May 10, 1955 J. C. STREB ET AL 2,708,043

AUXILIARY MAST CONSTRUCTION FOR FORK LIFT TRUCKS

Filed July 10, 1952 4 Sheets-Sheet 1

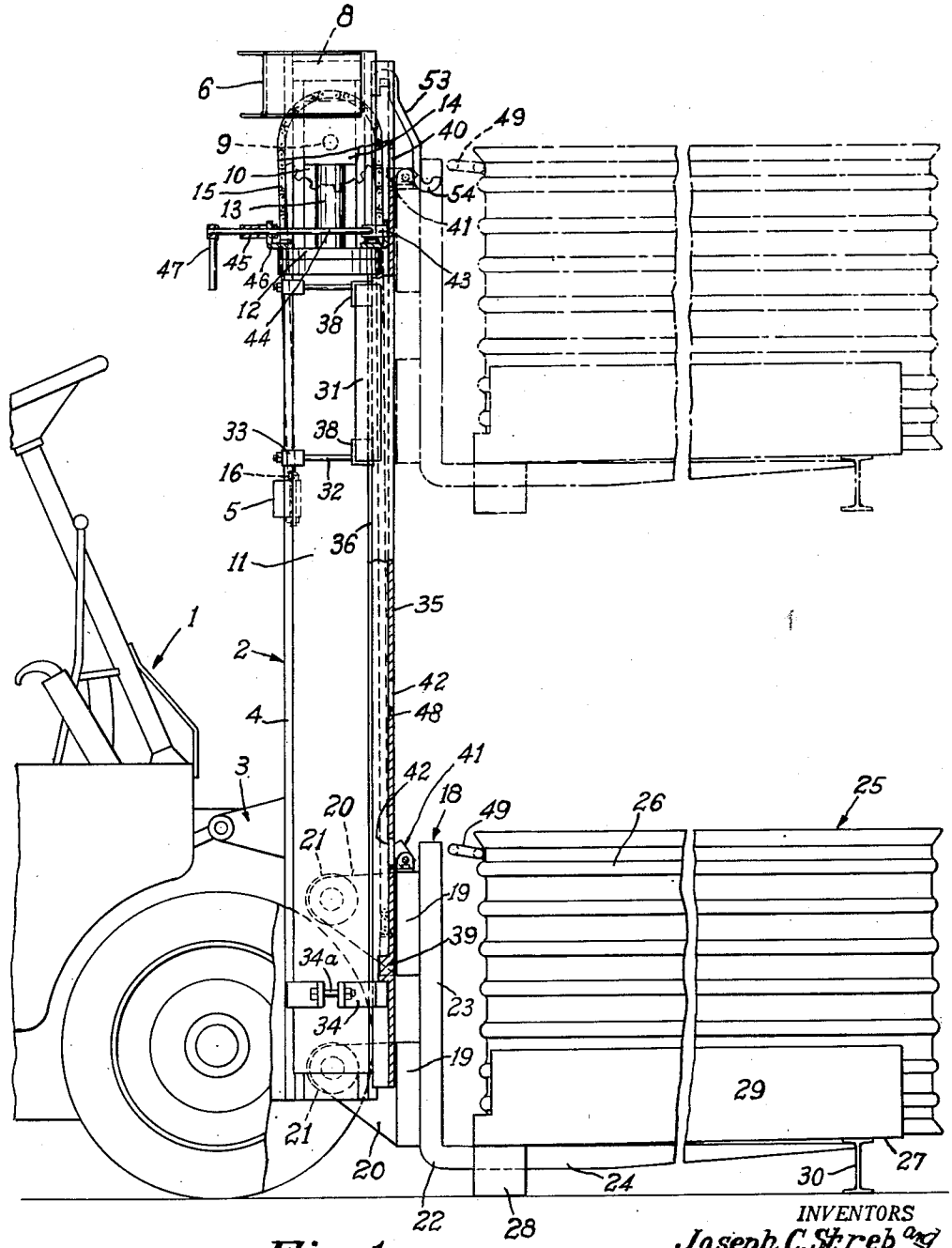

Fig. 1

INVENTORS
Joseph C. Streb and
BY Mark J. Osborne
Frease & Bishop
ATTORNEYS

May 10, 1955 J. C. STREB ET AL 2,708,043

AUXILIARY MAST CONSTRUCTION FOR FORK LIFT TRUCKS

Filed July 10, 1952 4 Sheets-Sheet 2

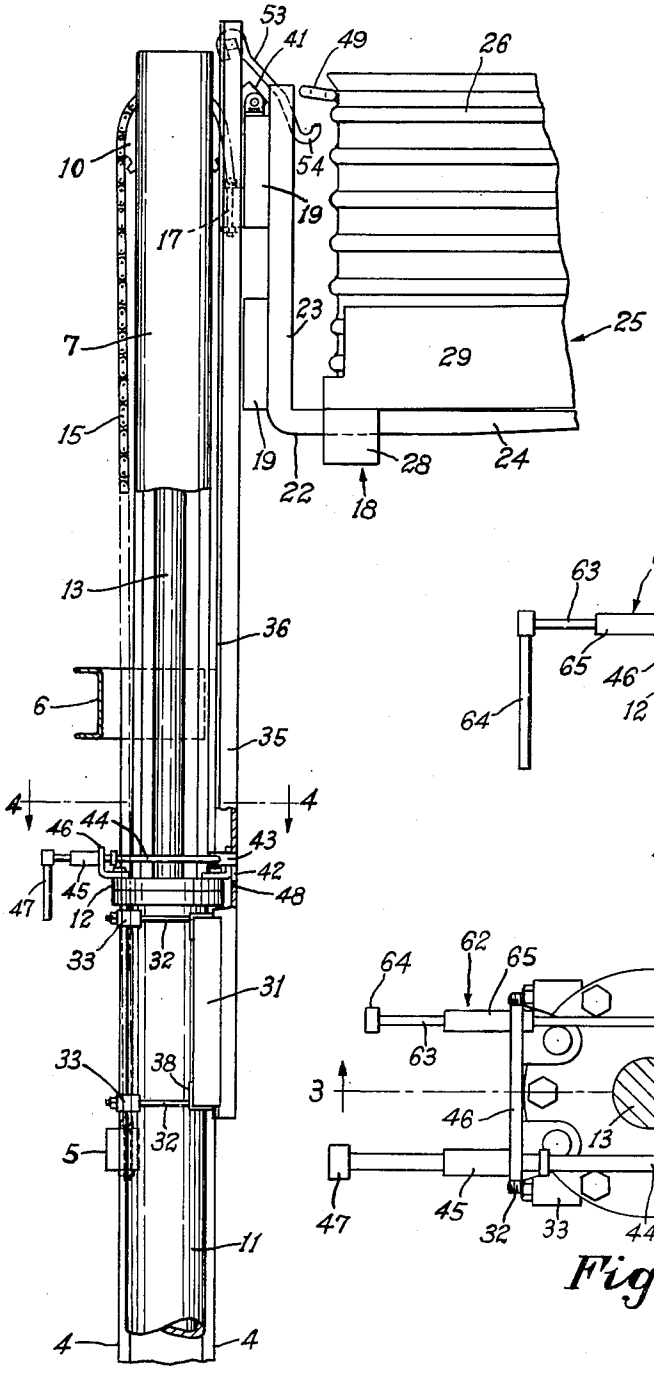

Fig. 2

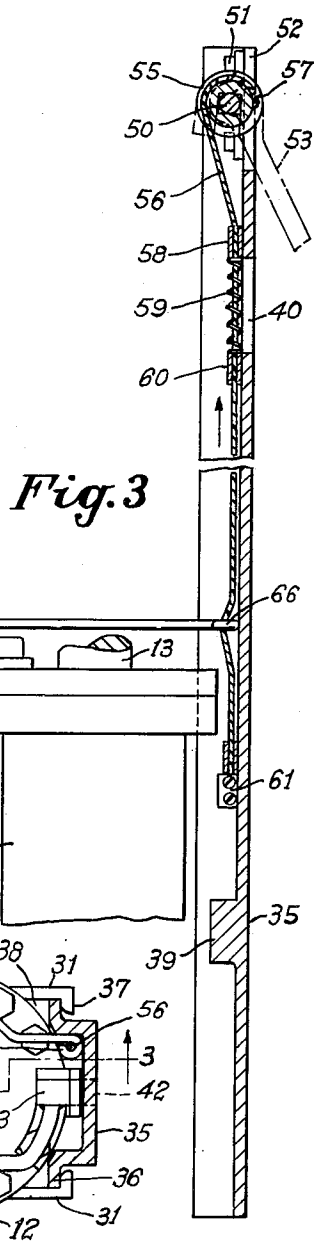

Fig. 3

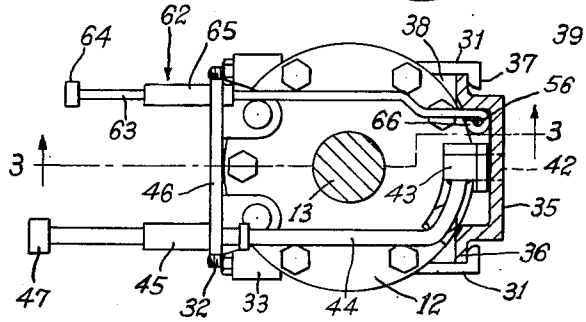

Fig. 4

INVENTORS
Joseph C. Streb and
BY Mark J. Osborne

Frease & Bishop
ATTORNEYS

May 10, 1955 J. C. STREB ET AL 2,708,043

AUXILIARY MAST CONSTRUCTION FOR FORK LIFT TRUCKS

Filed July 10, 1952 4 Sheets-Sheet 3

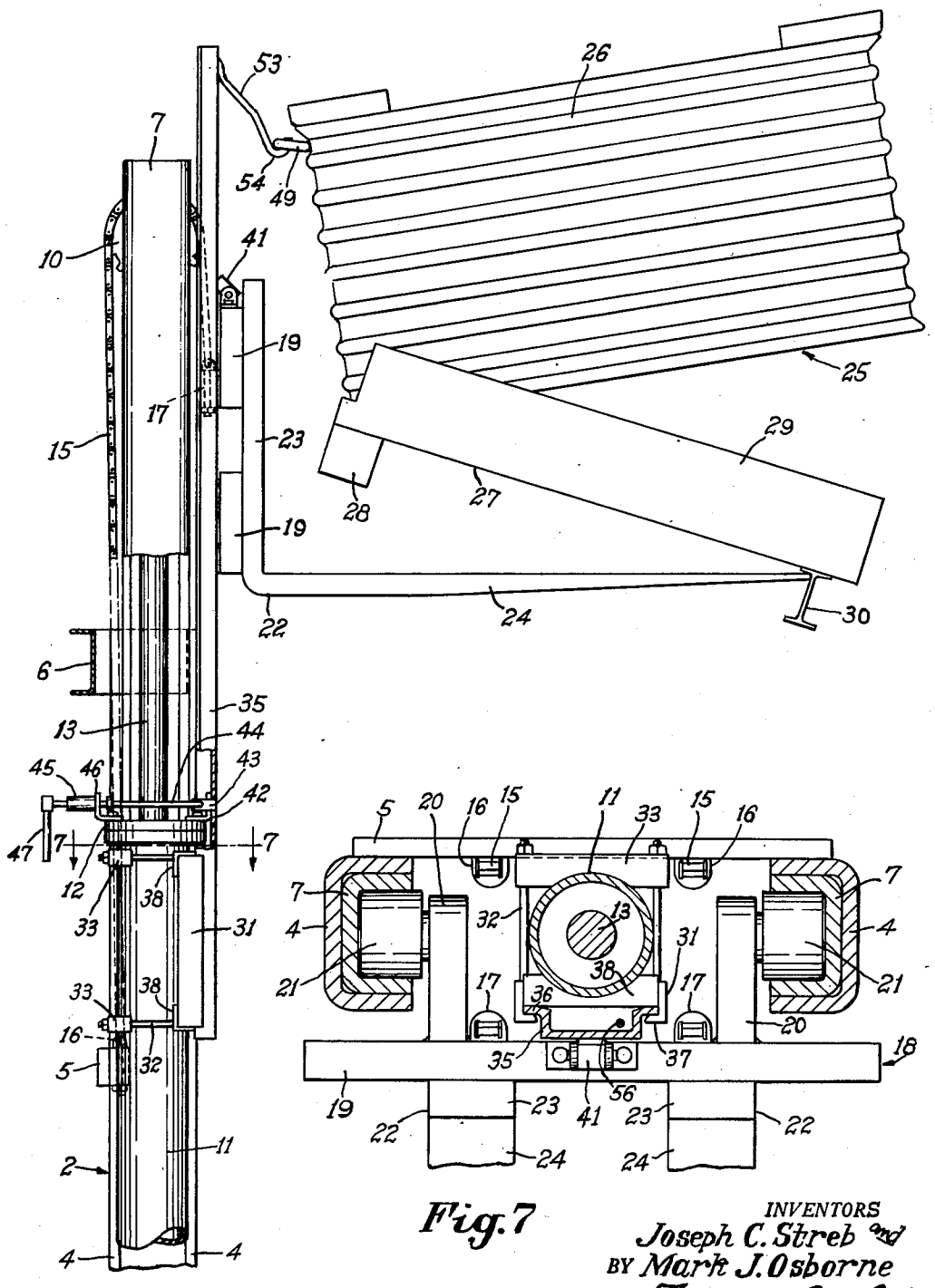

Fig. 5

Fig. 7

INVENTORS
Joseph C. Streb and
BY Mark J. Osborne
Frease & Bishop
ATTORNEYS

May 10, 1955 J. C. STREB ET AL 2,708,043

AUXILIARY MAST CONSTRUCTION FOR FORK LIFT TRUCKS

Filed July 10, 1952 4 Sheets-Sheet 4

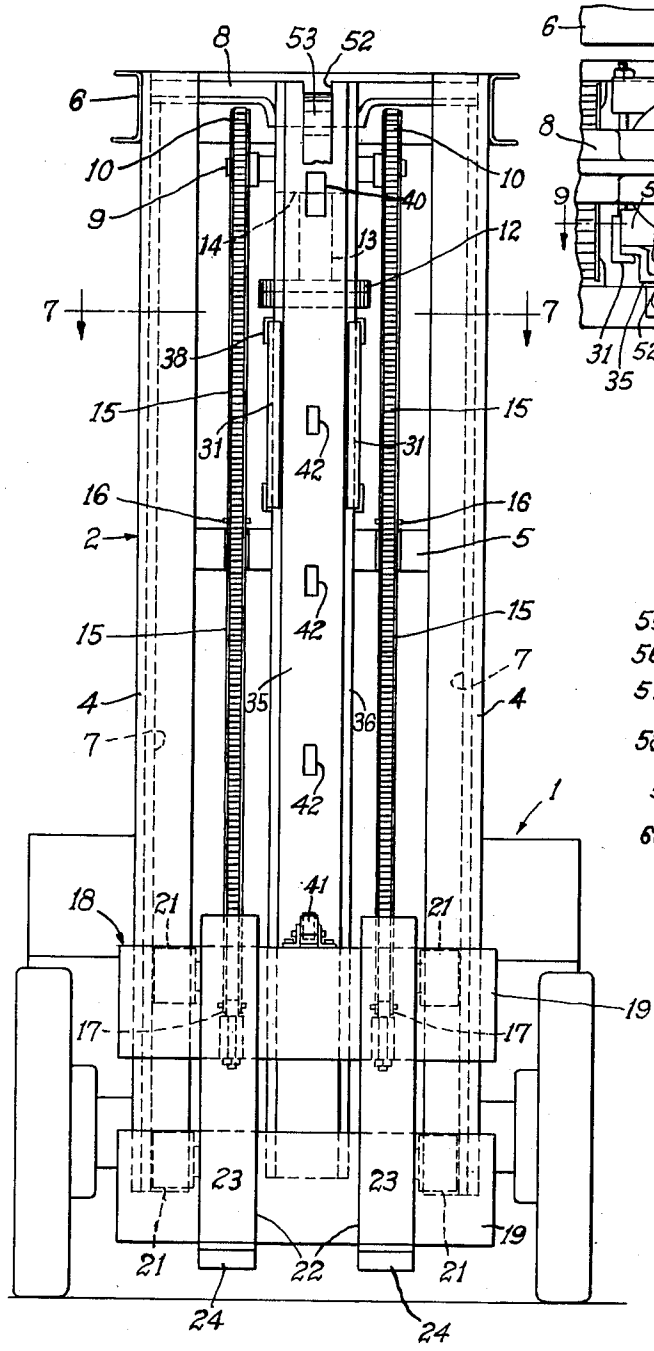

Fig. 6

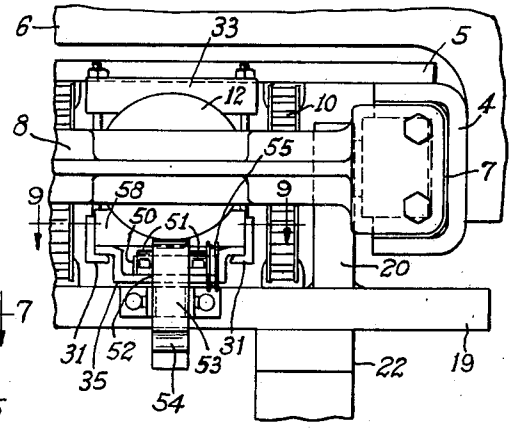

Fig. 8

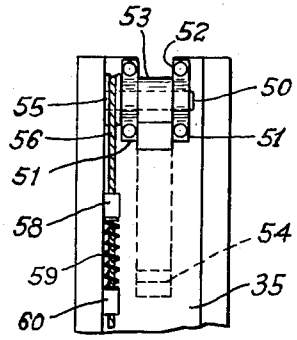

Fig. 9

INVENTORS
Joseph C. Streb and
BY Mark J. Osborne
Frease & Bishop
ATTORNEYS

United States Patent Office 2,708,043 Patented May 10, 1955

2,708,043

AUXILIARY MAST CONSTRUCTION FOR FORK LIFT TRUCKS

Joseph C. Streb, Canton, Ohio, and Mark J. Osborne, Rutledge, Pa., assignors to The Union Metal Manufacturing Company, Canton, Ohio, a corporation of Ohio

Application July 10, 1952, Serial No. 298,068

5 Claims. (Cl. 214—317)

The invention relates to fork lift trucks and more particularly to an auxiliary mast construction for a fork lift truck with which the contents of a bottom dump box handled by the lift truck may be dumped from a desired position elevated from the floor by opening the dump box bottom by manipulation of the auxiliary mast and fork of the lift truck.

