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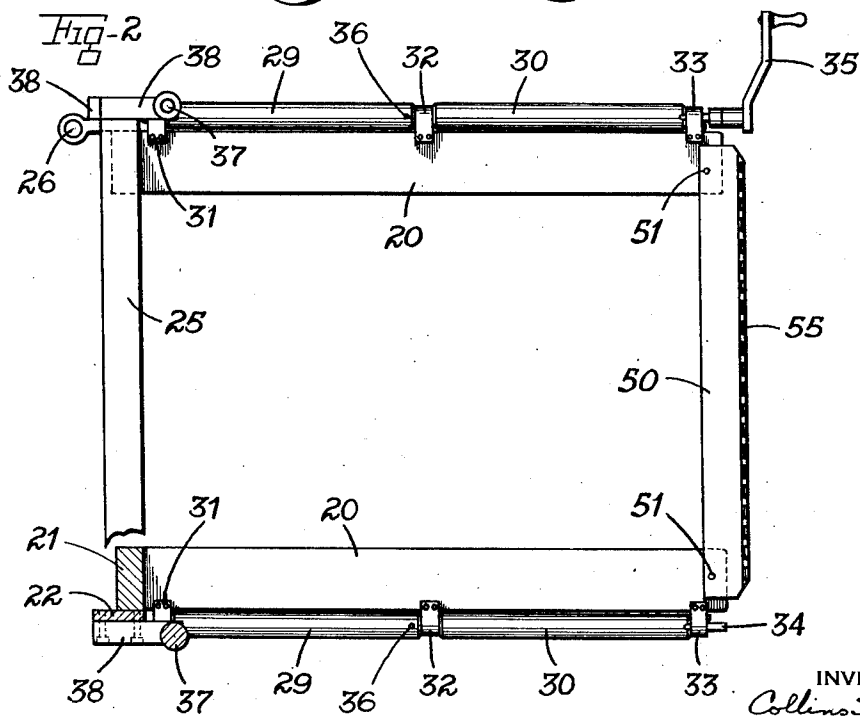
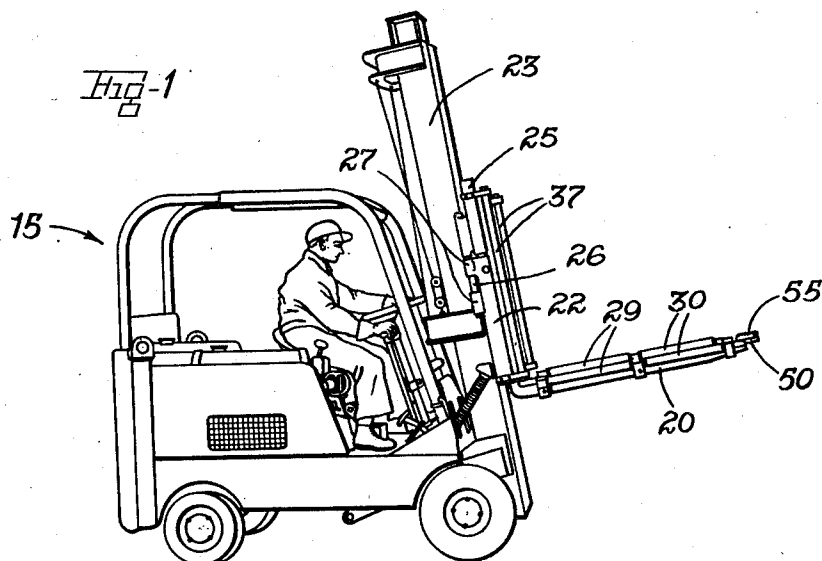
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2,665,019

