Jan. 22, 1963 W. E. KNAPP ET AL 3,074,691

LIFT TRUCK

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FIG. 1

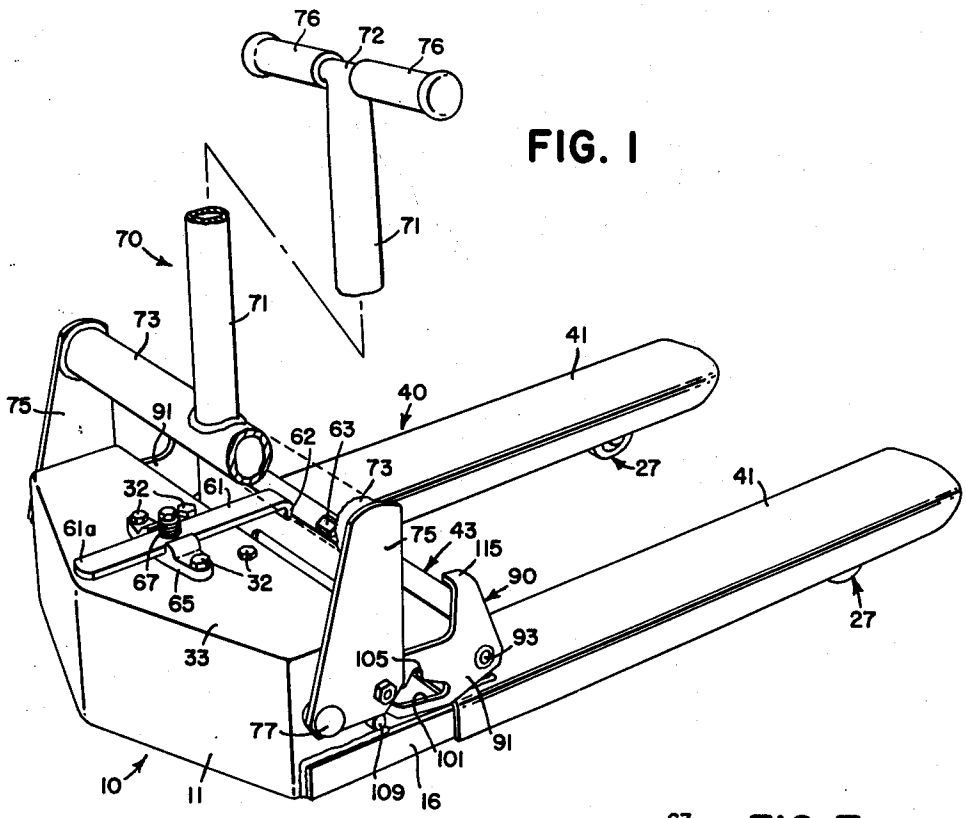
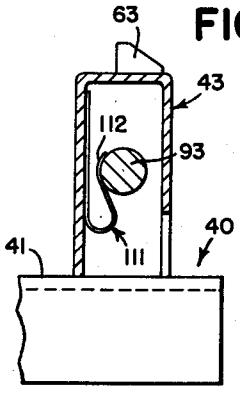


