

Aug. 30, 1955

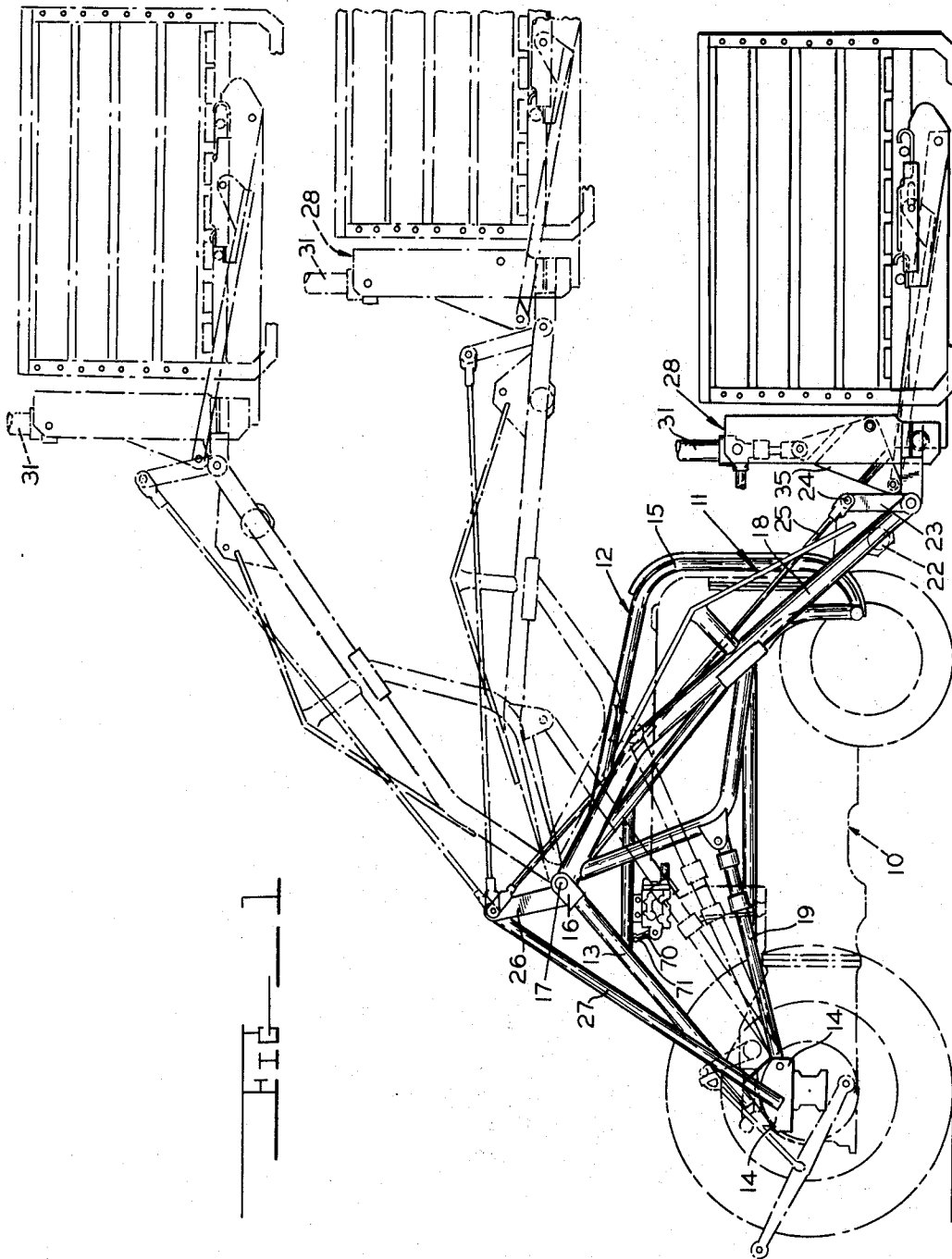
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PALLET HANDLING AND DUMPING APPARATUS

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4 Sheets-Sheet 1



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PALLET HANDLING AND DUMPING APPARATUS

