

July 3, 1962

M. E. DOLE
BIN TILTING DEVICE

3,042,237

Filed Nov. 26, 1957

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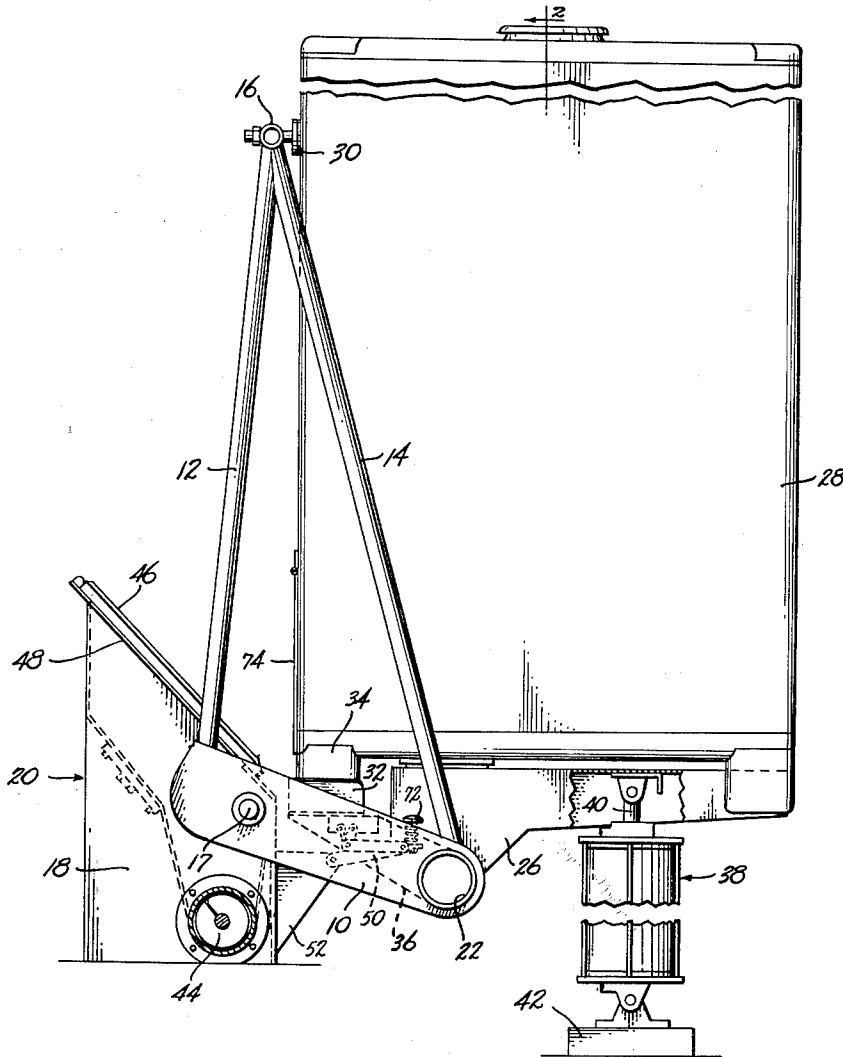


Fig. 1.