Skid boxes have been used for years for the storage, transportation and handling of materials in manufacturing plants. Such boxes ordinarily are handled, transported, or moved from place to place and positioned or otherwise manipulated by fork lift trucks. Frequently it is desirable to provide for dumping the contents of such boxes from the boxes at an elevated position above the floor. For this purpose bottom dump boxes are used, of the type generally illustrated in Riemenschneider et al. Patent No. 2,445,038.

In the Riemenschneider et al. patent the bottom dump box is suspended from hooks at either side of the top of the stationary guide of the main mast of the fork lift truck, and the box is dumped by lowering the fork. Because the point of box suspension is a fixed position on the fork lift truck mast, the box can only be dumped from one location or height above the floor.

However, in handling a bottom dump box on a fork lift truck, the height from which the box is to be dumped is variable because it may be necessary to dump, for example, into a freight car, or into a truck, or into a bin or other receiving station, the heights of which are not uniform above the ground or floor.

It is, therefore, a general object of the present invention to provide an auxiliary mast construction for a fork lift truck adapted to be raised and lowered with respect to the truck mast, and having box engaging means thereon for holding a bottom dump box being handled by the truck at any desired elevation above the floor for dumping the box from such elevation.

Moreover, it is an object of the present invention to provide an auxiliary mast construction for a fork lift truck which may be manipulated by controls accessible to the truck operator for dumping a bottom dump box handled on the truck from any desired elevation above the floor.

