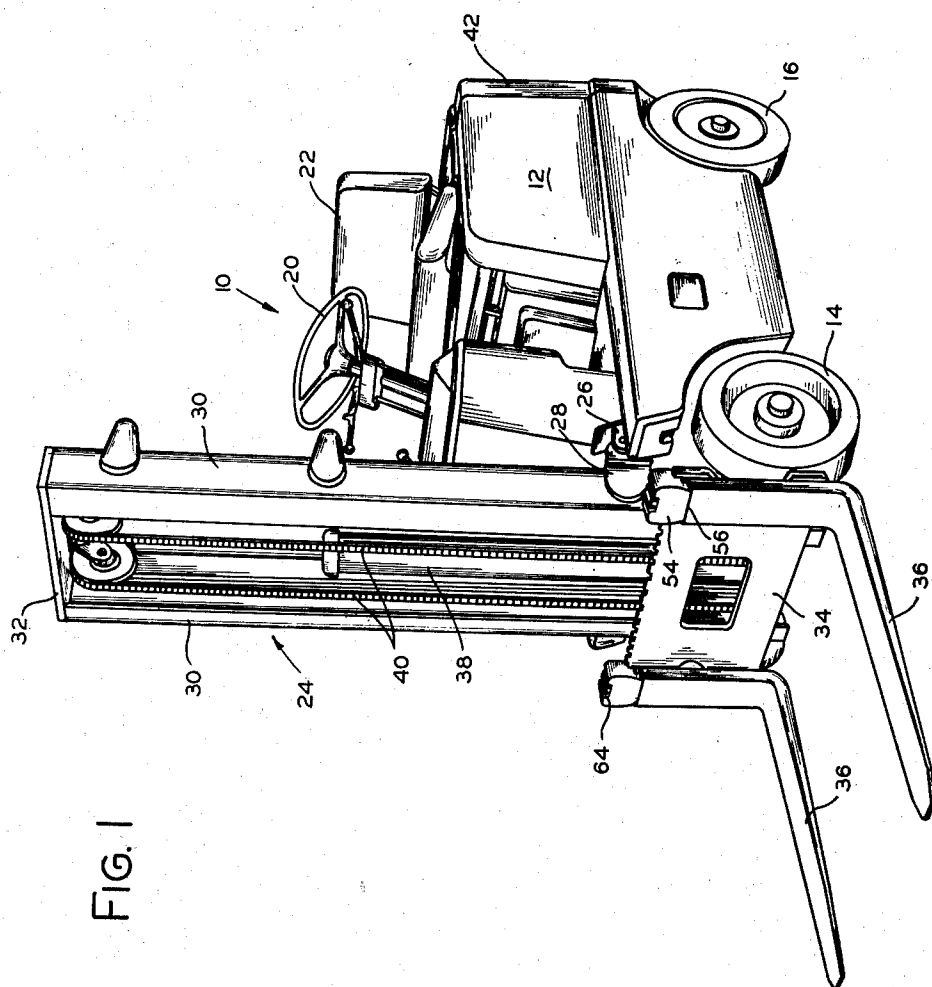


FIG. 1

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FIG. 3

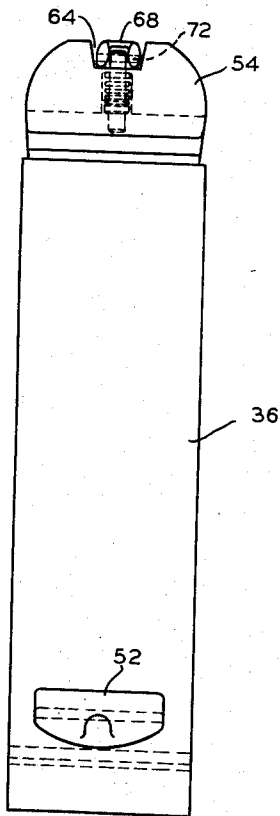


FIG. 2

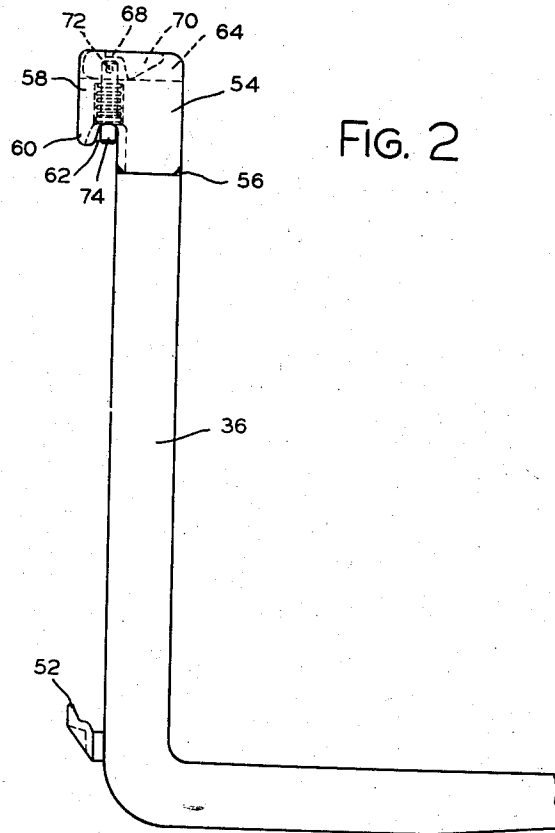
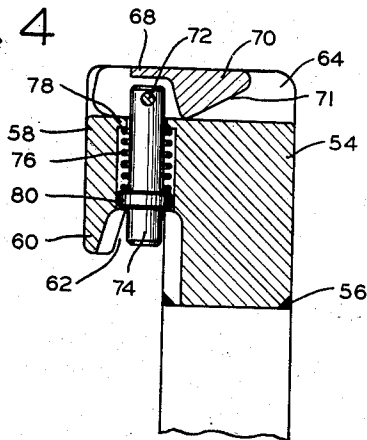


