

Aug. 2, 1932.

A. L. WASHBURNE

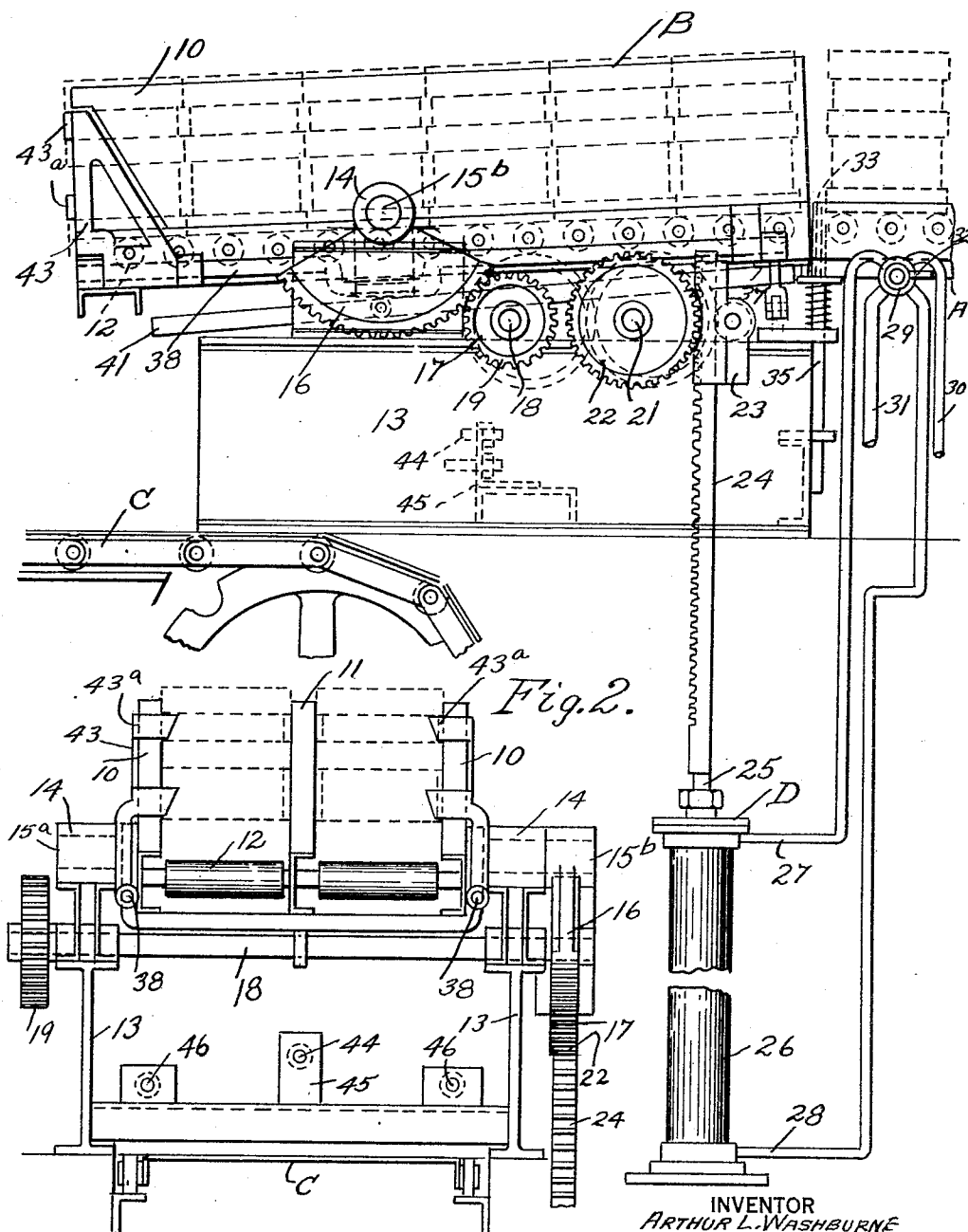
1,870,207

STACKER

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3 Sheets-Sheet 1

Fig. 1



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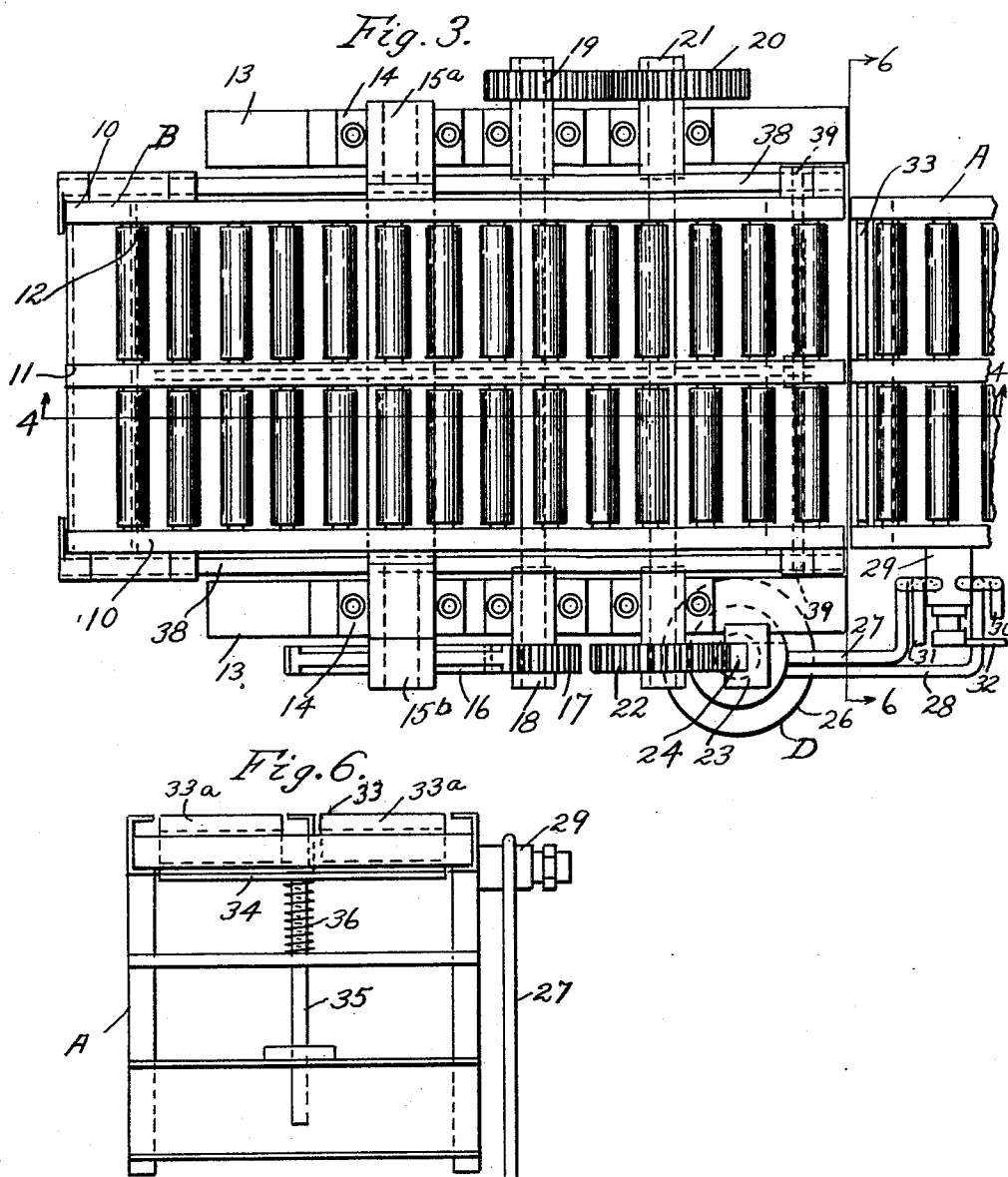