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FIG 6

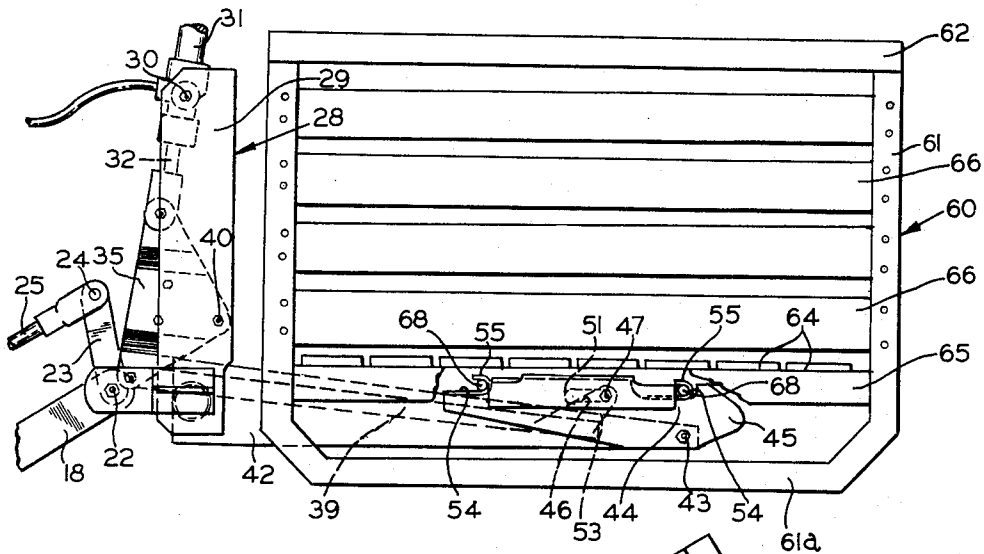
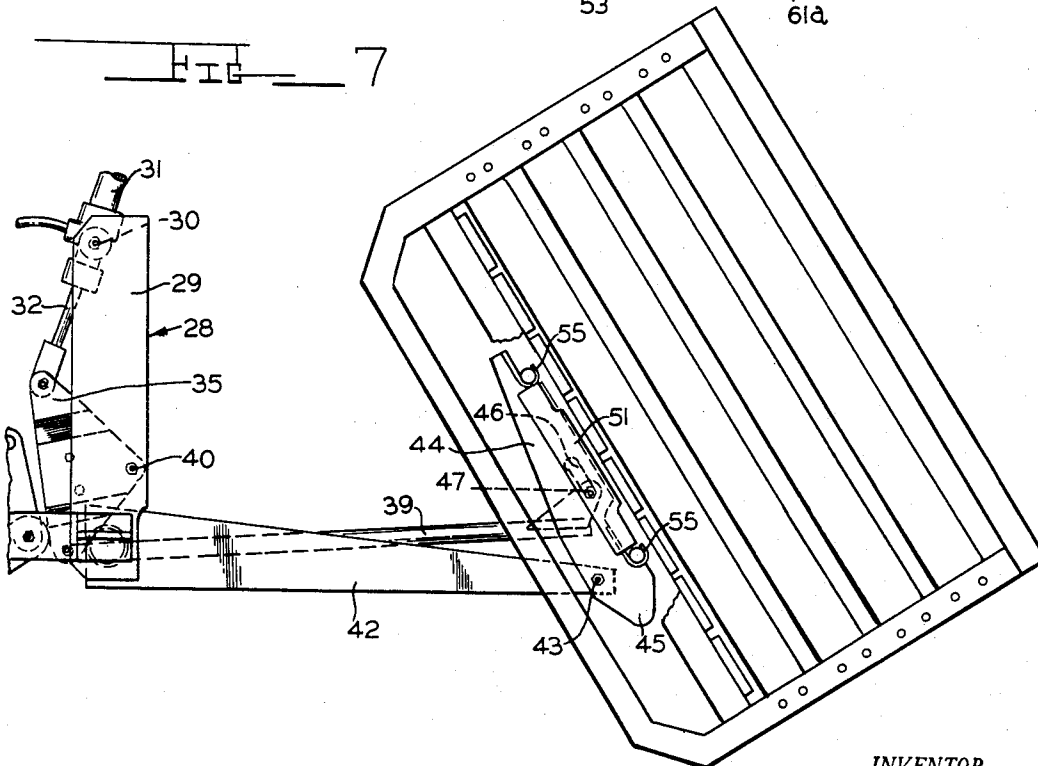