APPARATUS AND METHOD FOR UNLOADING LUMBER AND THE LIKE

Filed Aug. 17, 1949

5 Sheets-Sheet 1



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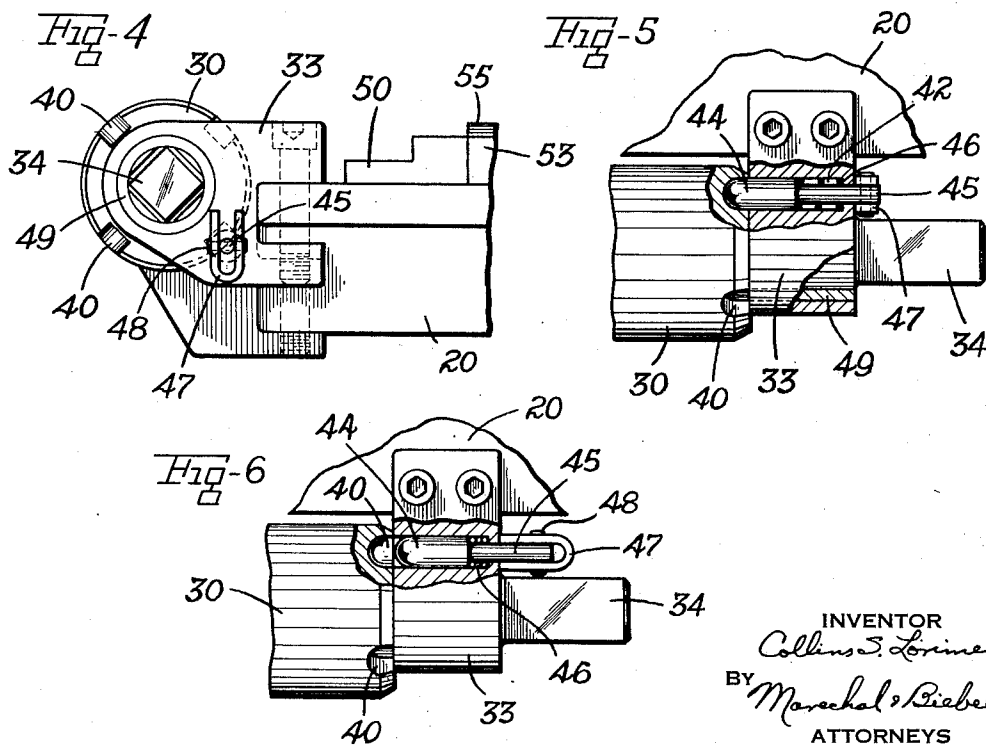
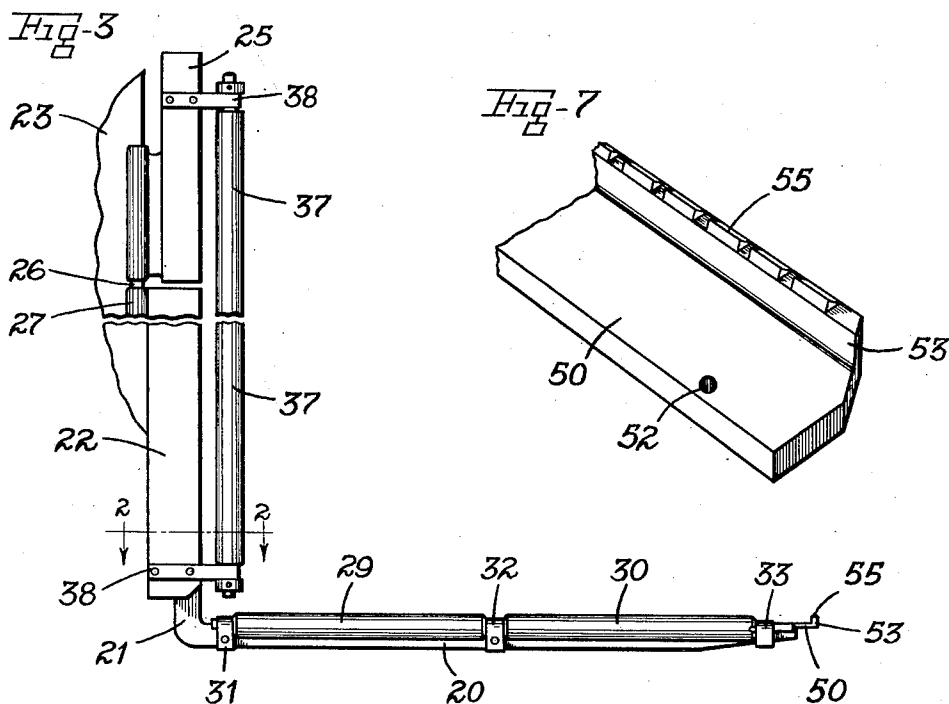
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APPARATUS AND METHOD FOR UNLOADING LUMBER AND THE LIKE