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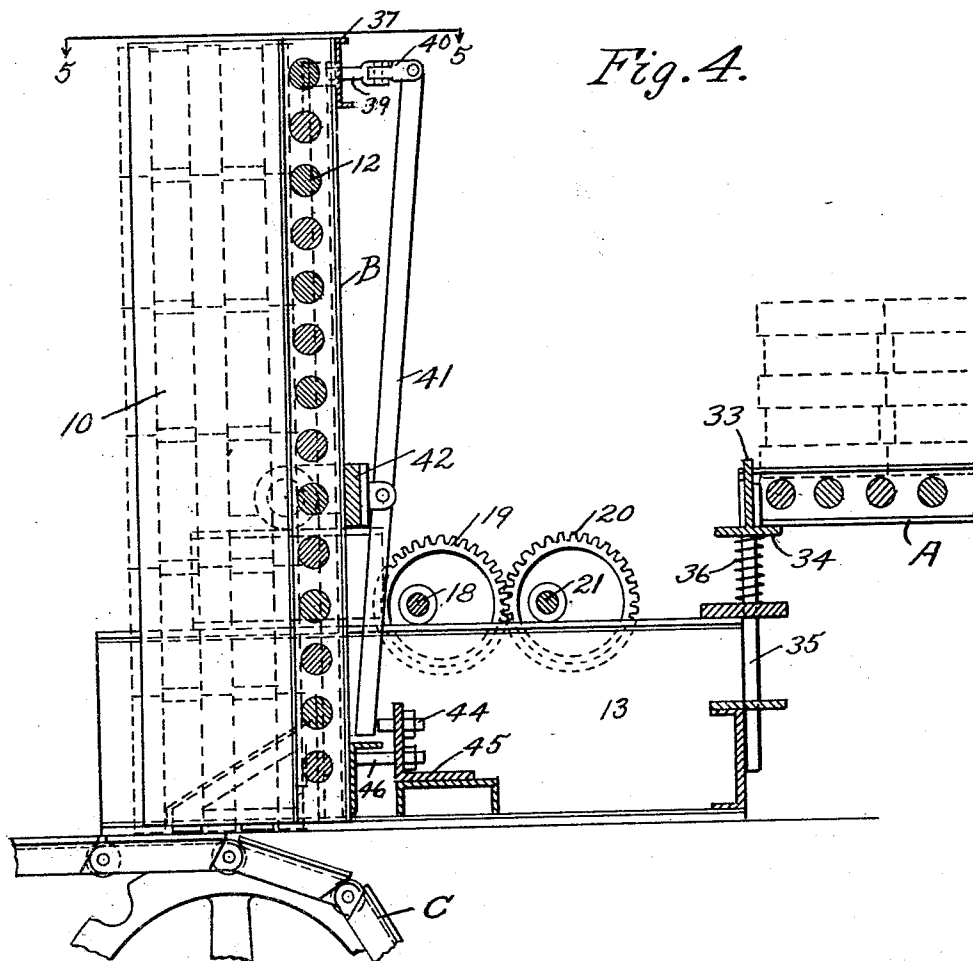
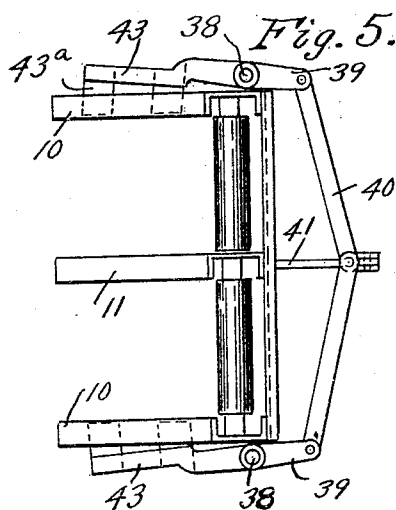
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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