FIG. 7



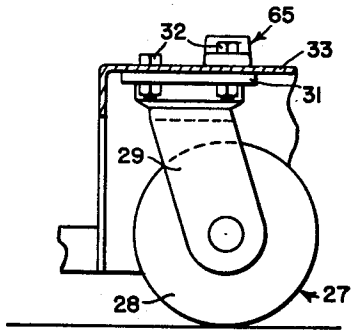


FIG. 8

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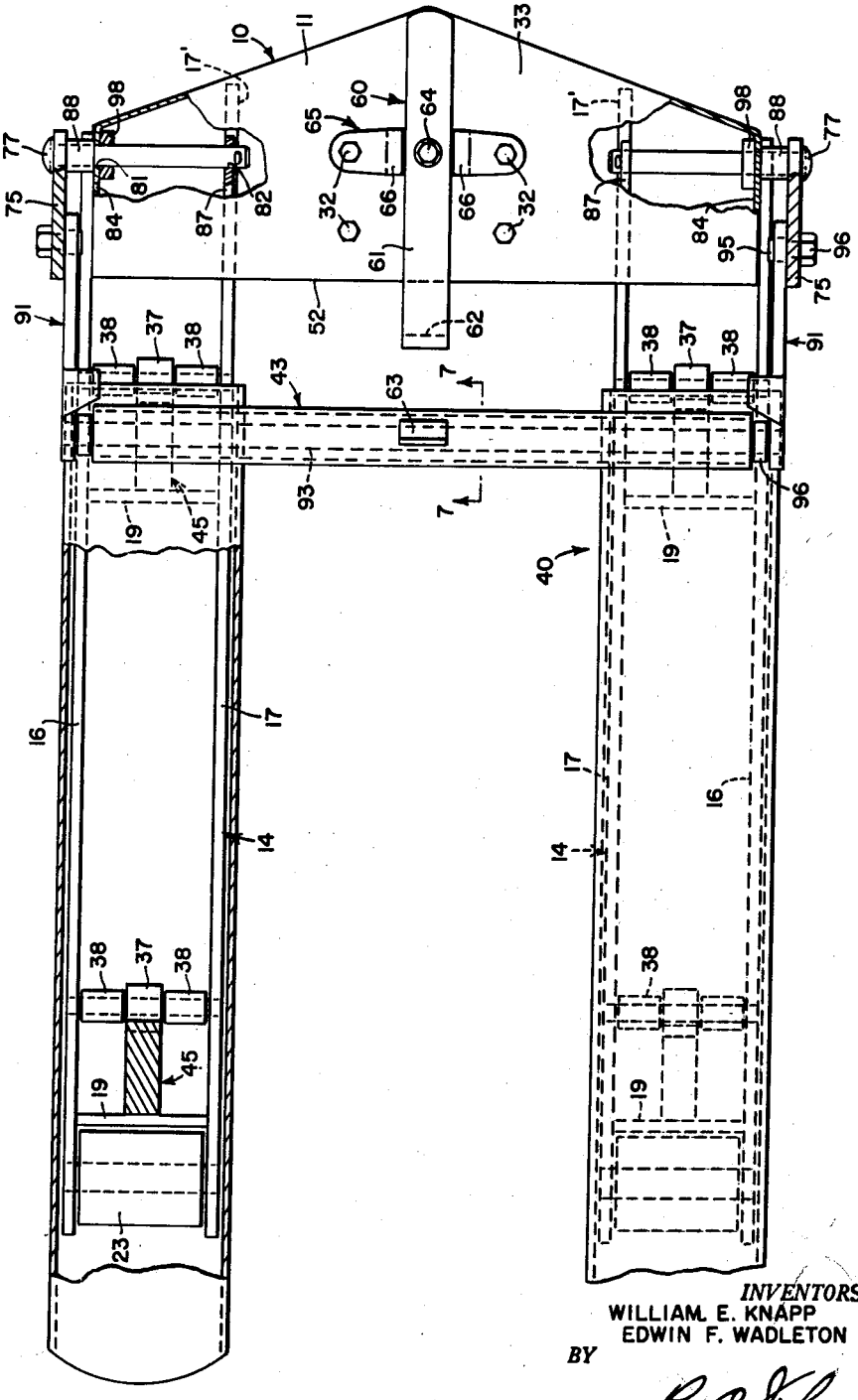