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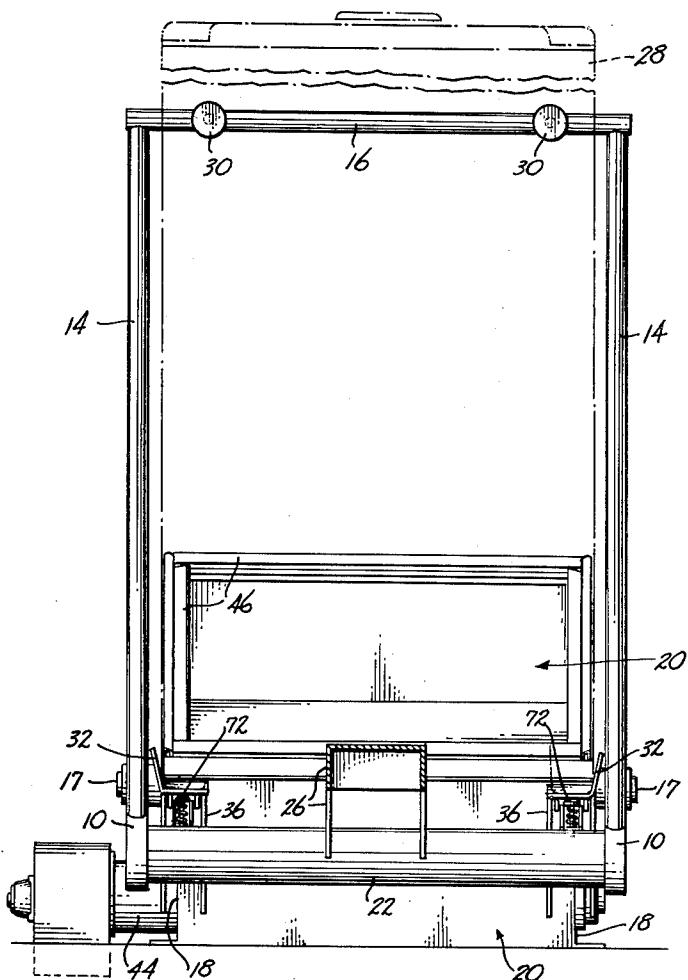


Fig. 2.

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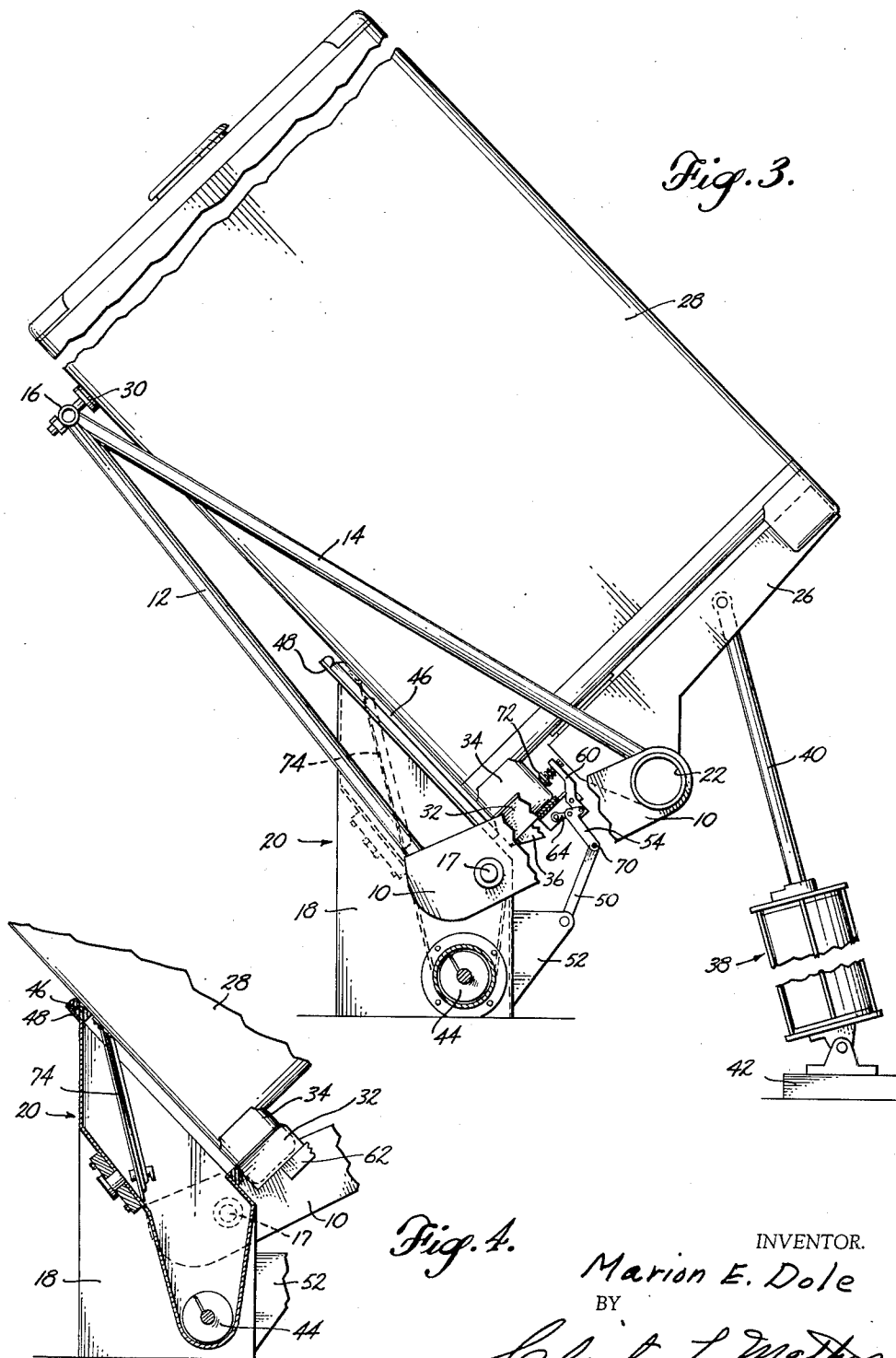
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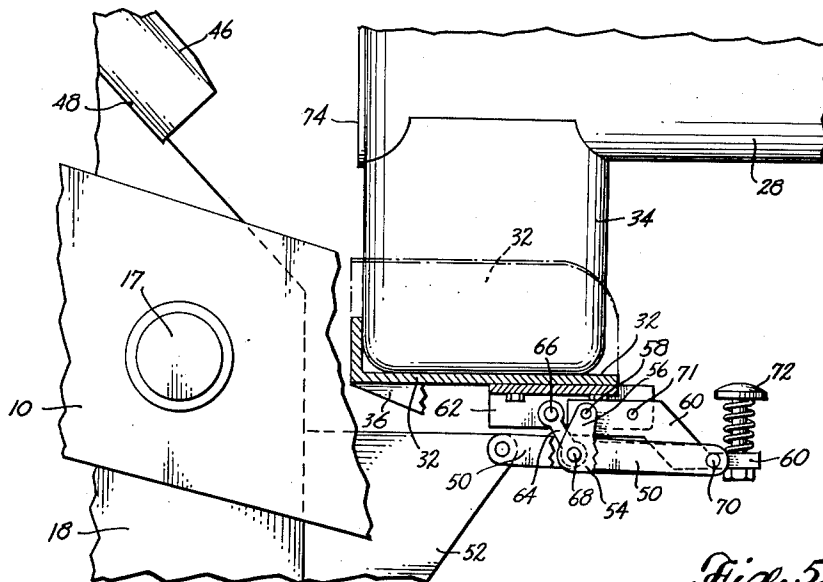