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5 Sheets-Sheet 2



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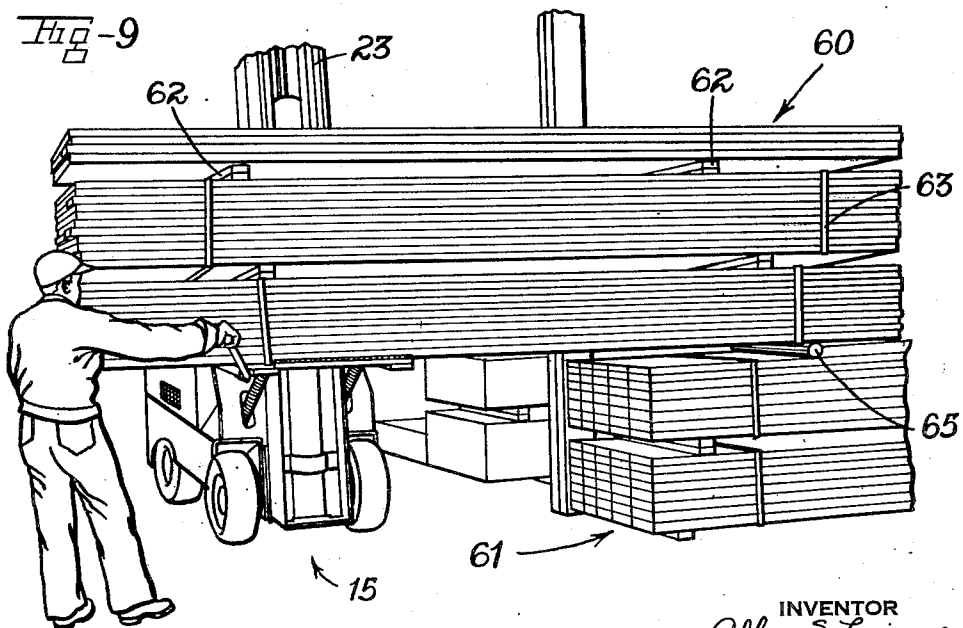
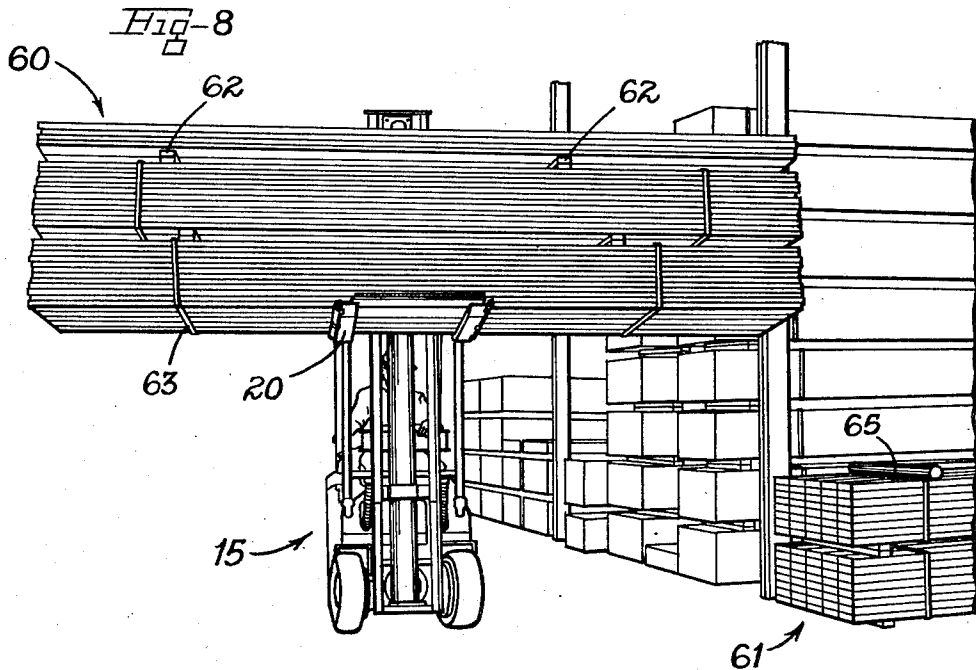
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APPARATUS AND METHOD FOR UNLOADING LUMBER AND THE LIKE