FIG. 2

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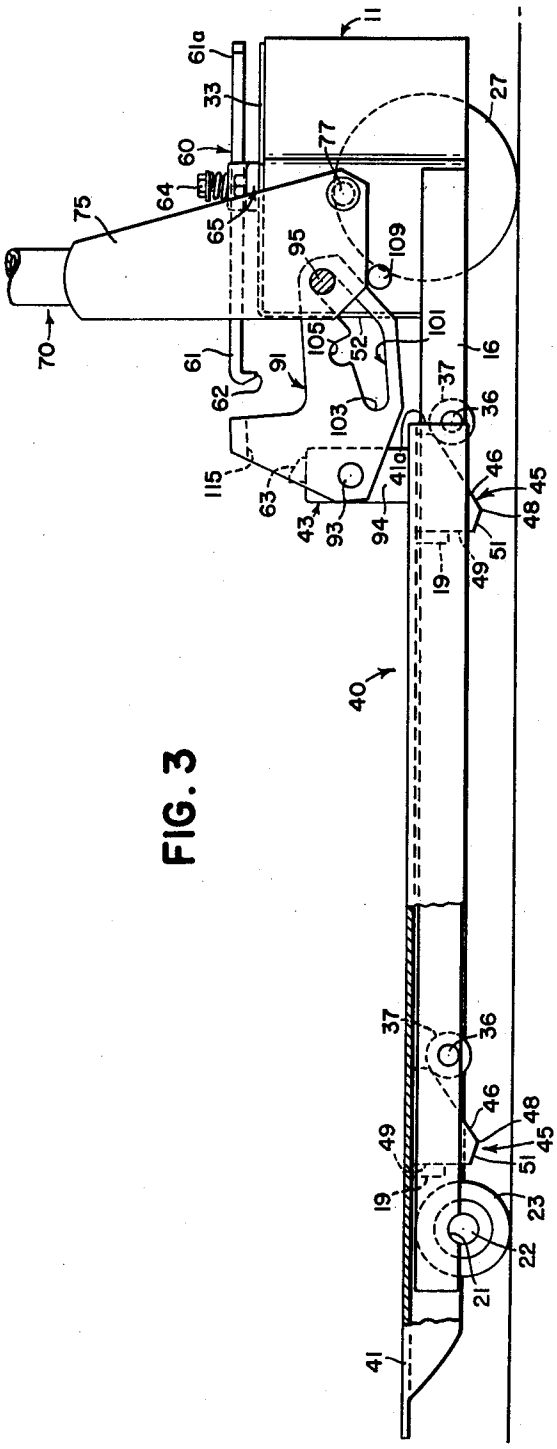