FIG. 4



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FIG. 6

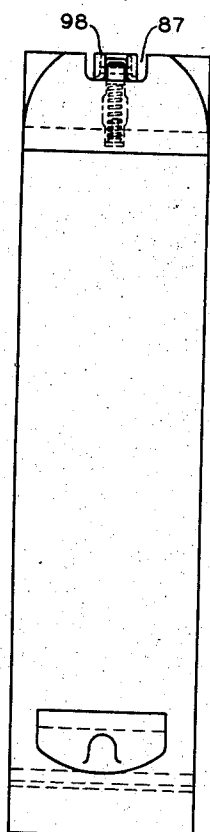


FIG. 5

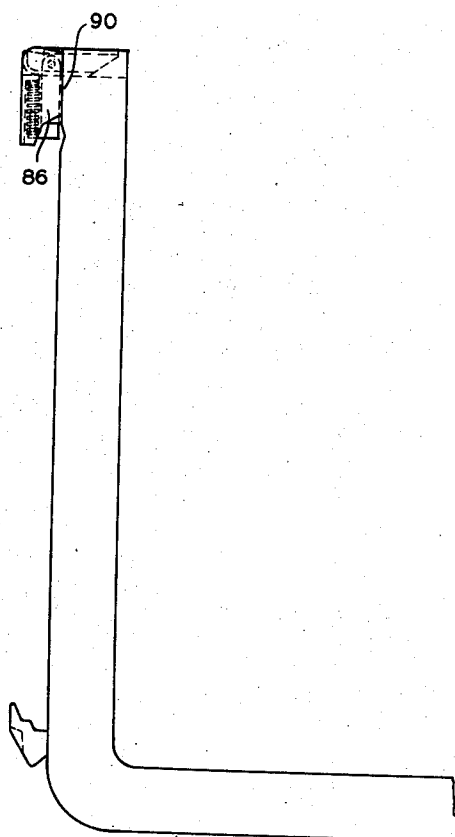
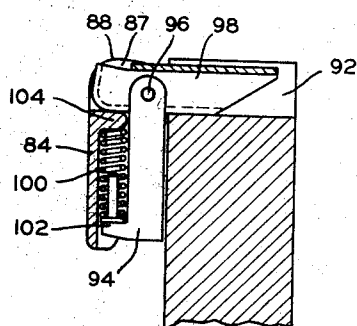