Furthermore, it is an object of the present invention to adapt fork lift trucks and bottom dump boxes handled thereon with readily operated means for manipulating the boxes so that the contents thereof can be dumped at a desired place and from any desired elevation above the floor by manipulation of controls by the fork lift truck operator.

Likewise, it is an object of the present invention to provide a fork lift truck with an auxiliary mast which may be raised to a desired location elevated above the floor by raising the truck fork, and then locked in such raised position, so as to permit independent raising and lowering movement of the truck fork.

Also, it is an object of the present invention to provide an auxiliary mast construction for a fork lift truck

which may be raised to and locked at a desired position elevated above the floor and which has a hook element that may be operated when the mast is locked in raised position to engage and suspend a bottom dump box being handled by the truck fork.

Moreover, it is an object of the present invention to provide an auxiliary mast construction for a fork lift truck having the described characteristics which may be incorporated as a part of a new fork lift truck, or which may be attached as an auxiliary to fork lift trucks in the field, so as to adapt them for the convenient manipulation, handling and dumping of bottom dump boxes.

Finally, it is an object of the present invention to provide a novel auxiliary mast construction for fork lift trucks which is simple in construction, which may be attached readily to existing fork lift trucks of any standard type, which may be operated with ease by the truck operator, which solves existing problems in the art and eliminates prior art difficulties, and obtains the foregoing advantages and desiderata in a simple and effective manner.