FIG. 3

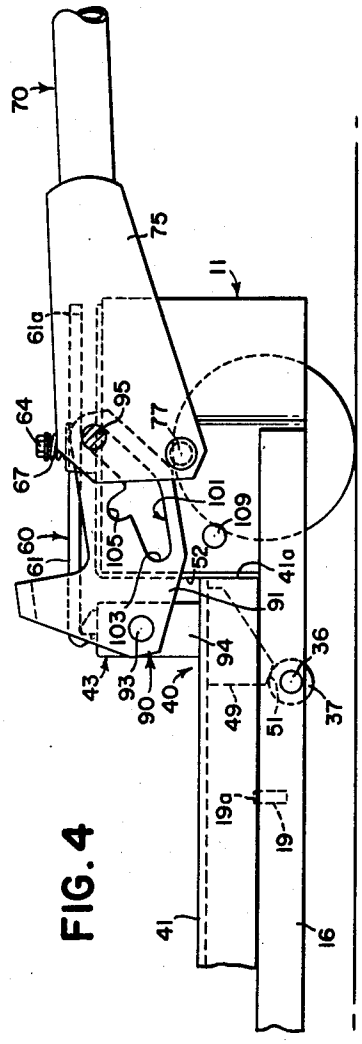


FIG. 4

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FIG. 5

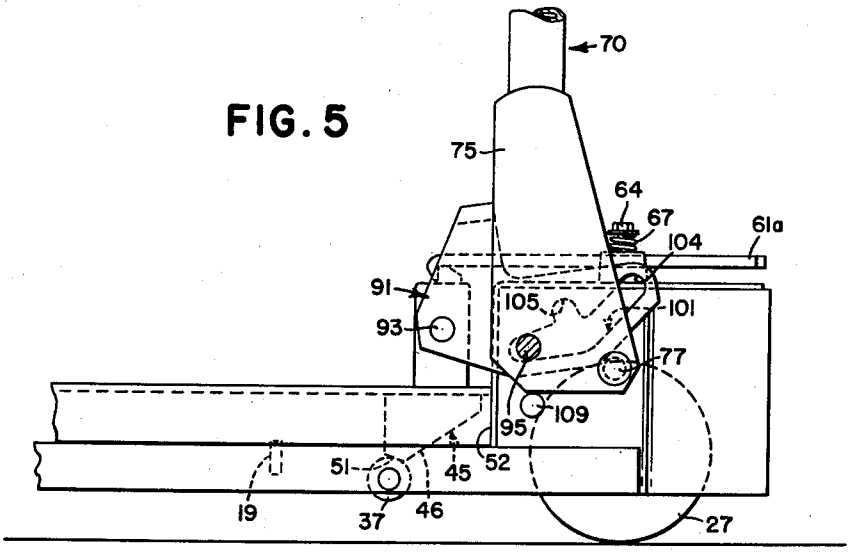
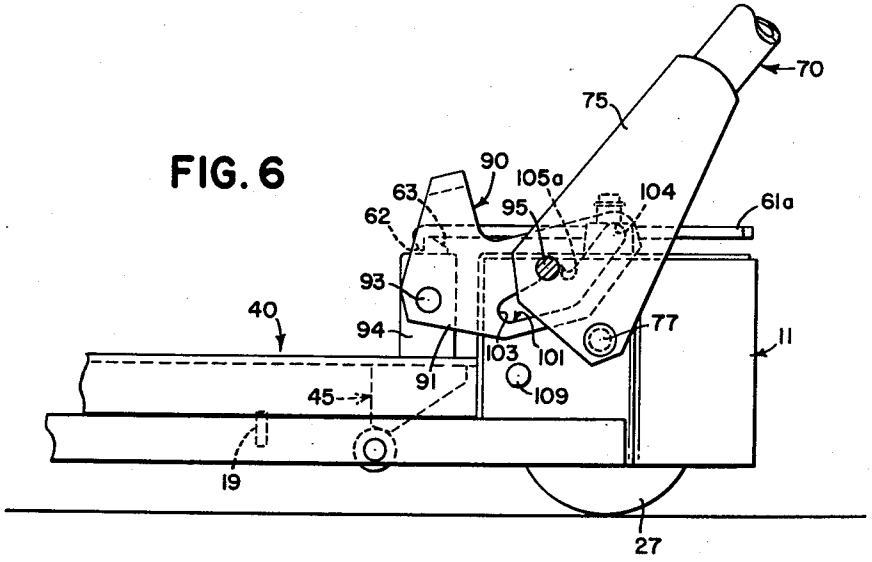


FIG. 6



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3,074,691
LIFT TRUCK

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Filed July 8, 1960, Ser. No. 41,578
9 Claims. (Cl. 254—5)

This invention relates generally to hand lift trucks and more particularly to lift trucks of this type in which the platform is raised, lowered and controlled by means of a handle which is also usable as means for pulling or pushing the truck from one place to another.

The object and general nature of this invention is the provision of means whereby the handle may be raised into a vertical position for pushing the truck about, which may be desirable when working in close quarters, and means whereby the handle may also be used, as by pushing generally rearwardly thereon, to start the lowering of the load from its upper or transport position, in which the load is, in effect, latched in its transport position.

Another feature of this invention is the provision of new and improved means for holding the lifting platform in its upper or raised position.

These and other objects and advantages of this invention will be apparent to those skilled in the art after a consideration of the following detailed description, taken in conjunction with the accompanying drawings, in which:

FIG. 1 is a perspective view of the lift truck in which the principles of the present invention have been incorporated.

FIG. 2 is a plan view of the lift truck shown in FIG. 1.

FIG. 3 is a side view of the lift truck shown in FIG. 1, the lifting platform of the truck being shown in its lowered position in both FIGS. 1 and 3.