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5 Sheets-Sheet 3



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APPARATUS AND METHOD FOR UNLOADING LUMBER AND THE LIKE

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Fig-10

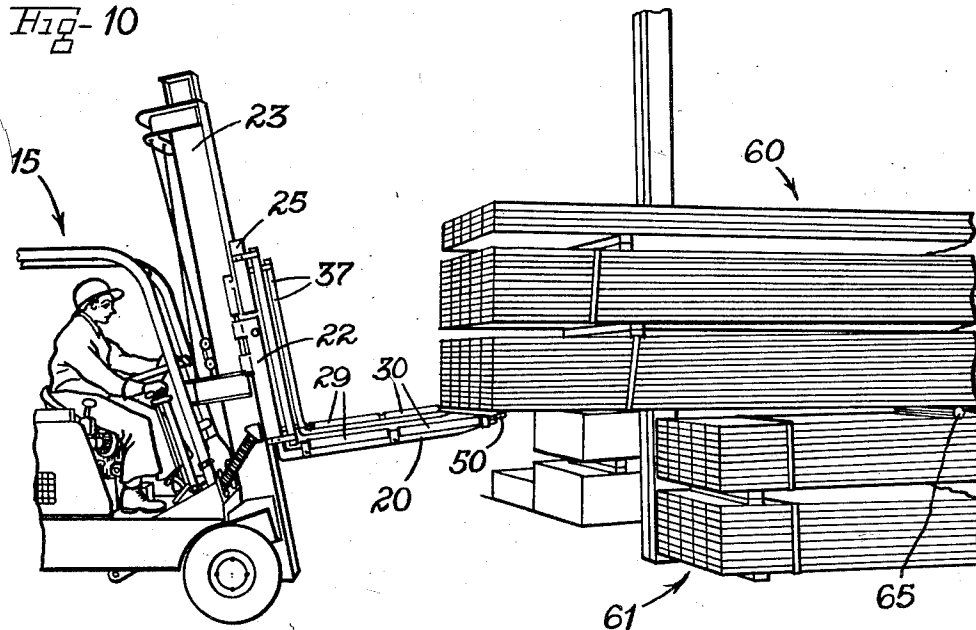
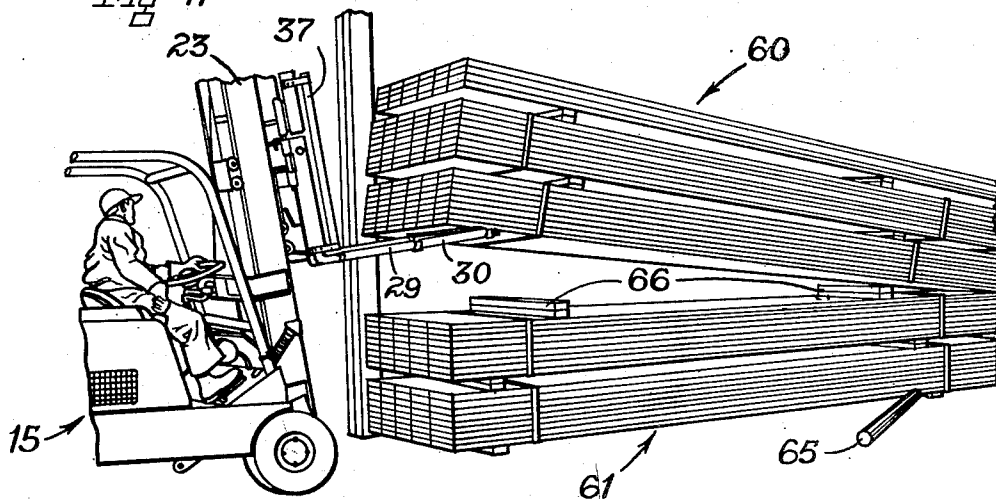


Fig-11



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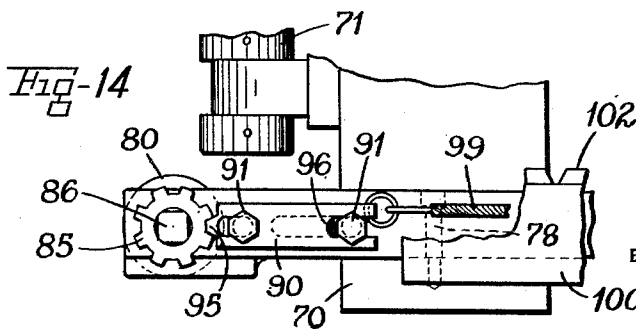
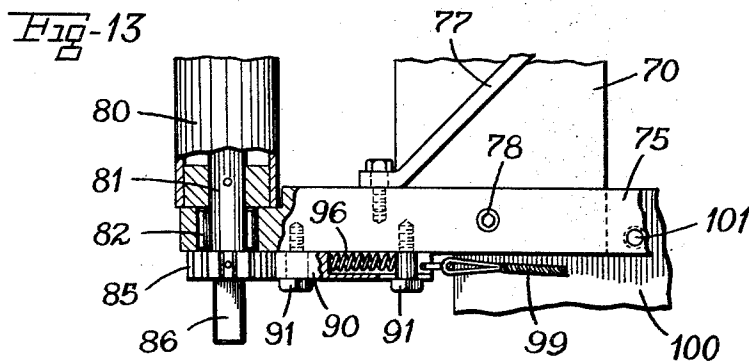
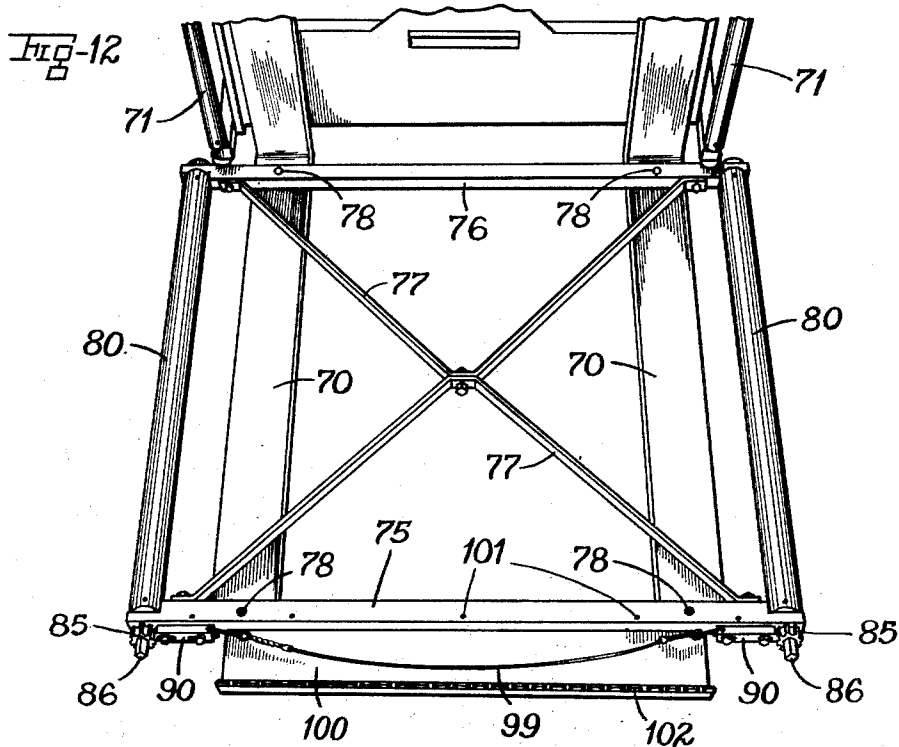
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APPARATUS AND METHOD FOR UNLOADING
LUMBER AND THE LIKE