FIG 7



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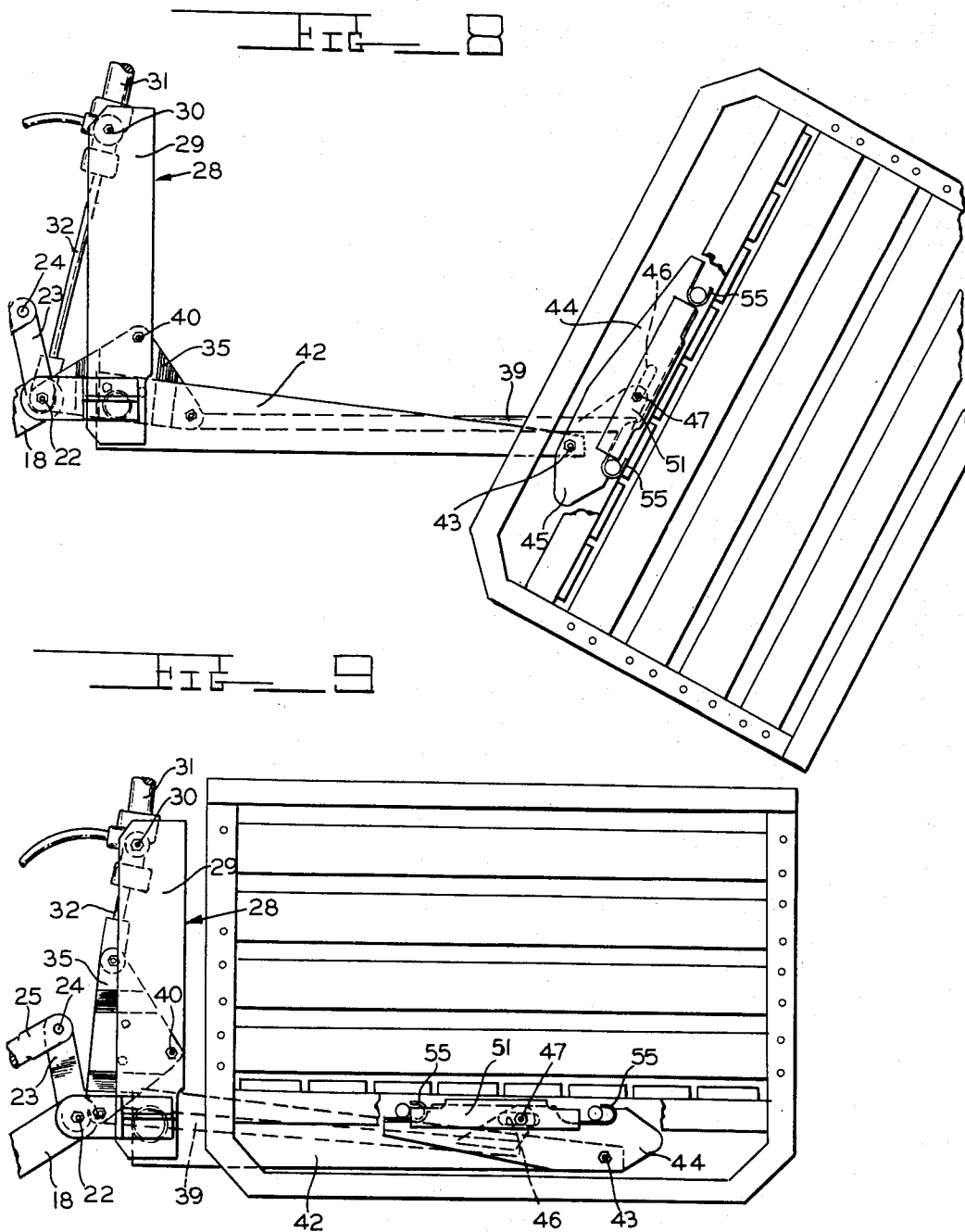
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PALLET HANDLING AND DUMPING APPARATUS

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4 Sheets-Sheet 4



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2,716,501

PALLET HANDLING AND DUMPING APPARATUS

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16 Claims. (Cl. 214—313)

The present invention relates to a pallet handling and dumping apparatus and more particularly to an apparatus for elevating and lowering a palletized receptacle and for selectively dumping the receptacle at any selected point of its vertical movement without releasing the receptacle from the apparatus.

The handling apparatus of the present invention is particularly adapted for the handling of flowable materials contained within a crate or similar receptacle provided with a false bottom to form a palletized container or receptacle. The apparatus is further particularly adapted for use with a loader or similar apparatus mounted upon a prime mover and having a vertically movable boom which travels through an arcuate path. The apparatus includes a pair of forwardly projecting lift arms mounted on the boom and enterable beneath the false bottom of the receptacle. The lift arms, upon elevation of the boom, contact the receptacle to elevate the same. To dump the receptacle, a remote controlled power means is effective to actuate the receptacle for movement longitudinally of the lift arms into re-entrant retaining means on the lift arm, following which the container is dumped by at least partially inverting the same while retained upon the lift arms.

It is, therefore, an important object of the present invention to provide a pallet handling and dumping apparatus in which a palletized receptacle is vertically movable and selectively dumpable at any selected point of its vertical movement.

Another important object is the provision of a material handling device including a lift arm insertable beneath the false bottom of a palletized container and engageable with the container to dump the container without release of the same from the lift arm.

Still another important object is the provision of a pallet handling and dumping device including a pair of lift arms insertable beneath a receptacle to elevate the same upon raising the lift arms and provided with means for shifting the receptacle longitudinally of the lift arms into locking engagement therewith so that subsequent tilting of the receptacle to dump the same will not cause displacement of the receptacle from the lift arms.

It is yet another important object to provide a pallet handling and dumping apparatus including a pair of lift arms insertable beneath a palletized receptacle to elevate the same and having relatively shiftable means capable of two stage movement, the first stage of movement of the shiftable means effecting longitudinal movement of the receptacle along the lift arms into locked engagement therewith, and the second stage of movement of the shiftable means tilting the receptacle to at least partially invert the same for dumping the receptacle contents.