ARTHUR L. WASHBURN, OF LOS ANGELES, CALIFORNIA

STACKER

Application filed November 14, 1931. Serial No. 574,951.

This invention relates to a device for stacking packages in a pile ready to be transferred to a hand truck. It is adapted to form a part of a conveyor system for packages, as for illustration, crates carrying bottles. In the device disclosed herein, the packages are positioned in a horizontal row in close formation and the row of packages then tilted to vertical position and deposited upon a carrier for removal. A specific use to which the invention may be put is that of stacking crates, each crate housing a demijohn or large bottle of water. It will be understood that the references to such use as hereinafter set forth is not intended as a limitation of the invention.

The objects of this invention are to provide a stacker having any or all of the following features: a chute which may be swung or tilted from a horizontal to a vertical position; an end gate for the chute movable in vertical position of the chute to release a stack of packages; means to control tilting of the chute and to coordinate therewith operation of the gate; and a chute as described forming the end of a conveyor line.

Fig. 1 is a side elevation of the stacker showing a fragment of a delivery conveyor and a fragment of a take-away conveyor; Fig. 2 is an end view of the stacker; Fig. 3 is a plan view of the stacker with a fragment of the delivery conveyor; Fig. 4 is a section of the stacker and fragments of the delivery and take-away conveyor with the stacker in discharge position; Fig. 5 is a view of the stacker as seen looking in the direction of the arrows 5—5 in Fig. 4 showing the package holding device in release position; and Fig. 6 is an end view of the delivery conveyor as seen looking in the direction of the arrows 6—6 of Fig. 3.

Referring more particularly to the drawings, A indicates a delivery conveyor of the rollerway type. At the end thereof is a stacker B comprising a rollerway section mounted to be aligned with the delivery conveyor and tiltable to vertical unloading position. A conveyor C of the carrying chain type to take away piles of packages unloaded by the stacker B is disposed at the far end of and below the horizontal level thereof. Operating means for the stacker is denoted by D. The conveyors A and C may be of conventional types. The specific structure shown is intended for handling two rows of crates side by side with six crates in a row on the stacker.