Fig. 5.

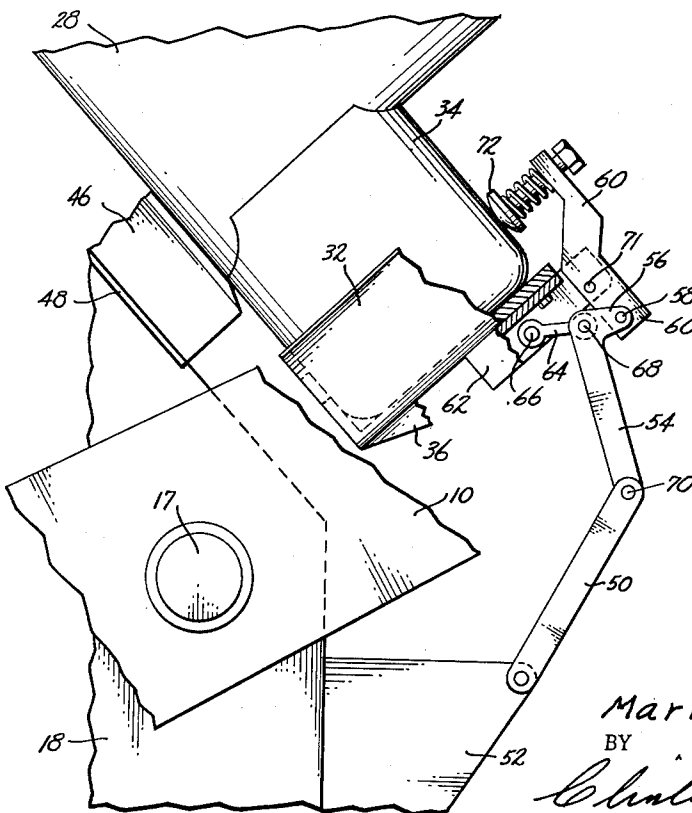


Fig. 6.