The specific nature of this invention, as well as other objects and advantages thereof, will become apparent to those skilled in the art from the following detailed description, taken in conjunction with the attached sheets of drawings on which, by way of preferred example only, is illustrated one embodiment of this invention.

On the drawings:

Figure 1 is a side elevational view of a pallet handling and dumping apparatus of the present invention illustrating the apparatus as mounted upon a prime mover for the elevation of a palletized container to a plurality of vertical adjusted positions;

Figure 2 is an enlarged fragmentary plan view of the apparatus of Figure 1 particularly illustrating a palletized container and one of the lifting arms;

Figure 3 is an enlarged sectional view taken along the plane 3—3 of Figure 2;

Figure 4 is a view similar to Figure 3 taken along the plane 4—4 of Figure 3;

Figure 5 is an enlarged sectional view taken along the plane 5—5 of Figure 2;

Figure 6 is an enlarged elevational view illustrating an adjusted position of the lift arm and the receptacle assumed during the dumping cycle;

Figure 7 is a view similar to Figure 6 showing a second adjusted position of the lift arm and the receptacle;

Figure 8 is a view similar to Figures 6 and 7 illustrating the relative positions of the lift arms and the receptacle at the termination of the dumping cycle; and

Figure 9 is a view similar to Figure 8 illustrating return movement of the receptacle relative to the lift arms after dumping has been completed.

As shown on the drawings:

As shown on the drawing in Figure 1, reference numeral 10 refers generally to a tractor 10 or similar prime mover upon which is disposed a material handling apparatus of the present invention, indicated generally by reference numeral 11.

More particularly, the device 11 includes a fixed frame 12 mounted upon the tractor 10 and including a pair of laterally spaced upwardly and forwardly inclined posts 13 secured at their lower rear ends to rear axle brackets 14 fixed to the tractor. The fixed frame also includes a forwardly extending bumper structure 15 secured to the tractor front axle (not shown) and cooperating with the posts 13 to distribute the weight of the device 11 and its load upon the tractor front and rear axles. It will be appreciated that a pair of posts 13 are provided to extend longitudinally along each side of the prime mover 11. The posts 13 each terminate at the upper forward end thereof in a clevis 16 mounting a lateral pivot pin 17. The pivot pins 17 carry forwardly extending laterally spaced loader booms 18 projecting forwardly beyond the bumper structure. An actuating hydraulic cylinder 19 is connected between each boom 18 and the associated bracket 14, so that, upon actuation of the cylinders 19, the booms 18 are raised and lowered, as best shown in Figure 1.

The free forward ends of the booms 18 are joined by a tubular cross shaft 20 having terminal laterally and rearwardly projecting clevises 21 joined to the ends of the booms 18 by bolts 22 (Figure 2). The cross shaft 20 also carries a pair of upstanding ears 23 spaced laterally inwardly from each clevis 21. The ears 23 are pivotally connected, as by bolts 24, to the free forward end of a generally rearwardly extending stabilizer rod 25 lying generally parallel to the associated boom 18 for attachment to an upstanding post 26 mounted upon the transverse brace member (not shown) joining the loader post 13. The posts 26 are each reinforced by a downwardly and rearwardly extending reinforcing rod 27 connected to the rear axle bracket 14 of the tractor 10. The purpose of the stabilizer bars 25 will be readily appreciated from an inspection of the adjusted positions of the booms 18, the cross shaft 20, and the stabilizing rods 25 in Figure 1 of the drawings. The height of each post 26 is substantially the same as the height of the ears 23, and the

length of the stabilizer bars 25 is substantially the same as the length of the booms 18, so that upon elevation of the booms, the parallelism existing between the stabilizer rods 25 and the booms 18 will retain the cross shaft 20 and the ears 23 at a constant inclination relative to the ground for a purpose to be hereinafter more fully described.

As best shown in Figures 2, 3, and 4, each clevis 21 is joined to the cross shaft 20 through an upstanding post 28 interposed between and fixedly joined to the cross shaft and the clevises by the post upstanding side plates 29. The laterally spaced upstanding plates 29 are joined respectively to the end of the cross shaft 20 and the clevis 21, and the side plates 29 are joined by a web 29a to define the post 28 of U-shaped cross-section. The upstanding plates 29 are joined adjacent their upper end by pivot bolt 30 supporting for pivoting movement a remote controlled cylinder 31 having a depending actuating rod 32 normally projecting downwardly between the plates 29 when the rod 32 is in its retracted position, illustrated in Figures 3 and 4.

The free end of the rod 32 is provided with a terminal mounting block 33 pivotally connected, as by bolt 34, to a pair of pivot plates 35 of identical, generally triangular configuration. The plates 35 are upwardly divergent to receive the mounting block 33 therebetween and are provided with registering apertures through which the pivot bolt 34 extends. The central portions of the plates 35 are in flatwise contact and are rigidly joined together, as by bolts 36.