The stacker B comprises a chute frame having side walls 10, an intermediate wall 11 and a floor formed by idler rollers 12 pivotally supported on sills 13. The sills 13 carry bearing blocks 14 in which trunnions 15a and 15b are journaled. The trunnions are fixed to the chute frame intermediate the ends and in such position that when the frame is in unloading position as shown in Fig. 4 the far end of the chute frame is substantially flush with the upper run of conveyor C. Trunnion 15b overhangs its bearing 14 and has fixed thereto a segmental gear 16. Meshing with gear 16 is a pinion gear 17 fixed to a shaft 18 extending transverse of the sills and journaled in bearing blocks thereon. At the other end of shaft 18 is an eccentric gear 19 meshing with an eccentric gear 20 fixed to a shaft 21. The shaft 21 is journaled on the sills and is parallel to shaft 18. Fixed to the other end of shaft 21 is a gear 22. A slipper 23 is mounted on a side of a sill 13 and slidably mounted therein is a rack 24 meshing with gear 22 so that reciprocation of the rack will turn gear 22 and through the intermediate gears cause tilting of the chute frame. With the rack in its lower position as shown in Fig. 1, the chute frame is substantially horizontal with a slight incline downwardly toward the far end so that the crates will tend to travel by gravity toward the far end. Rack 24 is mounted upon the rod 25 of a hydraulic double acting jack having a cylinder 26 with conduits 27 and 28 connected to the end. A valve 29 of the rotary plug type has an inlet conduit 30 for supply of pressure fluid and an exhaust conduit 31, so that by turning the valve as by a handle 32 the ends of the cylinder 26 may be alternately connected to the exhaust and inlet and raising and lowering of rack 24 controlled. The eccentric gears provide for a

slow initial and final speed in the tilting of the stacker frame. Thus, the stacker frame may be manually controlled to move it from loading position shown in Fig. 1 to unloading position shown in Fig. 4.

On the frame of conveyor A is a gate 33 comprising plates 33a upstanding from a web 34. To the web is affixed a stem 35 slidably guided in ways on the chute frame of conveyor A. A compression spring 36 tends to hold the gate in upper or closed position obstructing movement of crates from the conveyor A to the stacker B. The web 34 projects so as to be engaged by a cross member 37 on the chute frame of stacker B. In loading position of the stacker, cross member 37 rests on web 34 and holds the gate plates 33a down and out of the way of crates allowing them to pass. In unloading position spring 36 maintains the gate in upper or closed position preventing passage of crates.

During tilting of the stacker from loading to unloading positions, the crates must be held in the stacker frame. To this end, I have provided crate holding means. Paralleling the sides of the stacker chute frame and journaled thereon are rocker shaft 38 having arms 39 fixedly secured thereto and extending downwardly. Connecting the lower ends of arms 39 is a toggle 40 and connected to the knuckle of the toggle is an actuating lever bar 41. A bracket 42 serves for pivotal mounting of the lever 41. At the far end of the stacker chute frame and secured to shafts 38 are arms 43 having fingers 43a for projection across the unloading end of the frame. With the toggle in knuckle out position the arms 43 are disposed with fingers 43a retracted to release crates and in knuckle in position the fingers are in protracted or holding position. In the operation of the stacker the fingers should be protracted when loading, protracted when tilting, and retracted when unloading. The bar 41 controls the position of the fingers. In loading position, the bar 41 is disposed with the knuckle of the toggle in as shown in Fig. 1. The bar 41 remains in this position while the stacker is being tilted. When the stacker approaches its final unloading position, the end of bar 41 engages an abutment comprising adjustable pin 44 mounted on an abutment bracket 45. Abutment pin 46 serves to limit the swinging of the stacker frame. In full unloading position the end of bar 41 engages pin 44 swinging the bar to position the knuckle of toggle 40 out with the arms 43 disposed so that fingers 43a are retracted and the stacker load is released.