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7 Claims. (Cl. 214—512)

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This invention relates to apparatus and a method for use with lift fork trucks to load or unload an elongated load such as a stack or bundle of lumber by endwise movement thereof.

The invention has particular application to conditions such as are involved in handling lumber in yards or sheds wherein it is desired to stack the lumber with one end thereof outermost, for example in bins or decks or simply in piles. When lumber is stored in this fashion, it is readily piled or unpiled by hand, but this is a laborious and time consuming operation. On the other hand, since lumber is ordinarily stored in comparatively long pieces, when it is handled by a lift fork truck, the fork has to be positioned near the center of the load for proper balance, and the truck can accordingly move such a load only generally transversely of its length. As a result, if it is desired to unload a pile standing between two or more other piles with only an end exposed, there is no convenient way to gain access to the center of the desired pile with a conventional lift fork truck.

The lumber may be handled in individual pieces but it is found convenient and economical to gather the pieces into bundles of convenient size and then to band the bundles with steel tape. This not only simplifies the further handling of the lumber, but it provides for keeping the lumber in better condition and with less tendency for warpage, breakage and the like. Such bundles are relatively heavy and bulky, and it is important to provide for the proper handling, stacking and removal thereof.

The present invention provides a simple attachment for the forks of a lift fork truck which will enable the truck to load or unload a stack of lumber or other elongated load by endwise movement of the load without manual handling thereof by the operator and without impairing the utility of the truck for handling loads of other sizes and shapes. In accordance with the invention, rollers are provided on the forks in position to receive and support the load for normal lifting and carrying by the truck. These rollers are fitted with square ends or other suitable connections for a crank or other drive element to provide for rotation of the rollers and resulting endwise movement of the load transversely of the forks for loading or unloading, suitable locks being provided to prevent rotation of the rollers except when desired by the operator. In addition, the forks are equipped with a friction bar or other suitable projection located forwardly of the rollers in position for frictional

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engagement with the underside of the load when the latter is supported on the ground or pile, such as a bundle of lumber in a stack, and when the fork is elevated with this projection in position to engage and raise the end of the load, the latter can then be readily pushed or pulled by moving the truck as desired to complete the unloading operation or to initiate loading.

One of the principal objects of the present invention is to provide apparatus and a method of this character for use in conjunction with a lift fork truck to handle a stack of lumber or similarly elongated load safely and conveniently, and another object to provide such apparatus in the form of a simple mechanism for attachment to the forks of a conventional lift fork truck which does not impair the utility of the truck for other lifting and carrying operations and which can be readily removed if desired.

Other objects and advantages of the invention will be apparent from the following description, the accompanying drawings and the appended claims.

In the drawings:

Fig. 1 is a perspective view of a lift fork truck equipped with a lumber handling attachment in accordance with the invention;

Fig. 2 is a view partly in plan and partly in section on the line 2—2 of Fig. 3 showing the forks of the truck of Fig. 1;

Fig. 3 is a side elevation of the forks and supporting frame therefor;

Fig. 4 is a fragmentary front end view on a larger scale of one of the forks and the parts mounted thereon;

Fig. 5 is a top view of the same fragment shown in Fig. 4 with portions broken away and in section to illustrate details of internal construction and showing the locking member for the roller in locked position;

Fig. 6 is a view similar to Fig. 5 showing the locking member in unlocked position;

Fig. 7 is a fragmentary perspective view of the notched bar extending across the forward ends of the forks;

Fig. 8 is a perspective view of the truck of Fig. 1 showing the truck in the operation of carrying a bundle of lumber into position for unloading on a stack;

Figs. 9, 10 and 11 are perspective views illustrating progressive stages in the unloading operation.