The free lower ends of the plates 35 are downwardly divergent to receive therethrough additional pivot bolts 37 for joining the plate free ends to clevis 38 provided at the rear end of a dumping arm 39. The pivot plates 35 are also pivotally disposed at their forward ends upon a pivot bolt 40 carried by the plates 29 and surrounded by a pair of cylindrical bushings 41 to lock the pivot center for the plates 35 intermediate the plates 29.

Interposed between and rigidly joined to the side plates 29 is the extreme rear end of a forwardly projecting lifting arm 42 of channelled, U-shaped cross-section which extends forwardly of the cross shaft 20 adjacent each extremity thereof. The cross sectional height of the lift arm diminishes toward the outer extremity thereof, and the outer end of the arm carries a laterally extending pivot bolt 43 which serves to join the arm 42 to a relatively pivotable dumping arm 44 having a tapered nose portion 45 projecting beyond the lift arm and of inverted U-shaped channel stock. As best illustrated in Figure 5, the lift arm 42 and the dump arm 44 are partially nested when the arms assume their positions of Figures 1 and 6 with the actuating rod 32 of the cylinder 31 being fully retracted.

The dump arm is provided with opposed longitudinally extending slots 46 within which is positioned a pivot bolt 47 having an enlarged cylindrical central portion 48 abutting the opposing inner surfaces of the dump arm 44 and reduced shank portions 49 projecting through the slots 46. The bolt shank portions 49 also project through circular apertures 50 formed in a dumping arm slide 51 also of inverted U-shaped cross-section and partially telescoped over the dump arm 44. The enlarged central portion 48 of the bolt 47 is pivotally received by opposing apertures 52 formed in laterally spaced ears 53 rigidly joined to the free end of the dump rod 39. The dumping arm 44 is provided with spaced longitudinally extending recesses 53 and 54, respectively, formed in the upper surface thereof and terminating at the forward extremities thereof in rearwardly open re-entrant hook elements 55. The slide 51 is of such length as to be interposed between the hook elements 55, for a purpose to be hereinafter more fully described.

Operation

The device, as heretofore described, is adapted for use

with a receptacle 60 comprising U-shaped side rails 61 having the open tops thereof closed by a longitudinally extending upper rail 62. The side frames are joined by an upper lateral rail 63 (Figure 2) and by transversely extending bottom slats 64 resting upon and secured to lower side rails 65. Additional similar side rails 66 are provided to join the side frames to define a generally rectangular crate receptacle. The floor slats 64 are elevated above the lower portions 61a of the side rails to define a space beneath the floor slats 64 and intermediate the side rails into which the lift arms 42 may be inserted. The side rails thus provide bottom skids for the palletized receptacle 60.

The receptacle also carries a pair of longitudinally extending braces 67 positioned inwardly from the side frames and carrying therebetween transversely extending trunnions 68 which are contacted by the dump arms 44 upon elevation of the booms 18. The trunnions 68, upon elevation of the receptacle 60, fit into the slots 53 and 54 in the dumping arms 44 and during elevating and lowering of the receptacle, as illustrated in Figure 1, the laterally spaced dumping arms contacting the longitudinally spaced trunnions will elevate or lower the receptacle to a plurality of substantially horizontal positions, and the crate may be lowered to the ground and disengaged from the dumping arms by merely lowering the dumping arms relative to the crate after contact with the ground and the crate has been established.

To dump the receptacle, as best illustrated in Figures 6-9, inclusive, the hydraulic cylinder 31 is actuated by manipulation of the manually operable valve handle 70 (Figure 1) which connects the cylinder to the same source of fluid pressure as that utilized to elevate and lower the booms 18 through the cylinders 19 under the control of valve handle 71. The actuation of the cylinders causes extension of the cylinder actuating rod 32 to pivot the pivot plates 35 about their axis of pivoted movement 40. Initial actuation of the plates 35 causes forward movement of the dump rod 39, and this rod movement will move the ears 53 forwardly carrying the pivot bolt 48 forwardly within the slot 46 of the dumping arm. Such movement of the bolt 48 will effect forward movement of the slide 51 into abutment with the forward trunnion 68 to shift the palletized container 60 forwardly until the trunnions 68 enter the re-entrant slots defined by the elements 55.

Subsequent further actuation of the cylinder 31 will effect further pivoted movement of the plates 35 and the elevation of the dumping arm 44 about the pivot bolt 43 to at least partially invert the receptacle 60 to the positions shown in Figures 7 and 8.