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3,042,237

BIN TILTING DEVICE

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4 Claims. (Cl. 214—314)

This invention relates to a receptacle tilting and unloading apparatus.

More particularly this invention relates to an improvement on United States Letters Patent No. 2,578,116 issued December 11, 1951, for Receptacle Tilting and Unloading Device such as bins disclosed in United States Letters Patent No. 2,648,428, issued August 11, 1953.

In the prior art of unloading bins containing material, it was common to move the bin against an unloading discharge chute and then tilt the bin and the tilt rack together.

The present invention has for an object the tilting of the bin or angularly moving the bin against a relatively fixed discharge means.

Another object of the present invention is to provide bin leg engaging means which are operable in response to tilting movement of the tilt rack and the bin.

Other objects and advantages of this invention will become apparent as the description of the same proceeds and the invention will be best understood from the consideration of the accompanying detailed description, taken in connection with the accompanying drawings forming a part of the specification, with the understanding, however, that the invention is not to be limited to the exact details of construction shown and described since obvious modifications will occur to a person skilled in the art.

In the drawings:

FIGURE 1 is a view in side elevation and with parts broken away showing a tilting device of this invention along with a bin to be relatively tilted;

FIG. 2 is a view taken substantially on broken line 2—2 of FIG. 1 and with the bin shown in phantom so as not to obscure details of the tilting device;

FIG. 3 is a view similar to FIG. 1, except that additional parts have been broken away for purposes of illustration, and the tilting device and the bin carried thereby have been rotated approximately 45° over the relative positions shown in FIG. 1;

FIG. 4 is a fragmentary sectional view of parts shown in FIG. 3 to bring out further details of construction;

FIG. 5 is an enlarged fragmentary view showing the relative position of the foot engaging means when the structure is in the position shown in FIG. 1 of the drawings; and

FIG. 6 is a view similar to FIG. 5 except showing the relative position of the parts when the tilting mechanism and the bins are in the position shown in FIG. 3 of the drawings.

Referring now to the drawings, there is a side brace at each side of the tilting mechanism and each side brace may comprise a base brace 10 and two diagonal braces 12 and 14.

Each of the side braces 10—12—14 is interconnected at a top portion as by a tubular brace 16. At the bottom each of the side braces 10—12—14 is pivotally connected by a bearing 17 with one of the end plates 18 of the discharge hopper, generally indicated by 20. Also the spaced apart base braces 10 are interconnected by a cross tubular brace 22.

The cross tubular brace 22 carries a tongue 26 and the tongue 26 is adapted to support a bin 28 so that the tines of a fork lift truck may be inserted under a bin 28 and a bin will straddle the tongue 26 so that a bin can be

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moved into place and supported by the tongue 26 or removed from the said tongue 26.

Preferably the tubular brace 16 carries adjustable padded stops 30 so that one side wall face of a bin 28 may be caused to engage, at the top end portion thereof, adjustable stops 30. The same face of the bin, which was arrested by engaging the adjustable stops 30, is arrested at the bottom against movement in the same direction when leg cups 32 engage legs 34 of the bin 28. Thus with movement of the bin and the tilting mechanism in a direction from FIG. 1 to FIG. 3, the legs 34 of the bin engage the vertical flanges of the leg cups 32 at the bottom and an upper portion of the bin 28 will engage with spaced apart adjustable stops 30.

The leg cups 32 may be supported by the base brace 10 or by the cross tubular brace 22 and as an illustration, there are shown supports 36 between each cup 32 and the cross brace 22. The purpose of supporting the leg cups 32 adjacent the braces 10 is to keep the leg cups 32 to the sides and thus not interfere with the movement of lift truck tines adjacent the tongue 26.