These and other objects and advantages apparent to those skilled in the art from the following description and claims, may be obtained, the stated results achieved, and the described difficulties overcome, by the parts, elements, constructions, arrangements, combinations and sub-combinations which comprise the present invention, the nature of which is set forth in the following general statement, a preferred embodiment of which—illustrative of the best mode in which applicants have contemplated applying the principles—is set forth in the following description and shown in the drawings, and which are particularly and distinctly pointed out and set forth in the appended claims forming part hereof.

The nature of the improvements in auxiliary mast construction for fork lift trucks may be stated in general terms as comprising auxiliary mast slide guide and stop means adapted for being mounted on or incorporated in fork lift truck construction; an auxiliary mast slide member slidable in said guide means from a lowered position engageable with said stop means to a selected elevated position; a releasable latch on the truck fork carriage engageable with the auxiliary mast slide member to raise said member to a selected elevated position by raising the fork carriage; manually operated lock means mounted on the truck and engageable with said slide member for locking the latter in the selected raised position; said latch being releasable from engagement with said slide member when the latter is locked in raised position and when locked permitting independent up and down movement of the fork carriage without disturbing the elevated and locked auxiliary mast slide member; a movable hook member mounted adjacent the upper end of the auxiliary mast slide member adapted for movement to a position for engaging a suspending member on a bottom dump box being handled on the fork carriage; means for normally holding said hook member in a position in which it will not engage the suspending member on a dump box being handled on the fork carriage; and manual means for manipulating the last-mentioned means to project said hook member to a position engageable with the suspending member on a bottom dump box being handled on the fork carriage.