Upon retraction of the actuating rod 32 into the cylinder, the dumping rod will be moved rearwardly to lower the dumping arm into re-engagement with the upper surface of the lift arm 42. Initial return movement of the rod 32 will not cause movement of the pin 47 within the slot 46 since the slot is not aligned with the path of retracting movement of the dumping rod and sliding movement of the pin within the slot cannot occur until the receptacle has returned to its initial position, as illustrated in Figure 9, and the slot becomes aligned with the path of movement of the dumping rod. At this time, the slides 51 will be moved rearwardly and the trunnions will be removed from the re-entrant dumping arm slots. The receptacle may now be disposed upon the ground or the like and the receptacle removed from the lift arm as hereinbefore described. Thus, it will be appreciated that the present invention provides an improved pallet handling and dumping apparatus for the handling of flowable material within an open topped container or receptacle. The palletized receptacle is elevated to a selected vertical position at which the container remains parallel to the ground, and the container may be inverted in any one of its vertically adjusted positions without removing the container from the lifting apparatus.

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It will, of course, be understood that various details of construction may be varied through a wide range without departing from the principles of this invention and it is, therefore, not the purpose to limit the patent granted hereon otherwise than necessitated by the scope of the appended claims.

I claim:

1. In an apparatus for handling a palletized receptacle having a raised bottom wall and a fixed laterally extending trunnion underneath said wall, comprising a vertically movable lift arm insertable beneath said wall, a dumping arm carried by said lift arm for engagement with said trunnion and pivotally movable relative to said lift arm, means on said dumping arm defining a re-entrant recess normally positioned adjacent to but longitudinally spaced from said trunnion, means carried by one of said arms for longitudinal movement there along into engagement with said receptacle to shift the same on said dumping arm causing entry of said trunnion into said recess, and means for pivotally moving said dumping arm relative to said lift arm to arcuately move said trunnion for dumping said receptacle.

2. In a tractor-mounted loader having a vertically swingable boom, apparatus for handling a palletized receptacle having a pair of longitudinally spaced laterally extending trunnions located beneath the receptacle bottom, comprising a pair of laterally spaced lift arms, dumping arms overlying said lift arms, respectively, and arcuately movable relative thereto about forwardly located lateral axes on said lift arms, said dumping arms being adapted to contact said trunnions upon elevation of a receptacle by said lift arms, actuatable power means for effecting arcuate dumping arm movement to tilt said receptacle about said axes, power-energizable locking means on said dumping arms, respectively, for engagement with said trunnions, connecting means joining said locking means and said power means for effecting movement of said locking means into engagement with said trunnions upon initial actuation of said power means, and lost-motion connecting means joining said locking means to said dumping arms to effect dumping movement thereof only after said locking means are engageable with said trunnions to prevent relative dumping arm-receptacle movement during such dumping.

3. A pallet handling and dumping apparatus for use with a receptacle having a false bottom and laterally extending longitudinally spaced trunnions disposed beneath said bottom, comprising a vertically swingable boom, a pair of laterally spaced longitudinally extending lift arms projecting beyond said boom and carried thereby for vertical movement therewith, said lift arms underlying said receptacle bottom and said trunnions, dumping arms overlying said lift arms, respectively, for vertical movement therewith and pivoted thereto adjacent the forward ends thereof for arcuate tilting movement relative to said lift arms, said dumping arms each contacting each of said trunnions and having rearwardly opening re-entrant recesses rearwardly of the axis of dumping arm tilting movement, said recesses being aligned with and equally spaced longitudinally from said trunnions, respectively, longitudinally slidable abutment means on said dumping arms for contacting said trunnions to slide said receptacle longitudinally along said dumping arms so that said trunnions enter said recesses and to retain said trunnions therein during pivoted dumping arm movement, and power means operatively connected to said dumping arms and said abutment means to effect sequential sliding movement of the abutment means and arcuate movement of the dumping arms to first lock said receptacle to the dumping arms and then tilt the receptacle for dumping the contents thereof.

4. In a handling apparatus for use with a palletized receptacle having a laterally extending trunnion, a vertically movable lift arm insertable beneath said trunnion, a dumping arm carried by said lift arm for contact with

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said trunnion upon elevation of said lift arm and pivotally movable relative to said lift arm about a forwardly located pivot axis, means on said dumping arm defining a rearwardly opening re-entrant recess positioned adjacent said trunnion, shiftable means engageable with said trunnion and movable relative to said dumping arm to shift the trunnion forwardly on said dumping arm for entry into said recess, and means for elevating said dumping arm about said axis to arcuately move said trunnion for dumping said receptacle, the weight of said receptacle and said shifting means retaining said trunnion in said recess.

5. In a pallet handling apparatus for use with a receptacle having a raised bottom and a laterally extending trunnion therebeneath, a vertically movable lift arm enterable beneath said receptacle bottom, a dumping arm pivoted to said lift arm for vertical movement therewith and for pivoted movement relative thereto, locking means on said dumping arm engageable with opposed portions of said trunnion to lock said receptacle to said dumping arm in firm assembly, and power means operable to pivot said dumping arm relative to said lift arm to dump said receptacle only after receptacle has been locked to said dumping arm.