Fig. 12 is a perspective view of lift forks provided with a somewhat different construction of the attachment;

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Fig. 13 is a view partly in plan and partly broken away in horizontal section showing the right-hand front corner of the attachment; and

Fig. 14 is a front elevation of the same corner of the attachment.

Referring to the drawings, which illustrate a preferred embodiment of the invention, Fig. 1 shows a lift fork truck of conventional design indicated generally by the reference character 15. The forwardly extending lift forks 20 include upwardly projecting portions 21 supported on a frame 22 adapted to be raised and lowered on the standard or column 23, the latter being pivotally supported on the truck at its lower end for forward and backward rocking movement as desired, the frame 22 being provided with an upper portion 25 mounted thereon by means of pins 26 welded to the portion 25 and set in sleeves 27 welded to the main frame 22. The construction and operation of these parts of the truck are conventional and accordingly require no further description.

A pair of rollers 29 and 30 is mounted on each of the lift forks 20 by means of brackets 31, 32 and 33, which are bolted to the forks and are so arranged as to locate the upper surfaces of rollers 31 above the upper surfaces of the forks and thus in position for directly receiving and supporting a load, the brackets 31 and 32 being identical and the brackets 33 at the front ends of the forks being of somewhat different construction as described hereinafter. The forward roller 30 of each pair is provided with a square or otherwise noncircular projecting end portion 34 to form a driving connection for a crank 35 or other driving element. The two rollers 29 and 30 of each pair are also provided with a driving interconnection, the shaft at the rearward end of the forward roller 30 being inserted in the forward end of the rearward roller 29 of the pair and being pinned thereto as indicated at 36 in Fig. 2 so that they turn together. Two additional rollers 37 are secured by brackets 38 to the frame 22 and to frame extension 25, the rollers 36 extending upwardly at substantially right angles to rollers 30 to act as guides for a load being loaded on to the forks or unloaded therefrom.

Each pair of rollers 29—30 is provided with a releasable locking or latching mechanism illustrated in detail in Figs. 4 to 6. The forward end of the forward roller 30 is formed with a plurality of angularly spaced notches 40. Each bracket 33 is formed with a bore 42 for receiving a reciprocable locking pin having an enlarged end portion 44 adapted to be received in notches 40 and a smaller portion 45 which extends through the bracket to its forward side. A spring 46 in bore 42 normally urges the pin 44—45 into locking position as shown in Fig. 5, and a U-shaped member 47 is pivoted by pin 48 to the outer end of pin portion 45.

It will thus be seen that when the member 44 is in the position shown in Fig. 5, the spring 46 will be free to urge the locking pin into locking position, thus positively retaining the adjacent roller 30 against rotation to prevent the possibility of undesired shifting of a load supported thereon. When the member 47 is pulled out to the position shown in Fig. 6, the locking pin will be retracted against spring 46 to release the rollers 30 for free rotation, bushings 49 being provided in brackets 31—33 to assure free rotation.

A plate or bar 50 is secured by bolts 51 in holes

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52 to the ends of forks 20 and is formed with an upturned portion 53 having a sharpened and notched upper edge 55. This sharpened portion of the bar 50 is thus adapted for frictional engagement independently of rollers 29—30 with the underside of a load, satisfactory results having been obtained with the parts so proportioned that the sharpened edge 55 is in substantially the same plane above the upper surface of forks 20 as the uppermost portion of rollers 29—30. When the lift truck is used for other purposes the friction bar may be simply lifted away from the forks and the truck used in the ordinary way.

Figs. 8 to 11 show the operation of a lift fork truck in accordance with the invention for loading or placing one or more bundles of lumber by endwise movement on to a pile. Fig. 8 shows the truck 15 with the load 60 balanced at its center and supported on the forks in elevated position above the pile 61 on which the load is to be placed. As shown, the load comprises several bundles of boards supported in vertically spaced relation with each other by means of spacers 62, the lower two bundles each being shown as formed of stacked boards tied together by means of metal straps 63 and the top bundle comprising loosely stacked boards. As pointed out, while this load is being picked up and transported on the truck, the rollers 29—30 are locked to hold the load against undesired shifting.

To initiate the unloading operation, the load is lined up endwise with the pile on which it is to be placed, and a separate roller 65 is placed on the outer end of the pile as shown in Fig. 8. The forks are lowered until the load is just above the level of roller 65, and the rollers 30 are then unlocked and one of them is cranked as illustrated in Fig. 9 to cause the load to move transversely of the forks and endwise of the pile until its leading end overhangs the roller 65. The weight of the load on the rollers 29—30 is sufficient to produce this movement, and the forks are then further lowered until the leading end of the load is resting on the roller 65.