Assuming the stacker is in loading position as shown in Fig. 1, the crates pass from the conveyor A on the stacker B being arrested from passage over the end by arms 43. When a load of 12 crates have moved upon the

stacker, the valve 29 is operated to raise rack 24. This causes the stacker frame to tilt slowly at first and then increasing in speed. During the initial movement of the stacker the gate 33 is released and closes due to the action of spring 36. This stops all movement of crates off the conveyor A. The speed of movement of the stacker increases and toward its final position decreases. As the stacker reaches unloading position shown in Fig. 4, bar 41 is engaged by abutment pin 44 and the arms 43 are swung to release the two piles of crates which then rest on conveyor C and are taken away. The valve 29 is then moved so that the rack 24 is lowered and the stacker restored to loading position, bar 41 moving arms 43 to protracted position with fingers 43a arresting movement of the crates off the stacker chute frame. Conveyor C moves the piles of crates slowly so that a hand truck may be manipulated to dispose its nose under a pile or pair of piles and the crates carted away.

What I claim is:

1. A stacker adapted for operation with a delivery conveyor for packages comprising in combination an open ended chute frame pivotally mounted intermediate its ends for tilting to effect a loading position in alignment with the delivery conveyor or an upright unloading position: means to tilt said frame including a set of gears having a driving gear, intermediate eccentric gears to effect a slow tilting movement at the ends of the swing of said frame; and means to selectively drive said set of gears in either direction.

2. A stacker adapted for operation with a delivery conveyor for packages comprising in combination an open ended chute frame pivotally mounted intermediate its ends for tilting to effect a loading position in alignment with the delivery conveyor or an upright unloading position: means to tilt said frame including a set of gears having a driving gear, intermediate eccentric gears to effect a slow tilting movement at the ends of the swing of said frame; means to selectively drive said set of gears in either direction: package holding means including rocker arms for swinging to and from each other transversely of said frame at its far end, and means to swing said rocker arms.

3. A stacker adapted for operation with a delivery conveyor for packages comprising in combination an open ended chute frame pivotally mounted intermediate its ends for tilting to effect a loading position in alignment with the delivery conveyor or an upright unloading position: means to tilt said frame including a set of gears having a driving gear, intermediate eccentric gears to effect a slow tilting movement at the ends of the swing of said frame; means to selectively drive said set of gears in either direction:

a gate urged into elevated position obstructing passage of packages from said conveyor onto said frame, means operated by said frame in loading position to hold said gate depressed: package holding means including rocker arms for swinging to and from each other transversely of said frame at its far end, and means to swing said rocker arms.

4. A stacker adapted for operation with a delivery conveyor for packages comprising in combination an open ended chute frame pivotally mounted intermediate its ends for tilting to effect a loading position in alignment with the delivery conveyor or an upright unloading position: means to tilt said frame including a set of gears having a driving gear, intermediate eccentric gears to effect a slow tilting movement at the ends of the swing of said frame; means to selectively drive said set of gears in either direction: package holding means including rocker arms for swinging to and from each other transversely of said frame at its far end, said rocker arms having fingers to be projected into the chute way or to be protracted therefrom, operating arms on said shafts, means to swing said rocker arms including an operating member, and a stationary abutment to be engaged by said member at unloading position of said frame thereby causing said rocker arms to be moved to retracted position.

5. A stacker adapted for operation with a delivery conveyor for packages comprising in combination an open ended chute frame pivotally mounted intermediate its ends for tilting to effect a loading position in alignment with the delivery conveyor or an upright unloading position: means to tilt said frame including a set of gears having a driving gear, intermediate eccentric gears to effect a slow tilting movement at the ends of the swing of said frame; means to selectively drive said set of gears in either direction: a gate urged into elevated position obstructing passage of packages from said conveyor onto said frame, means operated by said frame in loading position to hold said gate depressed: package holding means including rocker arms for swinging to and from each other transversely of said frame at its far end, said rocker arms having fingers to be projected into the chute way or to be protracted therefrom, operating arms on said shafts, means to swing said rocker arms including an operating member, and a stationary abutment to be engaged by said member at unloading position of said frame thereby causing said rocker arms to be moved to retracted position.

6. A stacker adapted for operation with a delivery conveyor for packages comprising in combination an open ended chute frame pivotally mounted intermediate its ends for tilting to effect a loading position in alignment

with the delivery conveyor or an upright unloading position: means to tilt said frame including a set of gears having a driving gear, intermediate eccentric gears to effect a slow tilting movement at the ends of the swing of said frame; means to selectively drive said set of gears in either direction: package holding means including rocker arms for swinging to and from each other transversely of said frame at its far end, rocker shafts extending along the sides of said frame and to which said rocker arms are secured, said rocker arms having fingers to be projected into the chute way or to be protracted therefrom, operating arms on said shafts, a toggle joint connecting said operating arms, a lever bar extending longitudinally of said frame and connected at one end to the knuckle of said joint, said lever bar being pivotally mounted intermediate its ends on said frame, a stationary abutment for engagement by the free end of said bar at unloading position of said frame whereby to swing said bar and move said knuckle toward collapsing position of said joint and thereby cause said rocker arms to be moved to retracted position.