6. In a handling apparatus for use with a receptacle having a lateral trunnion, a vertically movable lift element having one end enterable beneath said trunnion, a dumping member overlying said lift element and pivotally attached thereto adjacent said one element end, said dumping member being engageable with said trunnion to elevate the same about the point of pivotal attachment of said member and said element, actuatable locking means on said dumping member positively engaging said receptacle to prevent relative member-receptacle movement, and power means for sequentially actuating said locking means and pivoting said member relative to said element to dump the receptacle.

7. A pallet handling and dumping apparatus for use with a receptacle having a false bottom and a laterally extending trunnion disposed beneath said bottom in spaced relation thereto, comprising a longitudinally extending lift arm, means for elevating and lowering said lift arm, said lift arm being enterable beneath said receptacle bottom and said trunnion, a dumping arm carried by said lift arm for vertical movement therewith and pivoted thereto adjacent the forward end thereof for arcuate movement relative to said lift arm, said dumping arm contacting said trunnion and having a locking projection aligned with and spaced longitudinally from said trunnion for entry between said trunnion and said bottom, means on said dumping arm for contacting said trunnion to shift said receptacle longitudinally of said dumping arm so that said projection is interposed between said trunnion and said bottom to prevent further relative receptacle-dumping arm movement, and power means operatively connected to said dumping arm and said shifting means to effect sequential shifting of the receptacle and arcuate movement of the dumping arm to first lock said receptacle to the dumping arm and then dump the receptacle.

8. A pallet handling and dumping apparatus for use with a receptacle having a false bottom and laterally extending longitudinally spaced trunnions disposed beneath said bottom, comprising a vertically swingable boom, a pair of laterally spaced longitudinally extending lift arms projecting beyond said boom and carried thereby for vertical movement therewith, said lift arms being enterable beneath said receptacle bottom and said trunnions, dumping arms carried by said lift arms, respectively, for vertical movement therewith and connected thereto for independent lifting movement relative to said lift arms, said dumping arms being adapted to contact said trunnions and having locking means aligned with and spaced from said trunnions, abutment means slidable along said dumping arms shifting said receptacle to position the same for engagement with said locking means, and power means operatively connected to said dumping

arms and said abutment means to effect sequential shifting of said receptacle and lifting movement of the dumping arms to first lock said receptacle to the dumping arms and then dump the receptacle.

9. A pallet handling and dumping apparatus for use with a receptacle having a false bottom and laterally extending longitudinally spaced trunnions disposed beneath said bottom, comprising a vertically swingable boom, a pair of laterally spaced longitudinally extending lift arms projecting beyond said boom and carried thereby for vertical movement therewith, said lift arms being enterable beneath said receptacle bottom and said trunnions, dumping arms carried by said lift arms, respectively, for vertical movement therewith and pivoted thereto for arcuate movement relative to said lift arms, said dumping arms each contacting each of said trunnions and having re-entrant recesses aligned with and spaced longitudinally from said trunnions, longitudinally slidable abutment means on said dumping arms for contacting said trunnions to shift said receptacle longitudinally of said dumping arms so that said trunnions enter said recesses, and power means operatively connected to said dumping arms and said abutment means to effect sequential sliding movement of the abutment means and arcuate movement of the dumping arms to first lock said receptacle to the dumping arms and then dump the receptacle.

10. In a pallet handling apparatus for use with a receptacle having a raised bottom and a pair of longitudinally spaced laterally extending trunnions therebeneath, a vertically movable lift arm enterable beneath said raised bottom and said trunnions, a dumping arm overlying and normally contacting said lift arm, said dumping arm being pivoted to said lift arm for relative pivoted movement and having a pair of open-ended longitudinally extending recesses adapted to receive said trunnions therein, said dumping arms contacting said trunnions in spaced relation to said recesses upon elevation of said lift arms, longitudinally slidable abutment means on said dumping arms for shifting said trunnions longitudinally into and for retaining said trunnions in said recesses, a lateral pin carried by said abutment means, said dumping arm having a longitudinal slot receiving said pin therethrough, said pin and slot providing a lost motion connection with said dumping arms to accommodate sliding movement of said abutment means without corresponding movement of said dumping arms, a longitudinally extending actuating rod connected to said lateral pin, and double-acting power means for actuating said rod to effect initial sliding movement of said abutment means and subsequent pivoted movement of said dumping arm after said pin bottoms in said slot.