A lift truck will move a bin 28 onto the tongue 26 and the parts will assume the positions shown in FIG. 1 of the drawings. The leg cups 32 tend to adjust the bin sidewise so as to be centrally located on the tongue 26.

The means, to angularly move the tongue 26 and bin 28 supported thereby from the position shown in FIG. 1 of the drawings to the position shown in FIG. 3 of the drawings, may comprise a fluid piston and cylinder means generally indicated by 38. The said fluid operated piston and cylinder means 38 interconnect with the tongue 26 by a rod 40 which is pivotally connected with said tongue 26. At the other end portion, the fluid piston and cylinder means 38 is pivotally connected to a suitably arranged fixed support 42.

A discharge means to receive the contents from the bin 28 may be in the nature of the hopper 20 having a screw type conveyor discharge 44 within the hopper 20. The hopper 20 has an intake opening surrounded by a gasket 46. The hopper 20 has a face plate 48 supporting the gasket 46 and the face plate 48 is disposed at an angle in the order of 45° to the horizontal or the vertical. In the event that a bin, such as shown in FIGS. 1 to 3, is employed and said bin has a discharge door disposed in one side wall face and adjacent the bottom of the bin, then material will best discharge from the bin when the bin is tilted at an angle in the order of 45°. There may be variations in degrees but maximum efficiency requires tilting of the bin so that the material is discharging from the side walls or from the bottom at substantially the same angle.

In the present invention, the bin is tipped to the desired angle depending upon the location of the discharge door in the bin and the bin is moved against a discharge face plate, as the face plate 48, while the said face plate is relatively fixed as respects the bin so that the bin moves against a face plate which is to be distinguished from the prior art patent of F. J. White et al. 2,578,116. In said prior art patent, the bin was supported by the tongue and sealed against the hopper and then the bin and hopper and tongue tilted after such prior initial engagement.

Now referring to the fragmentary view, FIGS. 5 and 6, it is desired that as the bin and tilting means move from the position shown in FIG. 1 to the position shown in FIG. 3 of the drawings that apparatus be employed which will firmly secure the legs 34 in the leg cups 32 and urge the said legs 34 in a direction from right to left as viewed in FIGS. 1 and 3 of the drawings. This construction embodies a link 50 pivoted to a plate 52 and which plate 52 is carried by an end plate 18. The construction will be the same at each side and hence only the construction from the side as viewed in FIGS. 1 and

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3 will be described as the construction on the opposite side will be the same in function and paired therewith. The link 50 is pivoted by pivot means 70 to a second link 54. The link 54 carries a dog leg link 56 so that the links 54-56 may be termed a bell crank. The dog link 56 is pivoted at 58 with a link 60. The leg cup 32 carries a plate 62 and a link 64 is pivoted by pivot 66 with the plate 62. Also the link 64 is pivoted by pivot means 68 with the bell crank 54-56.

Referring now particularly to FIG. 6 which shows the tongue 26 tilted its furthest amount, and to return the parts to the position shown in FIG. 5 of the drawings, it will be apparent that as the pivot 70 moves to the right as respects the showing in FIG. 6, the pivot 68 will move downwardly and pivots 58 and 66 will move relatively towards each other and that the link 60 will move in a clockwise direction. As the link 60 moves in a clockwise direction about pivot 71, the adjustable spring loaded stop 72 will move away from the bin leg 34. This is the direction of movement as the bin is moved downwardly or in other words the tongue 26 moves in a clockwise direction, and thus the linkage described in connection with FIG. 6 will finally assume the relative positions shown in FIG. 5. When the bin starts normally in the position shown in FIG. 5, then upon turning of the tongue 26 in a counter-clockwise direction, the linkage will finally assume the relative positions shown in FIG. 6 of the drawings and the stop 72 will be urged against a bin leg 34 and the bin leg will be urged so that the bin leg is urged against the upright flange of a leg cup 32.