FIG. 7



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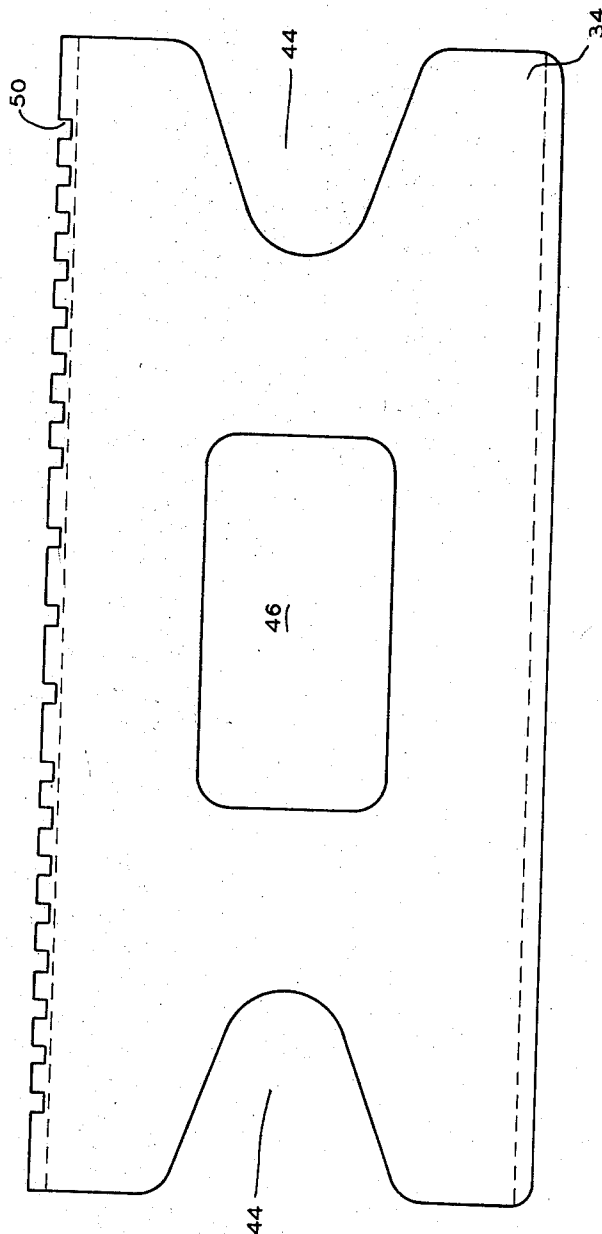
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FIG. 8



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LATCH ADJUSTMENT FOR FORK TINES OF INDUSTRIAL LIFT TRUCKS

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5 Claims. (Cl. 214-730)

This invention relates to latch means and more particularly to latch adjustment means for fork tines of an industrial lift truck whereby the lateral position of the forks relative to the truck axis may be varied as desired.

Various devices have been heretofore conceived and used for selectively varying the lateral positions of load engaging fork tines which are normally mounted forwardly of an upright mast of an industrial lift truck. However, it has been found that previously known latch adjustment devices for this purpose have been deficient in one regard or another; i. e., they have been either too costly and/or of unwarranted complexity for the purpose intended, or of such design that they were often broken or damaged in use.

We have conceived a latch mechanism design which overcomes all of the above-mentioned deficiencies; i. e., it is simple and rugged in structure, is manufacturable at low cost, and reduces to a minimum the possibility that damage thereto or breakage thereof will occur in use.

In carrying out our invention, two embodiments of which are disclosed herein, we provide essentially a spring loaded stop member registrable with any one of a plurality of laterally spaced grooves which are located along one edge of a fork carriage member, said stop member being connected to a lever member which is recessed in a groove formed in the upper end of each fork tine, and said lever member being rotatable out of such recessed relation to actuate the stop element out of registry with a laterally spaced groove, whereby to allow sliding adjustment of the fork tine in a lateral direction along the fork plate to a selected position in which the lever member may be moved back to a recessed position in the fork tine groove and the stop member caused to register with another one of said laterally spaced grooves.

It is therefore an object of this invention to provide improved latch means for the purpose specified.

Another object of this invention is to provide adjustment means for fork tines of industrial trucks which are so constructed as to practically eliminate the possibility of damage or loss in use and which are low in cost and essentially simple in structure.

These objects and advantages of our invention will be more apparent when reference is had to the accompanying drawings wherein:

Figure 1 is a perspective view of an industrial lift truck employing our invention in a preferred form;

Figure 2 is a side view of one of the fork tines shown in Figure 1;

Figure 3 is a rear view of the fork tine shown in Figure 2;

Figure 4 is an enlarged view of the upper portion of Figure 2 showing our latch mechanism in detail;

Figure 5 is a side view of a fork tine having a modified version of our latch mechanism associated therewith;

Figure 6 is a rear view of the fork tine illustrated in Figure 5;

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Figure 7 is an enlarged view of the upper portion of Figure 5 showing our modified latch means more clearly; and

Figure 8 is a front view of a fork carriage or plate to which the fork tines are adapted to be adjustably connected.