FIG. 4 is a fragmentary side view similar to FIG. 3, but showing, first, the lifting platform locked in its raised position and, second, the position the handle takes when the latter is actuated to elevate the platform into its transport position.

FIG. 5 is a fragmentary side view illustrating the position of the handle when it is raised so as to provide for pushing the truck from one place to another by pushing on the raised handle, the platform being held in its raised or transport position.

FIG. 6 is a view somewhat similar to FIG. 5 but showing the handle in a position engaging certain portions of the lift plate that is pivoted to the platform, so that after releasing the hold-up latch the handle may be pushed rearwardly to start the platform toward its lowered position.

FIG. 7 is a detail sectional view on an enlarged scale, taken generally along the line 7—7 of FIG. 2, showing the friction spring associated with the lift plate shaft.

FIG. 8 is a detail sectional view, partially in section, showing the front castering wheel support.

Referring first to FIGS. 1 and 2, the lift truck of this invention comprises a main frame 10 that is made up of a box type head 11 in the form of a front wheel support cover. The head 11 has fixed to the ends thereof a pair of generally rearwardly extending legs 14, each constituting a roller frame that is made up of laterally inner and outer bars 16 and 17. The front ends of the bars 16 and 17 are connected, as by welding, to the end portions of the head 11, the laterally outer bars 16 being secured, as by welding, to the outermost end portions of the head 11 while the laterally inner bars 17 extend forwardly into the head 11 and are welded thereto, as indicated at 17', FIG. 2. The bars 16 and 17 of each pair are rigidly interconnected by spacer bars 19, the upper edges of which

extend a short distance above the upper edges of the bars 16 and 17, as indicated at 19a in FIG. 4.

The rear ends of the two pairs of bars 16 and 17 are apertured or notched, as at 21, FIG. 3, to receive a roller shaft 22 that is rigidly fixed, as by welding, to the bars 16 and 17. A supporting roller 23 is journaled by suitable bearing means on the shaft 22, the rollers 23 supporting the rear ends of the main frame legs 14. The front portion of the main frame is carried on a caster wheel 27 that is generally of conventional construction. The caster wheel 27 is journaled for rotation in a fork 29 (FIG. 8) that is swiveled in a head 31 secured by bolts 32 to the upper plate 33 of the head 11.

A pair of roller shafts 36 are welded in apertures formed in the main frame bars 16 and 17 and support rollers 37 journaled on the central portions of the shafts 36 between spacer bushings 38 (FIG. 2). The main frame 10 supports an elevating platform that is indicated in its entirety by the reference numeral 40 and comprises a pair of channel legs 41 overlying the associated main frame legs 14. The platform 40 also includes a cross channel 43 that is rigidly secured, as by welding, to the forward end portions of the channels 41, the cross channel 43 thus tying the two channels 41 rigidly together. Front and rear portions of each of the channel legs 41 carry front and rear roller ramp blocks 45. The blocks are so located, as will be clear from FIG. 3, that the longer angled sections 46 of the blocks 45 rest on the rollers 37 when the platform is in a lowered position. In the aforesaid position, the rear edges 49 (FIG. 3) of the ramp blocks 45 bear against the rear spacer bars 19 of the main frame. The parts are so constructed and arranged that the inner horizontal face of each of the platform channels 41 is spaced above the upper edge of the associated main frame bars 16 and 17. As will be seen from FIGS. 3 and 4, whenever the platform 40 is pulled forwardly from its lowered position (FIG. 3), the ramps 45 move upwardly on the rollers 37 toward its raised position until the points 48 on the ramps 45 move past the tops of the associated rollers 37 after which the rearwardly and upwardly angled portions 51 rest on the rollers 37, as shown in FIG. 4. This determines the raised or elevated position of the platform 40 in which the forward ends 41a of the platform channels 41 come to rest against the rear wall 52 of the head 11.