7. A stacker adapted for operation with a delivery conveyor for packages comprising in combination an open ended chute frame pivotally mounted intermediate its ends for tilting to effect a loading position in alignment with the delivery conveyor or an upright unloading position: means to tilt said frame including a set of gears having a driving gear, intermediate eccentric gears to effect a slow tilting movement at the ends of the swing of said frame; means to selectively drive said set of gears in either direction: a gate urged into elevated position obstructing passage of package from said conveyor onto said frame, means operated by said frame in loading position to hold said gate depressed: package holding means including rocker arms for swinging to and from each other transversely of said frame at its far end, rocker shafts extending along the sides of said frame and to which said rocker arms are secured, said rocker arms having fingers to be projected into the chute way or to be protracted therefrom, operating arms on said shafts, a toggle joint connecting said operating arms, a lever bar extending longitudinally of said frame and connected at one end to the knuckle of said joint, said lever bar being pivotally mounted intermediate its ends on said frame, a stationary abutment for engagement by the free end of said bar at unloading position of said frame whereby to swing said bar and move said knuckle toward collapsing position of said joint and thereby cause said rocker arms to be moved to retracted position.

8. A stacker adapted for operation with a delivery conveyor for packages comprising

in combination an open ended chute frame pivotally mounted intermediate its ends for tilting to effect a loading position in alignment with the delivery conveyor or an upright unloading position: means to tilt said frame including a set of gears having a driving gear, intermediate eccentric gears to effect a slow tilting movement at the ends of the swing of said frame, and a reciprocable rack meshing with said driving gear; a double acting fluid actuated jack to move said rack, a manually controllable valve to control actuating fluid for said jack and to selectively move said rack in either direction.

9. A stacker adapted for operation with a delivery conveyor for packages comprising in combination an open ended chute frame pivotally mounted intermediate its ends for tilting to effect a loading position in alignment with the delivery conveyor or an upright unloading position: means to tilt said frame including a set of gears having a driving gear, intermediate eccentric gears to effect a slow tilting movement at the ends of the swing of said frame, and a reciprocable rack meshing with said driving gear; a double acting fluid actuated jack to move said rack, a manually controllable valve to control actuating fluid for said jack and to selectively move said rack in either direction: and package holding means including rocker arms for swinging to and from each other transversely of said frame at its far end, and means to swing said rocker arms.

10. A stacker adapted for operation with a delivery conveyor for packages comprising in combination an open ended chute frame pivotally mounted intermediate its ends for tilting to effect a loading position in alignment with the delivery conveyor or an upright unloading position: means to tilt said frame including a set of gears having a driving gear, intermediate eccentric gears to effect a slow tilting movement at the ends of the swing of said frame, and a reciprocable rack meshing with said driving gear; a double acting fluid actuated jack to move said rack, a manually controllable valve to control actuating fluid for said jack and to selectively move said rack in either direction: a gate urged into elevated position obstructing passage of packages from said conveyor onto said frame, means operated by said frame in loading position to hold said gate depressed: package holding means including rocker arms for swinging to and from each other transversely of said frame at its far end, and means to swing said rocker arms.

11. A stacker adapted for operation with a delivery conveyor for packages comprising in combination an open ended chute frame pivotally mounted intermediate its ends for tilting to effect a loading position in alignment with the delivery conveyor or an upright unloading position: means to tilt said

frame including a set of gears having a driving gear, and a reciprocable rack meshing with said driving gear; a double acting fluid actuated jack to move said rack, a manually controllable valve to control actuating fluid for said jack and to selectively move said rack in either direction; package holding means including rocker arms for swinging to and from each other transversely of said frame at its far end, said rocker arms having fingers to be projected into the chute way or to be protracted therefrom, means to swing said rocker arms including an operating member, and a stationary abutment to be engaged by said member at unloading position of said frame thereby causing said rocker arms to be moved to retracted position.

12. A stacker adapted for operation with a delivery conveyor for packages comprising in combination an open ended chute frame pivotally mounted intermediate its ends for tilting to effect a loading position in alignment with the delivery conveyor or an upright unloading position: means to tilt said frame including a set of gears having a driving gear and a reciprocable rack meshing with said driving gear; a double acting fluid actuated jack to move said rack, a manually controllable valve to control actuating fluid for said jack and to selectively move said rack in either direction; a gate urged into elevated position obstructing passage of packages from said conveyor onto said frame, means operated by said frame in loading position of said frame to hold said gate depressed; package holding means including rocker arms for swinging to and from each other transversely of said frame at its far end, said rocker arms having fingers to be projected into the chute way or to be protracted therefrom, means to swing said rocker arms including an operating member, and a stationary abutment to be engaged by said member at unloading position of said frame thereby causing said rocker arms to be moved to retracted position.

