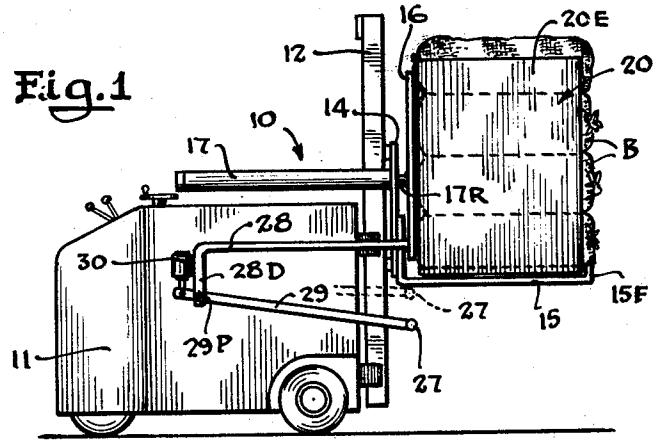
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LOADING OF BAGGED MAIL

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Fig.1



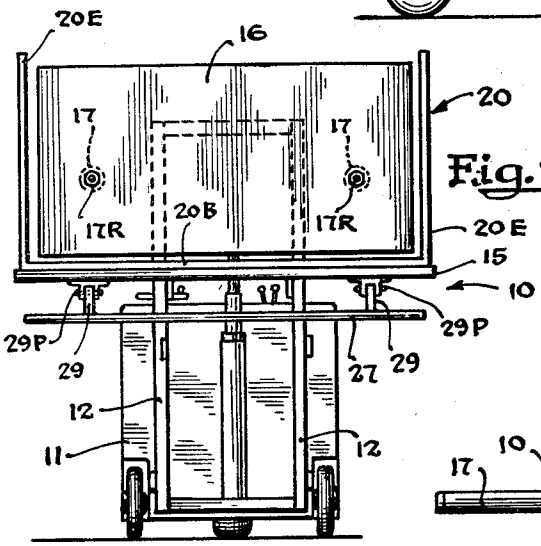


Fig.2

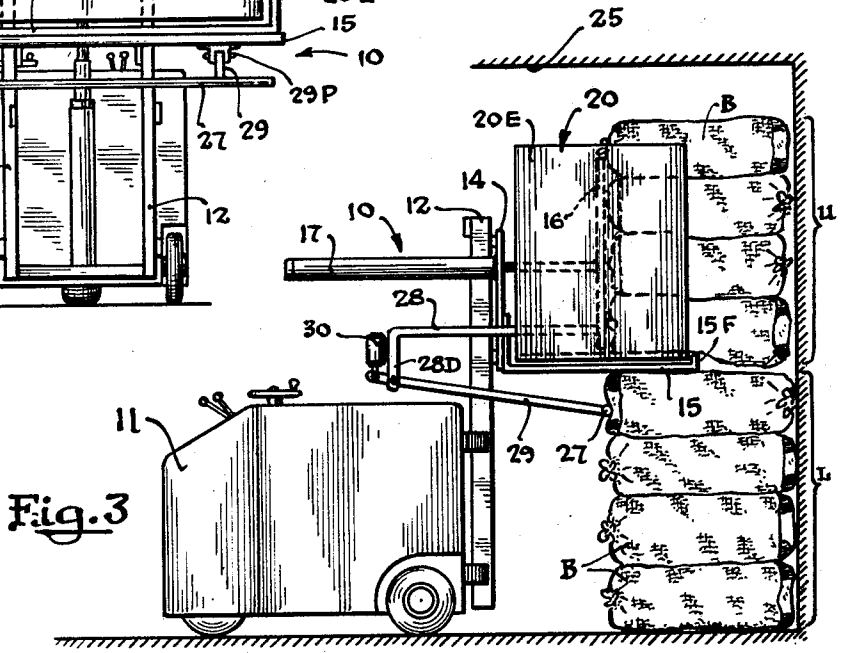


Fig.3

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Fig.4

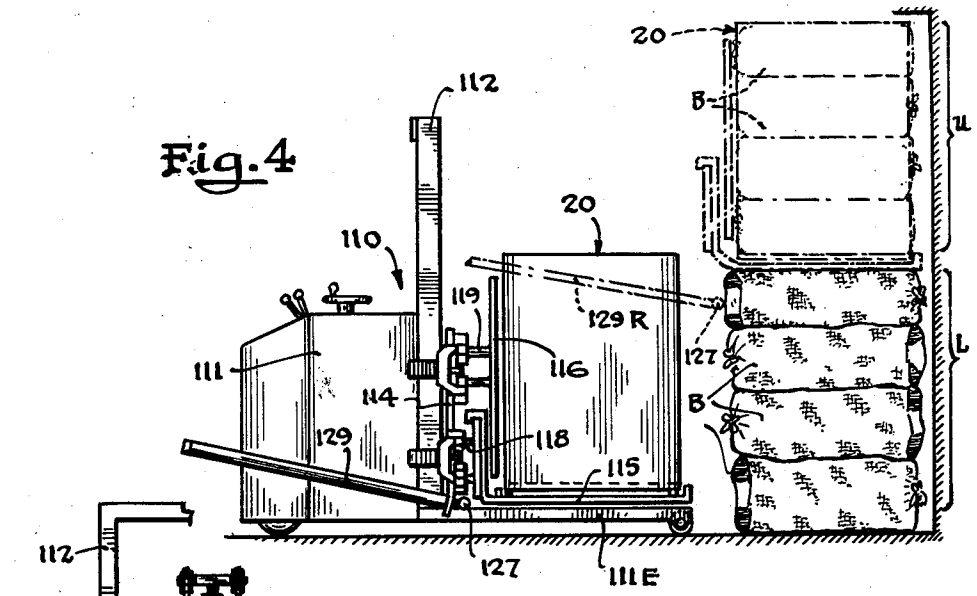


Fig.5

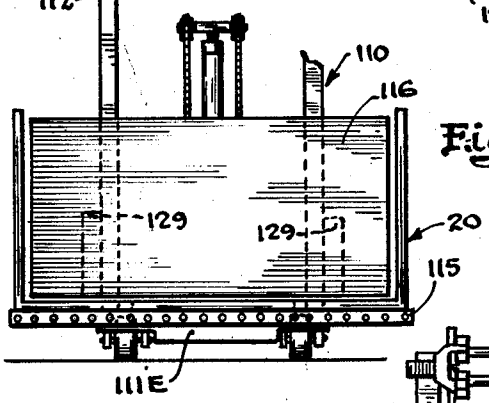