By way of example, the improved auxiliary mast construction for fork lift trucks of the present invention is shown in the accompanying drawings forming part hereof, wherein:

Figure 1 is a fragmentary side elevation of a standard type of fork lift truck with a bottom dump box positioned on the fork carriage thereof, illustrating the improved auxiliary mast construction with certain parts broken away and in section, and illustrating in dot-dash lines the fork

carriage moved to a position for engaging the auxiliary mast to elevate the same;

Fig. 2 is a view similar to Fig. 1 showing the auxiliary mast construction raised to a selected elevated position;

Fig. 3 is a fragmentary view with certain parts omitted and other parts in section as on line 3—3, Fig. 4, illustrating the control mechanism for the movable auxiliary mast hook;

Fig. 4 is a sectional view looking in the direction of the arrows 4—4, Fig. 2;

Fig. 5 is a view similar to Figs. 1 and 2 showing a box suspended by the auxiliary mast at a selected elevated position, and the fork carriage manipulated for opening the box to dump the contents thereof;

Fig. 6 is a fragmentary front elevation of the main mast of the fork lift truck;

Fig. 7 is a fragmentary sectional view looking in the direction of the arrows 7—7, Figs. 5 and 6;

Fig. 8 is a top plan view of the parts shown in Fig. 6; and

Fig. 9 is a fragmentary view looking in the direction of the arrows 9—9, Fig. 8.

Similar numerals refer to similar parts throughout the various figures of the drawings.

The invention as illustrated and described herein is applied to a particular construction of bottom dump box used with a standard type of fork lift truck of well known make. It is understood that the invention is equally applicable to other constructions of bottom dump boxes and to standard fork lift and high lift platform power trucks of other makes having a mast and a fork carriage vertically movable on the mast.

Referring first to Figs. 1, 2, 6 and 7, a usual type of fork lift truck is generally indicated at 1 having a normally vertical mast generally indicated at 2 extending upwardly from the front of the truck, the mast 2 normally being pivoted at its lower end on a horizontal axis for slight tilting movement by operation of lever connections generally indicated at 3 from the truck. Except for such tilting movement, the main mast 2 is stationary with respect to the truck body 1.

The main mast 2 normally includes spaced vertically extending channel members 4 opening laterally toward each other (Fig. 7) and connected together and pivotally mounted at their lower ends to the truck 1 in any usual or suitable manner. The mast channel members 4 are also suitably connected together by a cross bar 5 intermediate their ends and by a channel-shaped frame member 5 at the top ends thereof.

A mast slide is slidably mounted vertically within main mast 2 and comprises spaced channel members 7, slidable within channel members 4, the top ends of the slide members 7 being connected by a cross tie member 8 centrally mounting an upper sprocket shaft 9 (Figs. 1 and 6) having sprockets 10 mounted at either end thereof.

A mast elevator cylinder 11 is mounted on the truck 1 and extends vertically upward of the mast 2 intermediate the mast channel members 4 to the cylinder head 12 thereof. A piston rod 13 extends upward from its piston, not shown, operating hydraulically within cylinder 11, through cylinder head 12 to piston block 14 connected to slide top member 8 and mounting sprocket shaft 9. Thus, as the piston is actuated hydraulically within cylinder 11, the piston rod 13 moves up and down with respect to the main mast 2 thereby sliding mast channel members 7 up and down within the channels 4 of main mast 2.

Chains 15 are connected at 16 to the cross bar 5 of main mast 2, at one end, and then extend upward at the rear (to the left viewing Figs. 1, 2 and 5) of the main mast 2, then around sprockets 10, and then downward along the front portion of the main mast 2 where their other ends are connected at 17 to the fork carriage generally indicated at 18. The fork carriage 18 preferably includes spaced cross members 19 from the rear faces of which brackets 20 project inward within the confines of the mast channel members 4 and slide members 7 (Fig. 7).

Rollers 21 are journaled on the brackets 20 in such manner as to project into and to be engaged within the channels of channel slide member 7.

Angular spaced fork members 22 are secured to the front faces of cross members 19 of fork carriage 18 as shown in Figs. 1 and 7, the fork members 22 each comprising vertical portions 23 secured to the cross members 19 and finger and lifting portions 24.

In operation, when the piston in cylinder 11 is hydraulically actuated to raise and lower the mast slide member 7 as described, the fork carriage 18 will be raised and lowered at a two to one rate with respect to the rate of movement of the piston rod 13, because of the described chain and sprocket mounting of the fork carriage 18 on the main mast 2.

A bottom dump box to be handled by the fork lift truck 1 is generally indicated at 25. The box 25 may be picked up in the usual manner by fork carriage 18 and may be raised and lowered on the fork carriage in the usual manner for carrying the box 25 from place to place or for stacking or tiering similar boxes 25.

A usual bottom dump box 25 normally comprises rectangular preferably corrugated side walls 26, a hinged bottom wall 27 and spaced rear legs 28 on the bottom wall 27. The bottom wall 27 may also be provided with chute side walls 29 and a front cross fork abutment member 30.

The fork lift truck, mast, fork carriage and bottom dump box construction thus far described are well known prior constructions which form no part of the present invention excepting in the cooperative manner in which the improved auxiliary mast construction, now to be described, is combined with various elements of the mast, fork carriage and box. The improved auxiliary mast construction, as hereinabove indicated, may be incorporated as a part of a new fork lift truck of any one of several well known types, or may be attached as an auxiliary to fork lift trucks in the field so as to adapt them for the purposes of the present invention.