Referring now to Figure 1, the numeral 10 indicates generally an industrial lift truck. This vehicle includes a body portion 12 which is mounted on four wheels in the usual manner. In the industrial truck illustrated, the front wheels 14 are drive wheels and are operated by prime mover means such as an internal combustion engine located within body portion 12. The rear wheels 16 (only one of which is visible) are dirigible wheels and are connected to an operator's steering wheel 20 by means of a conventional linkage for steering the vehicle. The operator's station of which the steering wheel 20 is a part includes also a seat 22.

At the front end of the body portion of the truck is located a vertically disposed telescopic mast structure indicated generally by the numeral 24. This mast is pivotally mounted at its lower end on the body portion of the truck and is arranged to be tilted forwardly and rearwardly by conventional means, including a link and bracket 26 and 28, connected between truck mounted hydraulic cylinder means (not shown) and the mast-structure 24 at each side thereof. The mast structure 24 includes an outer guideway formed by a pair of channel members 30 and an inner slide member 32 which telescopes within the outer guide structure 30, 30.

A load supporting carriage 34 is arranged to move upwardly and downwardly on the inner slide member 32. The load supporting carriage as illustrated herein is provided with a pair of forwardly projecting fork tines 36 which are adapted to engage beneath the load to be transported and raised. Such raising action is produced in a conventional manner by an hydraulic motor 38 comprising an outer cylinder and an inner piston which is arranged to raise and lower the load supporting carriage 34 and the fork tines 36 through a chain and sprocket mechanism. The chains which form a portion of this mechanism are indicated on the drawing by the numeral 40.

The truck 10 also includes at the rear end thereof a counterweight 42 which ordinarily is made of metal and is secured to the rear end of the truck to counterbalance loads which are carried on the fork tines at the front of the truck.

The fork carriage 34 is mostly clearly shown in Figure 8 wherein openings 44 and 46 are shown formed therein to provide apertures through which the truck operator can view a load on forks 36 and to reduce the weight of the carriage. Bracket and roller means, not shown, connect the carriage to the track of the inner slide member 32 in a well known manner. A plurality of notches 50 are spaced at predetermined intervals along the upper edge of the carriage and are each adapted to cooperate with the latch means of our invention, hereinafter described, for providing a plurality of adjusted lateral positions of each fork tine.

Referring now to Figures 2-4, wherein a preferred embodiment of our invention is shown, each fork tine 36 is provided with a hook or bracket member 52 attached to the lower rear portion of the vertical section of the fork tine for connection with the bottom edge of the carriage 34, and a forged member 54, formed as shown in Figures 1 through 4, welded to each fork tine 36 at 56. A rearwardly projecting portion 58 of member 54 terminates in a downwardly depending portion 60 to form a transverse groove 62 which receives the upper notched edge of the carriage 34. A groove 64 extending

longitudinally of the fork tine axis is also formed in the upper surface of member 54. A lever 66 is located within the groove 64 and includes an upper surface portion 68 which is substantially flush or in the same plane with the upper surface of member 54 and which is formed to provide a forwardly extending portion 70 having a surface 71 and to receive a transversely extending pivot pin 72 in an inverted U-shaped rear portion thereof. From said pin 72 depends a stop member or dowel pin 74 which extends through an opening formed in member 54 which houses a spring member 76 in abutment with an annular lip 78 at the upper end thereof and with a flange 80 on the pin 74 at the lower end for urging the pin 74 to the downward position shown in Figure 4. The surfaces of the member 54 are formed with a curvature, as best shown in Figure 3, so as to minimize the possibility of injury to the operator or damage to his clothing, for example, as a result of previously used square corner construction.

When the fork tines are positioned on the carriage 34 as shown in Figure 1, lever 70 and pin 74 are in the positions indicated in Figures 2 through 4, pin 74 being in registry with a selected notch 50 on the carriage. If it is desired to change the lateral position of either fork tine it is only necessary for the operator to insert a finger, for example, into the groove 64 and to lift upwardly under surface 71 whereby the lever 70 pivots on pin 72 and lifts dowel pin 74 upwardly against spring 76 as the lever is rotated to a vertical position. In this position the dowel pin 74 is positioned upwardly out of groove 62, and therefore out of registry with a notch 50, thereby permitting the fork tine to be adjusted to any desired lateral position in which the lever 70 may again be actuated to its illustrated position and pin 74 caused to register with another notch 50. It will also be noted that lever 70 may be actuated to its illustrated horizontal position when pin 74 abuts a raised portion between any two of notches 50, thereby permitting the pin to automatically drop into the next notch when the fork tine is moved laterally.