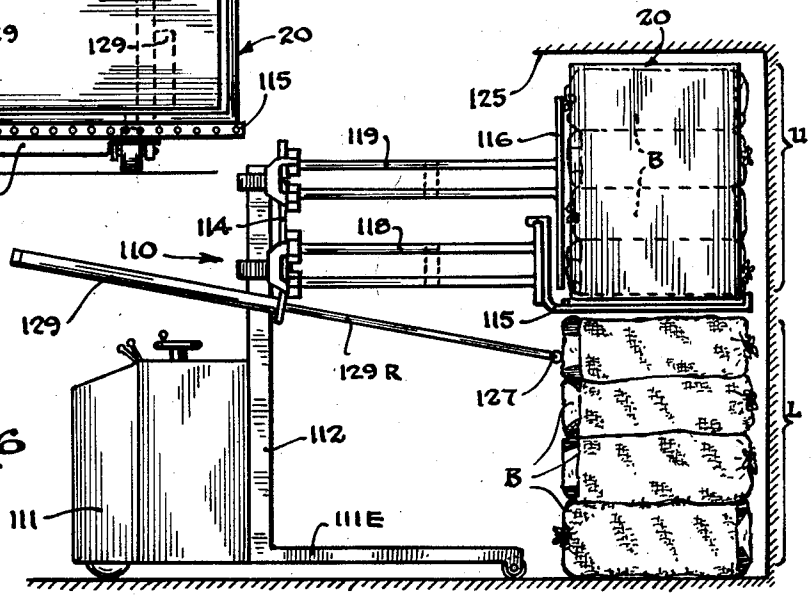


Fig.6



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3,157,301

LOADING OF BAGGED MAIL

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6 Claims. (Cl. 214—514)

This invention relates to loading of bagged mail and the like and particularly to handling of such bags in groups and stacking such groups one on top of another in a transport body such as a truck, trailer or railway car.