As will best be seen from FIGS. 2, 3 and 4, latch means, indicated generally at 60, is provided for releasably retaining the platform in its elevated position (FIG. 4) and will now be described. The latch means 60 includes a latch bar 61 rockably mounted on the upper wall 33 of the head 11 and having a rear hook end 62 adapted to engage an abutment 63 fixed to the upper central portion of the cross channel 43. As will be seen from FIG. 4, when the latch bar 61 engages the abutment block 63, the platform is held in its raised position, but the platform may be lowered by releasing the latch 60 and giving the platform a rearwardly directed push, sufficient to raise the ramp points 48 to pass rearwardly beyond the tops of the platform-supporting rollers 37.

The latch bar is rockably mounted on the head 11 by means of a latch-mounting block 65, best shown in FIG. 2, in which the bar 61 is shown as disposed between a pair of upwardly extending guide bosses 66. The latch bar 61 is held in place between the guides 66 by means of a cap screw 64 threaded into an opening in the guide block 65. A spring 67 is disposed between the top of the guide block 61 and the head of the cap screw 64 for yieldably holding the bar 61 in a generally horizontal position but accommodating rocking of the latch bar 61, as by stepping on the forward end portion 61a thereof.

The means for effecting the raising and lowering of the platform 40 comprising a handle member 70, best

shown in FIG. 1. The handle 70 is made up of a handle bar 71 carrying a cross rod 72 at its upper end and securely fixed, at its lower end, to a lower cross bar, preferably in the form of a pipe 73, to the outer ends of which are fixed, as by welding, a pair of handle end plates 75. Hand grips 76 are fixed to the outer ends of the cross rod 72. The handle 70 is pivoted for generally fore and aft swinging about a transverse axis relative to the head 11 by virtue of a pair of headed pins 77, each of which extends through an opening in the rear lower portion of the associated handle plate 75 and through an opening 81 formed in the associated end portion 84 of the head 11 and through an opening 82 in the support plate 87 (FIG. 2) located between the forward end of the associated main frame bar 17 and the rear wall 52 of the head 11. A tubular spacer 88 is disposed between the outer face of each end wall of the head 11 and the associated handle plate 75. The pivot-receiving openings 81 in the end portion of the head 11 are reenforced by apertured plates 98 welded to the end walls of the head 11, as best shown in FIG. 2.

The handle 70 is operatively connected with the platform 40 for raising and lowering the latter by novel means that will now be described. Referring first to FIGS. 1, 3 and 4, lifting means 90 is swingably connected with the channel 43 of the platform 40 and includes a pair of lift plates 91 fixedly connected, as by welding, to a cross shaft 93 that extends through apertures in end members 94 that are welded in position between the end portions of the cross channel 43. The end members 94 are apertured to receive the cross shaft 93, and spacers 96 (FIG. 2) are disposed between the end members 94 of the channel 43 and the lift plates 91. Each of the handle side members 75 carries a hexagonal socket head cap screw 95 that is threaded into a tapped opening in the associated handle side plate 75 and is locked in place by a nut 96. The head of each of the cap screws 95 serves as a stud entering into a slot 101 formed in the main portion of the associated lift plate 91. Each slot 101 is of particular construction. As best shown in FIGS. 3–6, the slot 101 includes a main portion having slot ends 103 and 104 and a slot portion 105 that extends generally at a right angle to the main portion of the slot 101. A stud 109 is carried at each end of the head 11 and serves as a stop, as best shown in FIGS. 1 and 3, determining the vertical position as follows:

FIGS. 1 and 3 show the lift truck and its load platform 40 in the lowermost position and the handle 70 vertical, with the lower rear portions of the handle side plates 75 resting against the stop studs 109, whereby the handle 70 may be employed to push the platform into position underneath the pallet of a load to be raised. As will be seen from FIG. 3, in this position the lift studs 95 are disposed in the forward ends of the slot 101 whereby after the pallet has been maneuvered underneath the load, the latter may be raised by swinging downwardly on the handle 70, swinging the latter to the position shown in FIG. 4, which motion acts through the lift plates 91 to shift the platform 40 forwardly and upwardly, the ramp blocks 45 moving forwardly and upwardly on the rollers 37 until the rear angle faces 51 of the ramps 45 ride up and over the rollers 37 with the forward ends of the platform channels 41 engaging the rear wall 52 of the head 11, at which time the rear end 62 of the latch bar 61 snaps over the abutment 63 and thus locks the platform 40 in its raised position. The load is thus raised off the floor and held by the latch 61. The handle 70 may now be used to pull the load to the location desired. It will be seen from FIGS. 5 and 6 that, while the platform 40 is held in its upper position by the latch bar 61 engaging behind the abutment 63, as best shown in FIGS. 5 and 6, the handle 70 may be raised freely, without affecting the position of the load, optionally into either of two positions, one of which is indicated in FIG. 6 in which the handle is raised past a 45° position into a position where the studs 95 may enter the notches 105 in the lift plates 91. With the handle 70 in this position (FIG. 6), all that is necessary to do to lower the load is to step on the end 61*a* of the release latch bar 61, which raises the hook end 62 out of engagement with the abutment block 63, after which the handle 70 may be raised a slight additional amount, sufficient to push the platform 40 rearwardly so as to carry the ramp blocks past the tops of the associated rollers 37, after which the load lowers by gravity. The forward edge of the slot 105, as indicated at 105*a*, is disposed at such an angle that when the load lowers the arms 91 are cammed upwardly past the studs 95.

Under many conditions, it may be desirable, while the load is held in its raised position as shown in FIGS. 4 and 5, to swing the handle 70 into its vertical position, so as to push the truck to various locations, for example, and in order to do this without having the notches 105 fall into the engagement with the studs 95 as the handle is moved from the position shown in FIG. 4 to the position shown in FIG. 5, we provide a friction spring 111 (FIG. 7) that is disposed within the channel 43 and is provided with a curved end 112 frictionally engaging the shaft 93. The action of the spring 111 is to stub or retard the downward swinging of the lift links 91 under the action of gravity as the studs 95 move past the slots 105. If the handle 70 is raised with a fair amount of rapidity, the studs 95 will pass the notches 105 and move into a position, shown in FIG. 5, at the rear ends of the slot 101, whereby although the load is raised and is retained in its raised position by the latch 61, the handle 70 is disposed in a vertical position and hence may be employed to push the truck around to different positions while the load is raised. Whenever it is desired to lower the load, all that is necessary to do is to swing the handle 70 downwardly and forwardly with a relatively slow movement so that when the handle reaches the position shown in FIG. 6, the lift plates 91 will drop downwardly to carry the slots or notches 105 into engagement with the studs 95. The latch 61 is then disengaged from the abutment and the handle 70 may then be raised to start the load toward its lowered position. Similarly, the load may be pulled around while raised on the truck with the handle somewhere in between the position shown in FIG. 6 and the position shown in FIG. 4, and then when it is desired to drop the load, all that it is necessary to do is to raise the handle 70 fairly slowly so that the notches 105 will engage the studs 95 as the handle is raised, after which the latch 61 may be disengaged by stepping on the end 61*a*. Raising the handle 70 further will then serve to push the load over into its lowered position.

Each of the lift plates 91 is provided with an extension 115 that extends generally upwardly and inwardly so that by stepping on one or the other of the extensions 115, the side plates 91 may be held against dropping downwardly while the handle 70 is raised from a lower position into a vertical position. Thus, regardless of whether the handle 70 is raised rapidly or slowly, stepping on one of the extensions 115 will prevent the lift plates 91 from engaging their notches 105 with the studs 95 on the handle.

While we have shown and described above the preferred structure in which the principles of the present invention have been incorporated, it is to be understood that our invention is not to be limited to the particular details, shown and described above, but that, in fact, widely different means may be employed in the practice of the broader aspects of our invention.