In accordance with the present invention, auxiliary mast slide guide members 31 are mounted in a stationary manner with respect to the main mast 2 as by being clamped by bolts 32 and saddles 33 to the cylinder 11 adjacent the upper end of the cylinder. A stop member 34 is also clamped about the cylinder 11 by bolts 34*a* (Fig. 1) near the bottom end of the cylinder.

An auxiliary mast slide member 35 having approximately the length of the main mast 2 (Fig. 1) is slidably mounted in the slide guides 31 for movement vertically with respect to the main mast 2. The auxiliary mast slide member 35 includes rearwardly recessed slide flanges 36 which are retained between the inturned flanges 37 of the slide guides 31 and the slide guide plates 38 (Figs. 4 and 7). Downward movement of the auxiliary slide member 35 is stopped by stop member 34 engaging the stop projection 39 (Figs. 1 and 3) adjacent the lower end of member 35.

A slot 40 is formed in the slide member 35 adjacent its upper end and a pivoted dog or releasable latch member 41 is mounted on the upper cross member 19 of the fork carriage 18 adapted to engage the upper end of slot 40 as the carriage 18 moves upward with respect to slide member 35 and adapted to kick out of slot 40 as the carriage 18 moves downward with respect to slide member 35.

A series of apertures 42 is provided in the slide member 35 having a width narrower than the width of the slot 40 so that the dog 41 cannot engage in the apertures 42. A lock pin 43 is mounted on an offset end of rod 44 which is in turn slidably journaled in sleeve 45 mounted on bracket 46 in turn mounted on the cylinder head 12 of cylinder 11. The rod 44 has a rearwardly and downwardly extending operating handle 47 (Figs. 1 and 4) conveniently accessible to the fork lift truck operator.

The lock pin 43 is adapted to be projected selectively into any one of the apertures 42 when aligned with one

of the apertures, as shown for instance in Fig. 2. Thus the lock pin 43 may be manually engaged with or disengaged from any aperture 42 to lock the auxiliary mast slide member 35 in a selected raised position. Preferably the lower edge of each aperture 42 is formed with a tapered or cam surface 48 (Fig. 2) so that the cam surface will push the lock pin 43 out of engagement with any aperture 42 if the slide member 35 is raised when held in locked position against lowering by the lock pin 43.

The operation of raising or lowering and locking the slide member 35 in any selected position is as follows:

Assume that the fork carriage 18 is in lower position as shown in full lines in Fig. 1 and the slide member 35 is in the down position with its stop projection 39 engaged against the stop member 34 on cylinder 11. The pivoted dog 41 is held in an angularly upwardly extending position as shown in Fig. 1 by engagement with the front face of slide member 35. The fork carriage 18 under these conditions may be raised in the usual manner by the truck operator by operation of the piston in cylinder 11 until the fork carriage 18 reaches approximately the dot-dash position illustrated in Fig. 1.

At this time, the dog 41 drops into slot 40 and upon further raising the fork carriage 18, the upper face of dog 41 will engage the upper edge of slot 40 and raise the slide member 35. As the fork carriage 18 continues to raise, the slide member 35 will raise to an upper position such as illustrated in Fig. 2, when the operator can manipulate the handle 47 to project the lock pin 43 into a selected aperture 42 thus locking the slide member 35 in raised position.

Under these conditions, the fork carriage 18 now can be lowered and the slide member 35 will be held locked in raised position. In lowering the carriage 18 with the slide member 35 locked in raised position, the pivoted dog 41 will cam out of slot 40 as illustrated in full lines in Fig. 2 thus permitting the fork carriage 18 to be raised and lowered at will without disturbing the locked raised position of the slide member 35.

Now if the slide member 35 is locked in raised position as shown in Fig. 2 and it is desired to lower the same, it is only necessary to raise the fork carriage 18 to just above the full line position shown in Fig. 2 when the pivoted dog 41 will engage in slot 40. Then the operator may manually retract the locking pin 43 from the selected aperture 42 by manipulation of the handle 47. Upon then lowering the fork carriage 18, the slide member 35 will be lowered therewith.

Thus it is seen that the auxiliary mast slide member 35 is slidably mounted in slides 31 on the main mast 2 for up and down movement. This up and down movement is controlled by operation of the fork carriage 18 which is used to raise and lower the slide member 35 by engagement of the pivoted dog 41 on the fork carriage with the slot 40 in the auxiliary mast 35. The auxiliary mast 35 can be held locked in a raised position by the lock pin 43 carried by the main mast which may be selectively engaged with any aperture 42 in the auxiliary mast 35. When the auxiliary mast 35 is locked in raised position, the fork carriage can be raised and lowered with respect thereto and with respect to the main mast for handling or manipulation of a box 25 or other article on the fork carriage.

The dog 41 on the fork carriage automatically disengages from the auxiliary mast 35 when the fork carriage 18 is lowered with respect to the auxiliary mast provided that the auxiliary mast is locked in raised position on the main mast. The dog 41 automatically engages the auxiliary mast 35 when the fork carriage 18 is raised to a predetermined upper position with respect to the auxiliary mast.

In accordance with the present invention, the bottom dump box 25 is provided with a loop-like bail 49 fixed adjacent the upper end of the rear wall of the box, to the lower end of which wall the bottom wall 27 is pivoted or hinged as well shown in Fig. 5.