In my co-pending application Serial No. 139,526, filed September 20, 1961, a system is disclosed for sorting and handling bagged mail in which the sorting operations result in the assembly of the bags in groups and in a stable stacked and oriented relation on sideless hand trucks wherein end walls of the hand trucks serve to maintain the group of bags in the desired relation, and upon accumulation of a sufficient number of loaded hand trucks allocated to a common route or destination, the bags are transferred from the hand trucks onto lift trucks that transport the group of bags from each hand truck into the transport body and deposit the groups to form relatively high and stable stacks in such body. As disclosed in FIG. 18 of my aforesaid application, this transfer operation may be performed by providing the lift truck with sideless holder mounted on the lift forks or platform and having end walls to define a holder that is comparable in size with the sideless bodies of the hand trucks. With such a lift truck, the group of bags on a hand truck may be pushed as a stacked group out of one side of the hand truck body and into a similar position in the sideless holder of the lift truck. Such lift truck may then transport the group of bags into position in the transport body, and by use of the push plate mechanism of the lift truck, may deposit the group of bags in its original oriented relation in a stack in the transport body.

When a first group of bags has been deposited in a particular location in a transport body, as the base or lower part of a relatively high stack that is to be formed, the next group or load must be lifted and moved into position over the base or lower group and must then be pushed out of the side of the holder as the holder is withdrawn so as to thereby deposit the new group on the top of the lower group. Such stacking of the groups of bags is desirably performed at a relatively rapid pace and each time an upper group of bags is thus deposited on a lower group there is a possibility that unevenness of the individual bags, or accidental dragging of the moving lift forks or platform with the top of the lower group may disturb the stability of the lower group and thus cause the stack to tip or fall at about the time the upper group is deposited thereon.

In view of the foregoing it is the primary object of this invention to provide a lift truck of the self-unloading type whereby a lower portion of a stack of bags or the like may be held in position while another group of bags is deposited on the top of the original stack. Other objects related to the foregoing are to provide a lift truck having retaining means associated with the push plate mechanism of the truck for holding a lower portion of a stack in substantially the same vertical plane as the push plate during withdrawing movement of the lift forks or platform and to provide such retaining means that may be shifted to an out of the way position during those periods when the truck is being loaded or is being used to deposit a group of bags as the lower portion of a stack.

Other and further objects of the present invention will be apparent from the following description and claims, and are illustrated in the accompanying examples of the present invention and the principles thereof, and what is now considered to be the best mode in which to apply

these principles. Other embodiments of the invention embodying the same or equivalent principles may be made as desired by those skilled in the art without departing from the invention.

In the drawings:

FIG. 1 is a side elevational view of a self-unloading lift truck embodying the features of the invention;

FIG. 2 is a front elevational view thereof;

FIG. 3 is a side elevational view of the lift truck shown as it is depositing a group of bags onto the top of a lower group of bags;

FIG. 4 is a side elevational view of another type of self-unloading lift truck embodying the invention;

FIG. 5 is a front elevational view of the truck shown in FIG. 4; and

FIG. 6 is a side elevational view of the truck shown in FIGS. 4 and 5 and showing the loaded bag holder in position for depositing its load of bags as a group onto a lower group to form the complete stack of bags.

For purposes of disclosure the invention is herein illustrated in FIGS. 1 to 3 of the drawings as embodied in a lift truck 10 having a steerable wheeled body 11 with a column 12 at its forward end along which a lift carriage 14 may be moved up and down by means conventional in lift trucks of this kind. The lift carriage 14 has a horizontal platform 15 projected from its lower edge, and a push plate 16 is carried on the forward ends of horizontal piston rods 17R of piston and cylinder devices 17 mounted on the lift carriage 14. The push plate 16 may be operated to push a load from the platform 15 in a known manner.

On the platform 15 a sideless holder 20 is mounted, such holder 20 comprising a bottom wall 20B and end walls 20E which have substantially the same size and relationship as corresponding parts of the sideless hand trucks with which the truck 10 is to be used. The holder 20 is disposed on the platform 15 so that the push plate 16 may move through the holder 20, as will be evident in FIG. 2. The holder 20 in the present instance is shown as resting freely on the platform 15 so that it may be removed from the platform in the event that the particular loading system that is used makes such removal desirable, and such removal may be accomplished by sliding the holder 20 endwise onto and off of the platform 15. An upstanding flange 15F along the forward edge of the platform 15 prevents forward displacement of the holder during unloading operation of the push plate 16.

When the holder 20 has been loaded with a group of oriented mail bags B so that the holder 20 maintains the desired stacked and stable relation to the group, the group may be transported by the truck 10 into a transport body 25, and when the holder 20 has been located over the position where the group is to be deposited, the push plate 16 may be advanced while the truck 10 is backed away, thus to withdraw the holder 20 and cause the bags B to be deposited in a stacked relation. This operation may be accomplished with the structure thus far described.