The structure shown in FIGS. 5 and 6 of the drawings is extremely useful where the bins 28 are of a height much greater than the elevation of the adjustable stop 30 carried by the tubular cross brace 16. Also by having the movement of the tilting mechanism cause the adjustable stop 72 to engage the legs, then there is certainty of the position of the bin so that as the bin is tilted the door opening 74 of a bin 28 will positively register and index relative to the face plate 48 and the gasket 46 carried by said face plate 48.

The details of construction tilting mechanism per se of the drawings form no part of the present invention and generally the construction is illustrative of this invention indicating that the amount of angular movement of tilting mechanism is not necessarily limited to substantially 45°.

In view of the similarity of discharge doors and means to open and close the same here pertinent and to those illustrated in the patent to F. J. White et al. 2,578,116, the same have not been described and discussed in detail.

Obviously changes may be made in forms, dimensions and arrangements of the parts of my invention without departing from the principle thereof, the above setting forth only preferred forms of embodiment.

I claim:

1. A tilting device for a rectangular bin having a bottom end provided with supporting legs and a material discharge and discharge opening closure means therefor comprising a hinged outwardly opening door for closing said material discharge opening, said door being disposed adjacent a lower end portion of a side wall thereof; a rotatably mounted bin holding and supporting device comprising a rigid frame structure contacting the said side wall of said bin at a position above said side door and detachably supporting the bottom end of the bin; means for rotating said bin holding and supporting device substantially 45°; a relatively fixed material receiving means; a face plate having a material receiving opening therethrough, which opening is larger than said hinged door, said plate rigidly being disposed on said relatively fixed material receiving means, said face plate being angularly

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disposed at substantially 45° to the horizontal, being disposed in the path of travel of said discharge means of said bin, and being aligned to meet the said side wall of said bin around said door with a flush contact upon rotation of the bin holding device; and gasket means disposed between said plate and the said side wall of the bin upon said rotation, said relatively fixed supporting means supporting said bin against further tilting when the bin is rotated to provide said flush contact.

2. A tilting device for tilting relative to a fixed support bins having legs comprising a rotatably mounted bin holding device; a leg receiving cup carried by said bin holding device and having a bottom and a vertical wall for engaging with the forward and bottom portions respectively of a bin leg; clamping means carried by said bin holding device and engageable with the trailing portion of said bin leg; and a clamp operating means operable by and during rotary movement of the bin holding device, wherein the clamping means is rotatably carried by the bin holding device and the clamp operating means comprises links interconnecting the clamping means and a fixed support, whereby said bin leg is clamped to said leg receiving cup during rotary movement of said rotatably mounted bin holding device.

3. In apparatus for dumping the contents of a bin having a bottom and a side wall provided with a discharge door mounted to swing outwardly of said side wall to an open position, a fixed hopper having side walls and an open upper end which is inclined downwardly toward one of said side walls and is larger than said door for engagement with said bin side wall at a position surrounding said discharge door, and a lift frame pivotally supported adjacent said hopper for up and down pivotal movement about a substantially horizontal axis, said lift frame being pivotally movable about said axis in an upward direction from a position in which said lift frame is substantially horizontal and extends outwardly away from said one hopper side wall, bin supporting means on said lift frame and extending upwardly therefrom in said horizontal position of the lift frame to engage said bin side wall at a position above said door, and said support means being movable with said lift frame during said pivotal movement.

4. In apparatus for dumping the contents of a bin having a bottom and a side wall provided with a discharge door mounted to swing outwardly of said side wall to an open position, a fixed hopper having an open upper end which is inclined relative to the horizontal and is larger than said door, annular gasket means on said hopper upper end of a size to engage said side wall at a position surrounding said discharge door, a lift frame pivotally supported on said hopper for up and down pivotal movement about a substantially horizontal axis, means on said lift frame for supporting the bottom of said bin in a position in which said side wall is adjacent to and angularly related to said hopper end, power means attached to said lift frame for pivotally moving said lift frame upwardly to a position in which said side wall is engaged with said gasket means, and adjustable stop means on said lift frame movable with said lift frame during said pivotal movement and engageable with said side wall at a position above said discharge door.

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