What we claim, therefore, and desire to secure by Letters Patent is:

1. A hand lift pallet truck comprising a mobile frame, an elevatable platform carried thereby, means interconnecting said frame and platform whereby when the latter is moved in one direction relative to the frame the platform is raised, an oscillatable handle pivoted to the mobile frame and connected with said platform to shift the latter

in said one direction, a latch guide fixed to the forward central part of said frame and having laterally spaced apart guide shoulders, a member mounted between said guide shoulders and extending upwardly therefrom, a latch bar disposed between said shoulders and held thereby against lateral displacement, said latch bar being adapted to pivot about said member, spring means mounted about said member and acting against the top of said bar to normally hold the latter in a generally horizontal rearwardly extending position, means on the platform to interlock with the rear portion of said latch bar when the platform is raised, and the forward portion of said latch bar extending beyond said latch guide and acting when depressed to release the rear portion of the latch bar from said platform.

2. A hand lift pallet truck comprising a mobile frame, an elevatable platform carried thereby, means interconnecting said frame and platform whereby when the latter is moved in one direction relative to the frame the platform is raised, and releasably retained in that position, an oscillatable handle pivoted to the mobile frame, a lift plate pivoted to the forward portion of said platform and extending forwardly and upwardly toward said handle, the latter carrying a stud and said lift plate having an elongated opening forming slot adapted to receive said stud, said elongated opening being provided with first and second portions into either of which said stud may be disposed, one portion being disposed closer to the pivot of said lift plate than the other portion, said one portion adapted to receive said stud and so located that when said stud is disposed in said portion an upward movement imparted to said handle serves to shift said platform into a released position to permit the platform to lower.

3. The invention set forth in claim 2, further characterized by said one portion having a stud-engaging wall angled so that said lift plate is cammed out of engagement with said stud to accommodate complete lowering of said platform.

4. A hand lift pallet truck comprising a mobile frame, an elevatable platform carried thereby, means interconnecting said frame and platform whereby when the latter is moved in one direction relative to the frame the platform is raised, and releasably retained in that position, an oscillatable handle pivoted to the mobile frame and swingable between a generally vertical position to a generally horizontal position, connecting means between said handle and said platform whereby movement of said handle from its generally vertical position to its generally horizontal position moves said platform in said one direction into its raised position, and said connecting means including a stud on the handle and a member having an elongated opening forming a slot receiving said stud and pivoted to the platform, said elongated opening being provided with a portion to receive said stud and so located that when said stud is disposed in said portion, a rearward push on said handle will initiate the lowering action of said platform.

5. The invention set forth in claim 4, further characterized by stop means on the frame defining the upper limit of movement of the handle, and said portion being angled so that after the handle has been brought up against said stop means continued downward movement of the platform disengages the portion from said handle stud.

6. The invention set forth in claim 5, further characterized by an extension on said slotted member serving as a foot pedal to provide for holding said slotted member in a position disengaging the said portion from said handle stud.

7. The invention set forth in claim 4, further characterized by stop means on the frame defining the upper limit of movement of the handle, said stop means being located so that the pallet truck may be moved by a push on said handle while the platform is retained in its raised position.

8. The invention set forth in claim 1, further characterized by said interconnecting means comprising a plurality of rollers carried by said mobile frame, and a plurality of members having inclined surfaces, said members being carried by said platform and adapted to contact the rollers.

9. A hand lift pallet truck comprising a mobile frame having a forward end and a rearward end, an elevatable platform carried thereby, means interconnecting said frame and platform whereby when the latter is moved forwardly relative to the frame the platform is raised, an oscillatable handle pivoted to the mobile frame and connected with said platform to shift the latter forwardly, said interconnecting means comprising a plurality of rollers carried by said mobile frame, and a plurality of ramp blocks carried by said platform, each of said ramp blocks having a generally V-shaped lower surface comprising a forwardly downwardly inclined surface and a rearwardly downwardly inclined surface, said ramp blocks contacting the rollers, and stop means fixedly secured to the mobile frame and engageable by said platform, the parts being so arranged and constructed that when the platform is in its raised position, the forwardly downwardly inclined surface of the ramp blocks are in contact with the rollers, and the weight of the elevatable platform tends to roll said platform forwardly into abutting position against said stop means.

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