Under the present invention means are provided on the truck 10 for assuring stability of a lower group L of bags B when an upper group 11 is being deposited on top of the lower group as shown in FIG. 3. In the form of the invention shown in FIGS. 1 to 3 such means take the form of a horizontal retaining bar 27 disposed beneath the platform 15 and substantially in the plane of the push plate 16 and carried by and movable with the push plate in its forward and return movements. Thus a mounting arm 28 projects rearwardly from the lower portion of the push plate 16 on each side of the body 11 of the truck, the arms 28 being of a length somewhat greater than the range of movement of the push plate 16. At their rear ends the arms 28 extend downwardly at 28D to a level slightly below the lower face of the platform 15. The low-

er ends of the extensions 28D provide a mounting for the bar 27 and this mounting under the present invention is such as to enable the bar 27 to be raised from a lower effective position shown in full lines in FIGS. 1 and 3 to an upper or retracted position shown in dotted outline in FIG. 1.

The bar 27 has arms 29 fixed thereto and extended rearwardly beyond the extensions 28D and the arms are pivoted at 29P to the extensions 28D. Piston and cylinder actuating devices 30 connected between the extensions and the rear ends of the arms 29 enable the bar 27 to be raised to its upper position by power when required, and the devices 30 act also to limit the extent of downward movement of the bar 27.

When a group U of bags B is to be deposited on a lower group L as in FIG. 3, the retaining bar 27 is lowered to its effective relation, as shown in FIG. 1, and the platform 15 is raised to a level sufficient to clear the top of the lower group L. The truck is then advanced so that the platform 15 is over the group L, and as this is done the retaining bar 27 engages the adjacent ends of all of the bags B in the top tier of the lower group L. Then, as the push plate 16 is advanced and the truck 10 is backed away, the retaining bar 27 hold the lower group L in position to receive and support the upper group U. This retaining action is positive, and is maintained until the bags of the upper group U have settled into place to complete the stack. Any drag friction of the platform 15 on the top of the lower group L is of course resisted by the action of the retaining bar 27, and tipping of the stack due to such friction is thus prevented. The formation of a stable stack of bags B is assured.

In FIGS. 4 to 6 the invention is illustrated as embodied in a different type of self-unloading lift truck 11 having a steerable wheeled body 111. The body 111 has a low forward extension 111E that locates the front wheels substantially forwardly of a column 112 that is positioned at the rear edge of such forward extension. The column 112 has a lifting carriage 114 mounted thereon, and a push plate lifting platform 115 and a push plate 116 are mounted on the lifting carriage 114 for vertical movement therewith and for movement forwardly and rearwardly with respect to the carriage 114. Such mounting is conventional and comprises lazytongs 118 and 119 disposed in horizontal planes between the lifting carriage 114 and the platform 115 and the push plate 116. Thus the push plate 116 and the platform 115 may be moved forwardly and in unison beyond the forward end of the extension 111E, and may be retracted either in unison or in succession in a known manner.

In the lift truck 110 the means for holding the lower group L are provided by a horizontal retaining bar 127 that is fixed near its opposite ends to the forward ends of a pair of piston rods 129R which form parts of a pair of piston and cylinder devices 129. The piston and cylinder devices 129 have the forward ends of their cylinders fixed to lower portions of the lifting carriage 114 so that when the piston rods 129R are retracted, the retaining bar 127 is located near the carriage 114 and just above the level of the body extension 111E.

The platform 115 has a bag holder 20 thereon as described in connection with the structure shown in FIGS. 1 to 3, and when the holder 20 is loaded with bags B, the load is carried by the truck 110 into a transport container 125. The platform 115 and the push plate 116 are then projected forwardly on their supporting lazytongs 118 and 119 so as to be located forwardly of the extension 111E and over the location where the bags are to be deposited. The platform 115, and its holder 20 are then withdrawn while the push plate 116 is maintained in its forward position, and hence the stack of bags B is deposited in the desired location.