After the load has thus been moved into supported position on the roller 65, the cranking operation is carried on until the load has cleared the rollers 29—30 nearest the pile, or at least until the major proportion of the load has been transferred to the pile, the rollers 37 serving to guide the load during this movement and prevent undesirable friction against the upright parts of the forks or the frame 22. The truck is then moved away and brought into endwise relation with the load as shown in Fig. 10, with the bar 50 under the outer end of the load, the standard 23 preferably being tilted back during this step to elevate bar 50 above rollers 30 for working clearance. The forks are then raised until the notched edge 55 of bar 50 engages and raises the end of the load, after which the truck is moved forward to push the load fully on to the pile. Next the forks are raised still further as shown in Fig. 11 until the roller 65 is free and can be removed, and with the load in this position, spacers 66 are placed between the top of the pile and the load. Finally the forks are again lowered to deposit the load on the spacers 66, which are of sufficient height to provide clearance for removing the bar 50.

It will accordingly be seen that the present invention provides a simple attachment for the forks of a conventional lift fork truck which enables the truck to handle a stack of lumber or other elongated load and to unload such by end-

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wise movement on to a pile. Furthermore, this attachment does not affect the operation of the truck for handling other loads, but at the same time it can be readily removed if desired by simply unbolting the brackets 31, 32 and 38 and the bolts 51. The bundles of lumber can be removed from the pile with a lift fork truck by following the reverse sequence of operations. That is to say, the bar 50 can be inserted between bundles and the forks raised to elevate the outer end of the bundles sufficiently for removal of the spacers 66 and replacement of the roller 65. The load can then be lowered on to the roller 65 and pulled out in the same manner as described in connection with Fig. 10 for pushing the load into position, and after a sufficient part of the load has been pulled out, the bundles can then be cranked back on the forks and carried away.

Figs. 12 to 14 show a somewhat different construction of attachment which operates in a similar manner to that just described. The lift forks 70 correspond to the forks 20 of the truck 15, and the vertically arranged rollers 71 similarly correspond to the rollers 37 described in connection with Figs. 1 to 11. The remainder of the attachment includes a generally rectangular frame composed of cross bars 75 and 76 secured together by means of braces 77 as shown. This frame is removably secured to the forks 70 by means of a plurality of shouldered bolts 78 threaded into tapped bores in the upper surface of the lift forks 70. A roller 80 is journaled in the ends of the bars 75 and 76 for operation similarly to the rollers 29 and 30 as described, the supporting shafts 81 of these rollers being shown as supported in roller bearings 82 in the ends of the bars.

The releasable lock for holding the rollers 80 against rotation includes a ratchet wheel 85 pinned to the outer end of each shaft 81 adjacent the squared portion 86 of the shaft which receives a crank or other driving member. Cooperating with each ratchet wheel 85 is a bar 90 slotted to receive mounting bolts 91 which are set into the front face of bar 75 to support the bar 90 for sliding movement. The outer end of each bar 90 is formed with a projection 95 adapted to engage between the teeth of the ratchet wheel 85, and the inner surface of the bar 90 is hollowed to receive a spring 96 bearing against one of bolts 91 in position to urge the bar 90 outwardly and into engagement with the ratchet wheel. A chain or cord 99 connects the inner ends of the bars 90 to provide for readily pulling both bars out of locking engagement with their associated ratchet wheels 85 and thus to release the rollers 80 for free rotation.

A friction bar 100 is bolted to the bar 75 at 101 and is provided with an upturned front edge having suitable teeth 102 for operation in the same manner as described in connection with the bar 50. It will accordingly be seen that this attachment operates in essentially the same manner as described in connection with Figs. 1 to 11, it being merely necessary that the operator pull on chain 99 to release the rollers during the step of cranking the load off of or on to the forks.

While the form of apparatus herein described constitutes a preferred embodiment of the invention, it is to be understood that the invention is not limited to this precise form of apparatus, and that changes may be made therein without departing from the scope of the invention which is defined in the appended claims.

What is claimed is:

1. Apparatus for use in combination with a lift

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fork truck for loading or unloading an elongated load by endwise movement thereof, comprising a plurality of rollers supported on the forks of said truck in upwardly spaced and generally parallel relation with said forks to receive the load thereon, releasable means for locking said rollers against rotation, means for rotating at least one of said rollers to cause movement of said load transversely of said forks, bar means having a serrated portion, means for securing said bar means to the ends of said forks forwardly of said rollers and with said serrated portion thereof uppermost in position for frictional engagement with the underside of a load, and guide members having a relatively low coefficient of friction supported on said forks in generally upright and perpendicular relation with said rollers to guide the load during said transverse movement thereof.