At the upper end of the auxiliary mast 35 a shaft 50 (Figs. 3 and 9) is mounted in bearings 51 straddling a slot 52 at the upper end of member 35. Shaft 50 may have a central squared portion between bearings 51 on which a movable hook 53 is mounted having a hook portion 54 at its lower end and projecting through slot 52. One end of the shaft 50 is provided with a pulley-like member 55 to which an end of a cable 56 may be secured as indicated at 57. A collar 58 is secured or otherwise fixed to cable 56 forming a stop for the upper end of spring 59 surrounding cable 56; and another similar collar 60 surrounds cable 56 and is welded or otherwise fixed to auxiliary mast 35. The lower end of spring 59 engages the collar 60 and thus the spring normally tends to pull the cable 56 upward in the direction of the arrow shown in Fig. 3, permitting the shaft 50 to rotate in a clockwise direction by the weight of the hook member 53 so that the hook member normally hangs downwardly in the position shown in full lines in Fig. 1.

Again referring to Fig. 3, the cable 56 runs downwardly along the rear face of auxiliary mast 35 and the lower end thereof is secured to the auxiliary mast 35 at 61. A cable control member generally indicated at 62 is also mounted on bracket 46 at the top of cylinder 11 and includes a rotatable rod 63 and a manipulating handle 64. The rod 63 extends through a bushing 65 mounted on bracket 46 and at its forward end it is provided with a loop 66 encompassing the cable 56 (Figs. 3 and 4).

The handle 64 is also accessible to the truck operator and by manipulating the same the rod 63 may be turned thus placing a twist or kink in the lower end of cable 56 by the turning of the loop 66 which encompasses cable 56. The cable 56 in this manner is pulled downward against the pressure of the spring 59 to rotate shaft 50 counterclockwise and raise the hook member 53 to the full line position shown in Figs. 2 and 5.

If the hook member 53 is thus projected to the position shown in Fig. 2 with the fork carriage 18 raised as shown and carrying a bottom dump box 25 thereon, the hook portion 54 thereof is immediately below the loop 49 at the upper rear end of the box. Now, if the fork carriage is lowered while the hook 53 is held in this position, the hook portion 54 engages the loop member 49 to hold the upper rear end of the box in a fixed elevated position as illustrated in Fig. 5, whereupon, on continued downward movement of the fork carriage 18, the hinged bottom 27 of the box 25 opens up to discharge or dump the contents of the box 25. During such box opening movement, the forward ends of the fork member fingers 24 engage the front cross fork abutment member 30 on the hinged box bottom wall 27 to prevent the front end of the bottom wall from moving to the left, viewing Fig. 5, during the dumping operation.

Thus the hook member 53 comprises a movable load or box supporting member at the top of the auxiliary mast 35 which is normally urged to a disengaging position with respect to the loop 49 on a materials handling box 25 by the spring tensioning device 56—59, and manual control means is provided for actuating the tensioning device to move the hook member 53 to a position for load supporting engagement with the box 25.

Accordingly, the auxiliary mast construction of the present invention provides means on a fork lift truck whereby the contents of a bottom dump box handled by the truck may be dumped from selected desired positions elevated from the floor.

In general, the handling or dumping operation may be carried out as follows:

Assume that a bottom dump box 25 is located at some place in a plant and it is desired to dump the

contents thereof into a truck or box car or bin at some other location. The fork lift truck **1** is operated in the usual manner to pick up the box **25** on its fork carriage **18**, as shown for instance in Fig. 1. The box **25** by movement of truck **1** may then be transported to the dumping station in the usual manner. The auxiliary mast **35** may then be raised to a desired elevation in the manner described and locked in such elevated position. The hook member **53** is then projected outward, in the manner described, to a position to engage the bail **49** on the box **25** and the fork carriage **18** is then partially lowered. The truck **1** may then be moved to the exact desired position above the receptacle into which the contents of the box **25** is to be dumped. Upon further lowering of the fork carriage **18**, the contents of the box is dumped in a controlled manner into the receiving receptacle.

The box **25** may now be closed by raising the fork carriage **18** to the relative position shown in Fig. 2 at which time the hook member **53** drops out of engagement with loop **49** by gravity, whereupon the fork carriage may be lowered to transport and deposit the empty box **25** at any desired location.

In normal use, the auxiliary mast **35** may be left locked in raised position when the truck operator is repeatedly dumping a series of boxes. The auxiliary mast **35**, however, may be lowered in the manner previously described at any desired time.

Although only several locking apertures **42** are shown in Figs. 1 and 6 for locking the auxiliary mast **35** in selected raised positions, any number of locking apertures may be provided with any desired spacing therebetween so that the auxiliary mast may be locked in any selected elevated position.

Accordingly, the present invention provides a means by which the truck operator may select a proper dumping position or elevation for the auxiliary mast and then engage the dumping hook with the box to open the box on lowering of the fork carriage to dump the contents of the box; provides a construction in which the truck operator may leave the auxiliary mast locked in a particular "up" position and operate the fork carriage independently in the usual manner to raise and lower the same or to transport loads on the fork and to dump from the auxiliary mast always from one and the same elevated position or location; provides a construction in which the contents of a bottom dump box may be dumped from a selected elevated position by manipulation of the auxiliary mast and lift fork; provides an auxiliary mast construction for a fork lift truck having box engaging means for holding a box at any desired elevation above the floor for dumping; provides an auxiliary mast construction for a fork lift truck which may be manipulated by controls accessible to the truck operator; provides an improved auxiliary mast construction which may either be incorporated as a part of a new fork lift truck or attached as an auxiliary to fork lift trucks in the field; and provides a new auxiliary mast construction for fork lift trucks of simple construction which may be operated with ease and which solves existing problems and eliminates existing difficulties in the art in a simple, effective and efficient manner to obtain the described advantages and desiderata.

In the foregoing description, certain terms have been used for brevity, clearness and understanding, but no unnecessary limitations are to be implied therefrom beyond the requirements of the prior art, because such terms are used for descriptive purposes herein and not for the purposes of limitation and are intended to be broadly construed.