11. In a pallet handling apparatus for use with a receptacle having a raised bottom and a pair of longitudinally spaced laterally extending trunnions therebeneath, a vertically movable lift arm enterable beneath said raised bottom and said trunnions, a dumping arm overlying and normally contacting said lift arm, said dumping arm being pivoted to said lift arm for relative pivoted movement and having a pair of open-ended longitudinally extending recesses adapted to receive said trunnions therein, said dumping arms contacting said trunnions in spaced relation to said recesses upon elevation of said lift arms, longitudinally slidable abutment means on said dumping arms for shifting said trunnions longitudinally into and for retaining said trunnions in said recesses, a lateral pin carried by said abutment means, said dumping arm having a longitudinal slot receiving said pin therethrough, said pin and slot providing a lost motion connection with said dumping arms to accommodate sliding movement of said abutment means without corresponding movement of said dumping arms, a longitudinally extending actuating rod connected to said lateral pin, said slot and said rod being aligned when said dumping arm contacts said lift arm, and double-acting means for actuating said rod to effect initial sliding movement of said abutment means and sub-

sequent pivoted movement of said dumping arm after said pin bottoms in said slot, said slot and said arm being misaligned at all pivoted positions of said dumping arm to prevent relative movement of said abutment means during return movement of said dumping arm, so that said trunnions are retained in said recesses until contact between said dumping arms and said lift arms is made.

12. In a pallet handling apparatus for use with a receptacle having a raised bottom and a laterally extending trunnion therebeneath, a vertically movable lift arm enterable beneath said raised bottom, a dumping arm overlying said lift arm and having a rearwardly opening longitudinally extending recess adapted to receive said trunnion therein, said dumping arm having its forward end pivotally connected to the corresponding end of said lift arm and being adapted to contact said trunnion in spaced relation to said recess upon elevation of said lift arms, longitudinally slidable abutment means on said dumping arm for shifting said receptacle forwardly to enter said trunnion into said recess and having a lost-motion connection with said dumping arm to accommodate initial limited sliding movement of said abutment means without corresponding movement of said dumping arm, an actuating rod connected to said abutment means, and power means for actuating said rod, said rod exerting a lifting force on said dumping arm after the lost-motion movement of said abutment means is complete, whereby said power means effects sequential sliding movement of said abutment means and pivoted movement of said dumping arms.

13. In a pallet handling apparatus for use with a receptacle having a raised bottom and a pair of longitudinally spaced laterally extending trunnions therebeneath, a vertically movable lift arm enterable beneath said raised bottom and said trunnions, a dumping arm pivoted to said lift arm for relative pivoted movement and having a pair of open-ended longitudinally extending recesses adapted to receive said trunnions therein, said dumping arms contacting said trunnions in spaced relation to said recesses upon elevation of said lift arms, longitudinally slidable abutment means on said dumping arms for shifting said trunnions longitudinally into said recesses and having a lost-motion connection with said dumping arm to accommodate initial limited sliding movement of said abutment means without corresponding movement of said dumping arm and subsequent joint movement of said abutment means and said dumping arms, an actuating rod connected to said abutment means, and power means for actuating said rod to effect sequential sliding movement of said abutment means and pivoted movement of said dumping arm.

14. In a tractor-mounted loader, an apparatus for use with a receptacle having a raised bottom and a laterally extending trunnion therebeneath comprising a vertically movable longitudinally extending lift arm enterable beneath said receptacle bottom, means confining said lift arm to a path of vertical movement in which said arm is always horizontal, a dumping arm pivoted to said lift arm for vertical movement therewith and for pivoted movement relative thereto, means on said dumping arm engageable with said trunnion, power-energizable means for locking said receptacle to said dumping arm in firm assembly, and power means operable to pivot said dumping arm relative to said lift arm and to actuate said power-energizable means, thereby dumping said receptacle only after said receptacle has been locked to said dumping arm.

15. In a handling apparatus for use with a receptacle having a laterally extending trunnion, a vertically movable support element, a dumping arm carried by said support element for contacting said trunnion and pivotally movable about a transverse axis located on said support element in spaced relation to said trunnion, pivotal movement of said dumping arm tilting said receptacle about said axis, means on said dumping arm defining a locking

recess adapted to receive said trunnion therein during tilting of said receptacle to prevent displacement of said receptacle therefrom, said trunnion normally being spaced from said recess, power-actuable means engageable with said trunnion to move the same into said recess, and power means for sequentially actuating said power-actuable means and said dumping arm, so that tilting of said receptacle occurs only after said trunnion has been moved into said recess.

16. In a handling apparatus for use with a palletized receptacle having a laterally extending trunnion, a vertically movable lift arm enterable beneath said receptacle and engageable therewith upon vertical arm movement to elevate said receptacle, a dumping arm carried by said lift arm for vertical movement therewith and pivotally movable relative to said lift arm about a pivot axis, said dumping arm having a locking projection engageable with said trunnion to secure said receptacle to said dumping

arm for pivoted movement therewith, said locking projection normally being spaced longitudinally of said dumping arm from said trunnion, power-energizable reciprocary means engageable with said receptacle to move said receptacle longitudinally of the dumping arm to position said trunnion for engagement with said locking projection, and power means for sequentially moving said receptacle longitudinally and subsequently actuating said dumping arm only after said trunnion has been positioned for engagement with said locking projection.

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