13. A stacker adapted for operation with a delivery conveyor for packages comprising in combination an open ended chute frame pivotally mounted intermediate its ends for tilting to effect a loading position in alignment with the delivery conveyor or an upright unloading position: means to tilt said frame including a set of gears having a driving gear, intermediate eccentric gears to effect a slow tilting movement at the ends of the swing of said frame and a reciprocable rack meshing with said driving gear; a double acting fluid actuated jack to move said rack, a manually controllable valve to control actuating fluid for said jack and to selectively move said rack in either direction: package holding means including rocker arms for swinging to and from each other transversely of said frame at its far end, said

rocker arms having fingers to be projected into the chute way or to be protracted therefrom, means to swing said rocker arms including an operating member, and a stationary abutment to be engaged by said member at unloading position of said frame whereby to cause said rocker arms to be moved to retracted position.

14. A stacker adapted for operation with a delivery conveyor for packages comprising in combination an open ended chute frame pivotally mounted intermediate its ends for tilting to effect a loading position in alignment with the delivery conveyor or an upright unloading position: means to tilt said frame including a set of gears having a driving gear, intermediate eccentric gears to effect a slow tilting movement at the ends of the swing of said frame and a reciprocable rack meshing with said driving gear; a double acting fluid actuated jack to move said rack, a manually controllable valve to control actuating fluid for said jack and to selectively move said rack in either direction: a gate urged into elevated position obstructing passage of packages from said conveyor onto said frame, means operated by said frame in loading position of said frame to hold said gate depressed: package holding means including rocker arms for swinging to and from each other transversely of said frame at its far end, said rocker arms having fingers to be projected into the chute way or to be protracted therefrom, means to swing said rocker arms including an operating member, and a stationary abutment to be engaged by said member at unloading position of said frame whereby causing said rocker arms to be moved to retracted position.

15. A stacker adapted for operation with a delivery conveyor for packages comprising in combination an open ended chute frame pivotally mounted intermediate its ends for tilting to effect a loading position in alignment with the delivery conveyor or an upright unloading position: means to tilt said frame including a set of gears having a driving gear, intermediate eccentric gears to effect a slow tilting movement at the ends of the swing of said frame and a reciprocable rack meshing with said driving gear; a double acting fluid actuated jack to move said rack, a manually controllable valve to control actuating fluid for said jack and to selectively move said rack in either direction: package holding means including rocker arms for swinging to and from each other transversely of said frame at its far end, said rocker arms having fingers to be projected into the chute way or to be protracted therefrom, means to swing said rocker arm including a lever bar extending longitudinally of said frame, said lever bar being pivotally mounted intermediate its ends on said frame, a stationary abutment for engagement by

the free end of said bar at unloading position of said frame whereby to swing said bar and cause said rocker arms to be moved to retracted position.

16. A stacker adapted for operation with a delivery conveyor for packages comprising in combination an open ended chute frame pivotally mounted intermediate its ends for tilting to effect a loading position in alignment with the delivery conveyor or an upright unloading position: means to tilt said frame including a set of gears having a driving gear, intermediate eccentric gears to effect a slow tilting movement at the ends of the swing of said frame and a reciprocable rack meshing with said driving gear; a double acting fluid actuated jack to move said rack, a manually controllable valve to control actuating fluid for said jack and to selectively move said rack in either direction: a gate urged into elevated position obstructing passage of packages from said conveyor onto said frame, means operated by said frame in loading position of said frame to hold said gate depressed: package holding means including rocker arms for swinging to and from each other transversely of said frame at its far end, said rocker arms having fingers to be projected into the chute way or to be protracted therefrom, means to swing said rocker arms including a lever bar extending longitudinally of said frame, said lever bar being pivotally mounted intermediate its ends on said frame, a stationary abutment for engagement by the free end of said bar at unloading position of said frame whereby to swing said bar and cause said rocker arms to be moved to retracted position.