Moreover, the description of the improvements is by way of example and the scope of the present invention is not limited to the exact details illustrated, nor to the specific device shown.

Having now described the features, discoveries and principles of the invention, the construction, operation and method of use of a preferred embodiment thereof, and the advantageous new and useful results obtained thereby; the new and useful parts, elements, constructions, arrangements, combinations and sub-combinations, and mechanical equivalents thereof obvious to those skilled in the art are set forth in the appended claims.

We claim:

1. In combination with a fork lift truck having a main mast and a fork carriage vertically movable on the mast and a bottom dump box manipulated on the fork carriage; an auxiliary mast construction for use in locating the box at selected elevated positions and in dumping the contents therefrom including, an auxiliary mast slide member mounted on the main mast for vertical movement to extended positions above the main mast, cooperative engagement means between the fork carriage and slide member for raising the slide member to a selected elevated position by raising the fork carriage, cooperative means on the main mast and the slide member for locking the slide member in a selected elevated position, the cooperative engagement means between the slide member and fork carriage including a pivoted dog and vertically aligned slot so constructed as to automatically engage upon raising of the fork carriage and to automatically disengage when the slide member is locked in an elevated position and the fork carriage lowered independently thereof, and hook means on the slide member for engaging and supporting in a selected elevated position a box manipulated on the fork carriage.

2. In combination with a fork lift truck having a main mast and a fork carriage vertically movable on the mast and a bottom dump box manipulated on the fork carriage; an auxiliary mast construction for use in locating the box at selected elevated positions and in dumping the contents therefrom including, an auxiliary mast slide member mounted on the main mast for vertical relative movement to extended positions above the main mast, a pivoted dog on the fork carriage adjacent the slide member, a slot formed in the slide member adjacent its upper end and vertically aligned with and automatically engageable by the pivoted dog upon raising of the fork carriage, cooperative means on the main mast and the slide member for locking the slide member in a selected elevated position relative to the main mast, and hook means on the slide member for engaging and supporting in a selected elevated position a box manipulated on the fork carriage, whereby raising of the fork carriage will bring the pivoted dog thereon into engagement with the slide member slot to cause elevation of the slide member upon continued raising of the fork carriage to elevate the slide member above the main mast where it may be locked in a selected elevated position, and the box manipulated on the fork carriage will be engaged and supported by the hook means on the slide member and the box contents will be dumped by the lowering of the fork carriage beneath the box member independently of the locked slide member and box supporting hook means.

3. In combination with a fork lift truck having a main mast and a fork carriage vertically movable on the mast and a bottom dump box manipulated on the fork carriage; an auxiliary mast construction for use in locating the box at selected elevated positions and in dumping the contents therefrom including an auxiliary mast slide member on the main mast for vertical relative movement to extended positions above the main mast, cooperative engagement means between the fork carriage and slide member for raising the slide member to a selected elevated position extended above the main mast by raising the fork carriage, a manually operable and movable pin mounted on the main mast, a series of vertically aligned apertures formed in the slide member adjacent the main mast and selectively engageable by said movable pin, the aligned apertures being formed with cammed surfaces to eject the pin therefrom when the slide member is raised, the

cooperative engagement means between the slide member and fork carriage being so constructed as to engage upon raising of the fork carriage and to disengage when the slide member is locked in a selected elevated position and the fork carriage is lowered independently thereof, and hook means on the slide member for engaging and supporting in a selected elevated position a box manipulated on the fork carriage.

4. In combination with a fork lift truck having a main mast and fork carriage vertically movable on the mast and a bottom dump box manipulated on the fork carriage; an auxiliary mast construction for use in locating the box at selected elevated positions and in dumping the contents therefrom including, an auxiliary mast slide member mounted on the main mast for vertical relative movement to extended positions above the main mast, cooperative engagement means between the fork carriage and slide member for raising the slide member to a selected elevated position by raising the fork carriage, cooperative means on the main mast and the slide member for locking the slide member in a selected elevated position, the cooperative engagement means between the slide member and fork carriage being so constructed as to engage upon raising of the fork carriage and to disengage when the slide member is locked in a selected elevated position and the fork carriage is lowered independently, a hook member pivotally mounted adjacent the upper end of the slide member provided with a hook portion at its lower end opening towards and engageable with bail means on the box, spring tensioning means urging the hook means to a box disengaging position, and manually actuated control means operable to move the hook means to box engaging position.

5. In combination with a fork lift truck having a main mast and a fork carriage vertically movable on the mast and a bottom dump box manipulated on the fork carriage; an auxiliary mast construction for use in locating the box at selected elevated positions and in dumping the contents therefrom including, guide means vertically arranged on the main mast, an auxiliary mast slide member substantially coextensive in height with the main mast and vertically movably mounted in said guide means for vertical movement to extended positions above the main mast, cooperative engagement means between the fork carriage and slide member for raising the slide member to a selected elevated position by raising the fork carriage, cooperative means on the main mast and the slide member for locking the slide member in a selected elevated position, said cooperative means including means automatically unlocking the slide member from the main mast upon the slide member being raised when it is so locked, the cooperative engagement means between the slide member and fork carriage being so constructed as to engage upon raising of the fork carriage and to disengage when the slide member is locked in a selected elevated position and the fork carriage is lowered independently thereof, and hook means on the slide member for engaging and supporting in a selected elevated position a box manipulated on the fork carriage.

References Cited in the file of this patent

UNITED STATES PATENTS

2,220,450	Howell	Nov. 5, 1940
2,325,568	Eaton	July 27, 1943
2,357,548	Randall	Sept. 5, 1944
2,445,038	Riemenschneider et al.	July 13, 1948
2,599,855	Michaux, Jr.	June 10, 1952
2,606,680	Herman	Aug. 12, 1952