Where this unloading operation is to deposit the stack of bags directly on the floor, the retaining bar 127 is not used, and it remains in its retracted relation shown in FIG. 4. However, when the load is to be deposited on the top of a lower group L, as indicated in FIG. 6, the piston and cylinder devices 129 are operated so as to project the retaining bar 127 forwardly into contact with the adjacent ends of the bags B in the upper tier of the group L. Preferably the piston and cylinder devices 129 are tilted slightly downwardly and forwardly so that the retaining bar 127 engages the group L in a downwardly spaced relation with respect to the platform 115. The retaining bar 127 may of course be projected to its effective position at any time after the platform has been elevated to the required height, and after the retaining bar is in its effective position against the lower group L, the platform 115 and the holder 20 may be withdrawn to deposit the upper group U in the desired position.

From the foregoing description it will be apparent that the present invention enables groups of oriented mail bags to be handled quickly and easily, and enables a lower group of bags to have another group deposited on the top thereof without danger of tipping or disturbing stability of the lower group. More specifically it will be evident that the present invention enables a partially formed stack of mail bags to be retained in its stacked relation while another group of bags is put in position thereon.

Thus while I have illustrated and described preferred embodiments of my invention it is to be understood that changes and variations may be made by those skilled in the art without departing from the spirit and scope of the appending claims.

I claim:

1. In a powered lift truck having a mobile wheeled body with a lifting and unloading structure comprising a lifting carriage, and a lifting platform and a pusher plate supported for relative horizontal movement on said carriage, the improvement that comprises a horizontal retaining bar, and means supporting said bar on said structure for movement from a retracted position to an effective position wherein the forward face of the bar is disposed substantially in the plane of the forward face of the push plate and in downwardly spaced relation with respect to the platform whereby a load on the platform may be unloaded therefrom onto the top of a stack supported separate and apart from the lift truck by rearward movement of the platform and the lift truck while the pusher plate and the retaining bar are maintained in stationary engagement, respectively, with such load and an upper portion of the stack upon which said load is to be deposited.

2. In a powered lift truck having a mobile wheeled body with a lifting carriage and a supporting platform and a push plate mounted on the lifting carriage, the improvement that comprises a horizontal retaining bar disposed beneath said platform, and means for supporting and maintaining said retaining bar and push plate in engagement respectively with an upper portion of a stack supported separate and apart from the lift truck and with a load on the platform while the lift truck and the platform move rearwardly with relation to the bar and the push plate to thereby hold the stack in upright position while the load is deposited thereon.

3. In a lift truck having a mobile wheeled body with a lifting structure comprising a column, a lifting carriage vertically movable on the column, and a lifting platform and a pusher plate on said carriage, the improvement that comprises a horizontal retaining bar, and pressure fluid operated means supporting said retaining bar on said structure for movement from a retracted position adjacent said column to an effective position wherein the retaining bar may bear against a stack in downwardly spaced relation with respect to the platform, so that when said pusher plate and retaining bar are held stationary in contact, respectively, with a load on the platform and an upper portion of the stack that is supported separate and apart from the lift truck, rearward movement of

said platform relative to the lift truck causes withdrawal of the platform from beneath the load and deposit of such load on the top of such stack.

4. In a lift truck having a mobile wheeled body with a lifting and unloading structure comprising a lifting carriage, and a lifting platform and a pusher plate on said carriage, the improvement that comprises a horizontal retaining bar, and means for supporting said bar in engagement with an upper portion of a stack that is supported separate and apart from the lift truck, such engagement being beneath the platform, and for holding the pusher plate stationary against a load on the platform during rearward movement of the truck and said platform so that the stack is held in upright position while the load is deposited thereon.

5. In a powered lift truck having a mobile wheeled body with a lifting and unloading structure comprising a lifting carriage, and a lifting platform and a pusher plate on said carriage, the improvement that comprises means on said structure for engaging an upper portion of a stack that is supported separate and apart from the lift truck so that when the platform is located over such a stack and said pusher plate and said means are held stationary and in contact respectively with a load on the platform and with such upper portion of a stack, rearward movement of the truck and the platform acts

to withdwraw the platform and deposit the load onto the stack while the stack is held upright by said means.

6. In a lift truck having a mobile wheeled body with a lifting and unloading structure comprising a column, a lifting carriage vertically movable on the column, and a lifting platform and a pusher plate on said carriage, the improvement for simplifying the deposit of a load from said platform onto a stack supported separate and apart from the lift truck, said improvement comprising engaging means supported on said structure for movement to an effective position against an upper portion of such a stack while the platform is located over the stack, and actuating means for said engaging means and said pusher plate for holding the engaging means against such a stack for the pusher plate in a stationary relation against the load on the platform while the truck and the platform are moved rearwardly so that the load is discharged onto the stack while the stack is held upright by said engaging means.

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