2. The method of loading an elongated load into a confined space by means of a lift fork truck which comprises the steps of carrying said load into endwise relation with said space on the forks of said truck, effecting endwise movement of said load transversely of said forks until the leading end of said load overhangs said space while said load is still supported on said forks, positioning a roller below the leading end of said load, lowering said forks until the leading end of said load is supported on said roller, moving said load transversely of said forks until the major portion of said load is within said space, then releasing said forks from said load, bringing said forks into endwise relation with said load, raising said forks to elevate the trailing end of said load, pushing said load fully into said space, and finally elevating the trailing end of said load sufficiently to effect removal of said roller and replacement thereof with a spacer.

3. The method of loading an elongated load by means of a lift fork truck which comprises the steps of supporting said load on rollers carried by the forks of said truck and substantially parallel with said forks, carrying said load into endwise relation with the space into which said load is to be unloaded, rotating one of said rollers to cause endwise movement of said load transversely of said forks until the leading end of said load overhangs said space while said load is still supported on said forks, positioning a free roller below the leading end of said load, lowering said forks until the leading end of said load is supported on said free roller, again rotating said roller on said forks to cause further movement of said load transversely of said forks until the major portion thereof is in said space, then releasing said forks from said load, moving said forks to a position below the trailing end of said load, raising said forks to elevate said trailing end of said load, pushing said load with said forks fully into said space, elevating the trailing end of said load with said forks sufficiently to effect removal of said free roller and replacement thereof with spacers, and finally lowering said load onto said spacers and then disengaging and removing said forks therefrom.

4. Apparatus for attachment to the forks of a fork lift truck for handling a heavy load in the form of elongated material such as lumber or the like having a length substantially greater than the spacing of said forks and adapted to be placed in and removed from a pile in the lengthwise direction thereof which comprises a pair of rollers, means for mounting said rollers substantially parallel with said forks and with the upper sur-

faces thereof projecting above the level of said forks to receive said load thereon, means for fixing said rollers against turning with a load balanced thereon with its ends overhanging said rollers at both sides of said forks for lifting and transportation of said load on said lift truck, means for imparting torque power to said rollers to cause the load thereon to travel in the direction of the length thereof and transversely of said forks while one end of the load is supported on the pile, and load engaging means fixed at the outer ends of said forks having projections on the surface for engaging said load with a positive action following insertion of said forks beneath one end of said load with said forks extending in the general direction of the length of said load and of said pile to effect the pushing in and to initiate the drawing out of said load by movement of said lift truck.

5. Apparatus as defined in claim 4 including means for detachably fixing said load engaging means to said forks providing for ready removal and replacement thereof.

6. Apparatus for attachment to the forks of a fork lift truck for handling a heavy load in the form of elongated material such as lumber or the like having a length substantially greater than the spacing of said forks and adapted to be placed in and removed from a pile in the lengthwise direction thereof which comprises a pair of rollers, means for mounting said rollers substantially parallel with said forks and with the upper surfaces thereof projecting above the level of said forks to receive said load thereon, means for fixing said rollers against turning with a load balanced thereon with its ends overhanging said rollers at both sides of said forks for lifting and transportation of said load on said lift truck, means for imparting torque power to said rollers to cause the load thereon to travel in the direction of the length thereof and transversely of said forks while one end of the load is supported on the pile, and load engaging means fixed at the outer ends of said forks in substantially the plane of the upper surface of said rollers and having projections on the surface to be raised along with the raising of said forks into positive engagement under the opposite end of said load to effect the pushing in and to initiate the drawing out of said load with said forks extending in the general direction of the length of said load and of said pile.

7. Apparatus for attachment to the forks of a fork lift truck for handling a heavy load in the

form of elongated material such as lumber or the like having a length substantially greater than the spacing of said forks and adapted to be placed in and removed from a pile in the lengthwise direction thereof which comprises a pair of rollers, means for mounting said rollers substantially parallel with said forks and with the upper surfaces thereof projecting above the level of said forks to receive said load thereon, means for fixing said rollers against turning with a load balanced thereon with its ends overhanging said rollers at both sides of said forks for lifting and transportation of said load on said lift truck, means for imparting torque power to said rollers to cause the load thereon to travel in the direction of the length thereof and transversely of said forks while one end of the load is supported on the pile, additional rollers located at the inner ends of said forks and extending upwardly therefrom at substantially right angles to said load receiving rollers for a distance of the order of the length of said load receiving rollers for guiding the adjacent side of said load over a substantial extent thereof during lengthwise travel thereof while on said load receiving rollers, and load engaging means fixed to said forks having projections on the surface to be raised along with the raising of said forks into positive engagement under the opposite end of said load to effect the pushing in and to initiate the drawing out of said load with said forks extending in the general direction of the length of said load and of said pile.

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