17. A stacker adapted for operation with a delivery conveyor for packages comprising in combination an open ended chute frame pivotally mounted intermediate its ends for tilting to effect a loading position in alignment with the delivery conveyor or an upright unloading position: means to tilt said frame; a double acting fluid actuated jack to operate said means, a manually controllable valve to control actuating fluid for said jack and to selectively operate said means to tilt said frame in either direction: package holding means including rocker arms for swinging to and from each other transversely of said frame at its far end, rocker shafts extending along the sides of said frame and to which said rocker arms are secured; said rocker arms having fingers to be projected into the chute way or to be protracted therefrom, operating arms on said shafts, a toggle joint connecting said operating arms, a lever bar extending longitudinally of said frame and connected at one end to the knuckle of said joint, said lever bar being pivotally mounted intermediate its ends on said frame, a stationary abutment for engagement by the free end of said bar

at unloading position of said frame whereby to swing said bar and move said knuckle toward collapsing position of said joint and thereby cause said rocker arms to be moved to retracted position.

18. A stacker adapted for operation with a delivery conveyor for packages comprising in combination an open ended chute frame pivotally mounted intermediate its ends for tilting to effect a loading position in alinement with the delivery conveyor or an upright unloading position: means to tilt said frame; a double acting fluid actuated jack to operate said means, a manually controllable valve to control actuating fluid for said jack and to selectively operate said means to tilt said frame in either direction: a gate urged into elevated position obstructing passage of packages from said conveyor onto said frame, means operated by said frame in loading position of said frame to hold said gate depressed: package holding means including rocker arms for swinging to and from each other transversely of said frame at its far end, rocker shafts extending along the sides of said frame and to which said rocker arms are secured, said rocker arms having fingers to be projected into the chute way or to be protracted therefrom, operating arms on said shafts, a toggle joint connecting said operating arms, a lever bar extending longitudinally of said frame and connected at one end to the knuckle of said joint, said lever bar being pivotally mounted intermediate its ends on said frame, a stationary abutment for engagement by the free end of said bar at unloading position of said frame whereby to swing said bar and move said knuckle toward collapsing position of said joint and thereby cause said rocker arms to be moved to retracted position.

19. A stacker adapted for operation with a delivery conveyor for packages comprising in combination an open ended chute frame pivotally mounted intermediate its ends for tilting to effect a loading position in alinement with the delivery conveyor or an upright unloading position: means to tilt said frame including a set of gears having a driving gear, and a reciprocable rack meshing with said driving gear; a double acting fluid actuated jack to move said rack, a manually controllable valve to control actuating fluid for said jack and to selectively move said rack in either direction; a gate urged into elevated position obstructing passage of packages from said conveyor onto said frame, means operated by said frame in loading position to hold said gate depressed: package holding means including rocker arms for swinging to and from each other transversely of said frame at its far end, rocker shafts extending along the sides of said frame and to which said rocker arms are secured, said rocker arms having fingers

to be projected into the chute way or to be protracted therefrom, operating arms on said shafts, a toggle joint connecting said operating arms, a lever bar extending longitudinally of said frame and connected at one end to the knuckle of said joint, said lever bar being pivotally mounted intermediate its ends on said frame, a stationary abutment for engagement by the free end of said bar at unloading position of said frame whereby to swing said bar and move said knuckle toward collapsing position of said joint and thereby cause said rocker arms to be moved to retracted position.

20. A stacker adapted for operation with a delivery conveyor for packages comprising in combination an open ended chute frame pivotally mounted intermediate its ends for tilting to effect a loading position in alinement with the delivery conveyor or an upright unloading position: means to tilt said frame including a set of gears having a driving gear, intermediate eccentric gears to effect a slow tilting movement at the ends of the swing of said frame, and a reciprocable rack meshing with said driving gear; a double acting fluid actuated jack to move said rack, a manually controllable valve to control actuating fluid for said jack and to selectively move said rack in either direction: a gate urged into elevated position obstructing passage of packages from said conveyor onto said frame, means operated by said frame in loading position to hold said gate depressed: package holding means including rocker arms for swinging to and from each other transversely of said frame at its far end, rocker shafts extending along the sides of said frame and to which said rocker arms are secured, said rocker arms having fingers to be projected into the chute way or to be protracted therefrom, operating arms on said shafts, a toggle joint connecting said operating arms, a lever bar extending longitudinally of said frame and connected at one end to the knuckle of said joint, said lever bar being pivotally mounted intermediate its ends on said frame, a stationary abutment for engagement by the free end of said bar at unloading position of said frame whereby to swing said bar and move said knuckle toward collapsing position of said joint and thereby cause said rocker arms to be moved to retracted position.

In witness that I claim the foregoing I have hereunto subscribed my name this 5th day of June, 1931.

ARTHUR L. WASHBURNE.