Now referring to Figures 5-7, a somewhat modified form of the latching arrangement described above is illustrated. In this modified form of our invention a member 84 having forwardly extending side portions 86 and upwardly extending side portions 88 is welded to the back face of the fork tine along the forwardly facing edges 90 of side plates 86 so as to provide a groove 87 between upper side plates 88. Member 84 is welded to the fork tine such that said groove substantially aligns with a similar groove 92 in the upper surface of the fork tine. A stop or dowel pin member 94 depends from a pivot pin 96 which is mounted on a lever 98 located in the grooves 87 and 92. A spring 100 is mounted in the opening between the side members 86 and abuts a lip 102 of pin 94 and a lip 104 on member 84 so as to urge pin 94 downwardly as shown. The modified arrangement of Figures 5 through 7 functions in the same manner as the construction shown in Figures 2 through 4.

We prefer the first above described structure to the latter for the primary reason that utilization of a single forged member 54 welded to the fork tine at 56 is less costly to manufacture than the latter described structure. In the latter described structure of Figures 5 through 7 a machining operation on the bottom surface of the grooves 87 and 92 is necessary after member 84 is attached to the fork tine in order to provide proper alignment of the grooves in which lever 98 is mounted. Such an operation is obviously unnecessary in the structure of Figures 2 through 4.

Although we have shown but two embodiments of our invention, other variations in the design, construction and assembly of parts may be made without departing from the scope of our invention.

We claim:

1. Latch means for the fork tines of industrial lift trucks comprising bracket means connected to and forming part of the fork tine for attaching same to a fork carriage, a longitudinally extending groove formed in the upper surface of the bracket means, a lever member substantially fully confined within said groove, pin means pivoted on said lever and depending downwardly therefrom, and means urging said pin means downwardly.

2. A fork tine means for use with industrial lift trucks comprising an L-shaped member, bracket means rigidly connected to said member at the upper portion thereof and extending rearwardly and downwardly therefrom to form a hook portion, a fork carriage adapted to be engaged along the upper edge thereof by said hook portion, a plurality of notches laterally spaced along said top edge, pin means associated with said bracket means for engaging a selected one of said notches, and lever means connected to said pin means for alternately engaging and disengaging the pin means from any one of said notches, said lever means being mounted on the upper portion of said bracket means and pivotally connected to said pin means for alternately engaging and disengaging said pin means from any one of said notches, and said lever means being substantially bounded on three sides by said bracket means.

3. Fork tine means for industrial lift trucks adapted to be adjustably mounted on truck mounted carriage means comprising an upper hooked bracket portion registerable with the carriage means, a plurality of notches along one side of the carriage means, pin means normally extending downwardly through the open portion of the hooked bracket portion for registry with any selected one of said notches, a U-shaped groove extending longitudinally through the upper portion of said fork tine means, and lever means located in said groove, pivotally connected to said pin and rotatably actuatable to urge said pin upwardly out of any one of said notches.

4. As an article of manufacture, a fork tine for use with industrial trucks comprising an L-shaped member terminating in a generally horizontally disposed upper surface, and a fork bracket member having a bottom surface contiguous to said upper surface and rigidly attached thereto, said bracket member being constructed to provide a rearwardly extending hook portion adapted for connection with a carriage of an industrial lift truck and a longitudinally extending groove formed in the bracket member for the reception of latch means.

5. A fork tine for use with industrial lift trucks comprising an L-shaped member and bracket means secured to said member at the upper portion thereof and extending rearwardly and downwardly therefrom, a groove formed in the upper horizontal portion of the fork tine, a lever means located in said groove, and pin means pivoted on said lever means and extending downwardly therefrom through said bracket means.

References Cited in the file of this patent

UNITED STATES PATENTS

2,270,664	Weaver	Jan. 20, 1942
2,421,472	Way	June 3, 1947
2,471,429	Hawkins	May 31, 1949
2,596,747	Ward et al.	May 13, 1952
2,668,602	Cushman	Feb. 9, 1954
2,676,722	Ulinski	Apr. 27, 1954