

May 13, 1952

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BULK DELIVERY SYSTEM FOR DROP DELIVERY BINS

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3 Sheets-Sheet 1

Fig. 1.

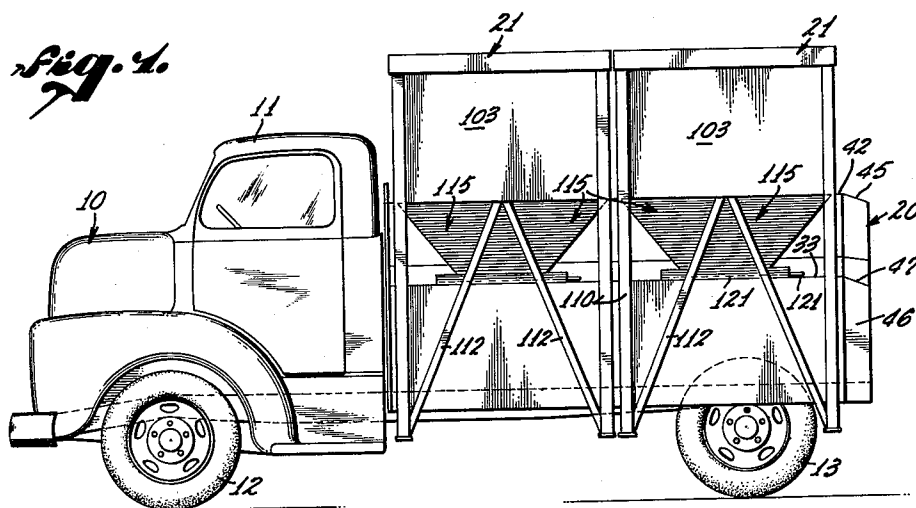


Fig. 2.

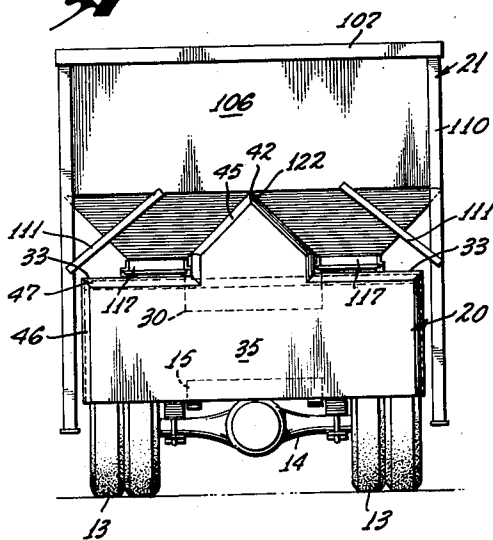
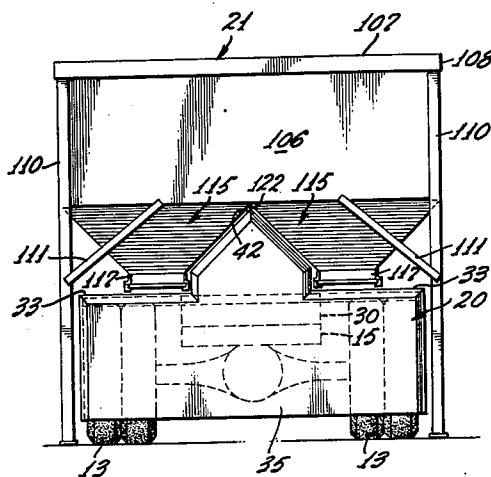


Fig. 3.



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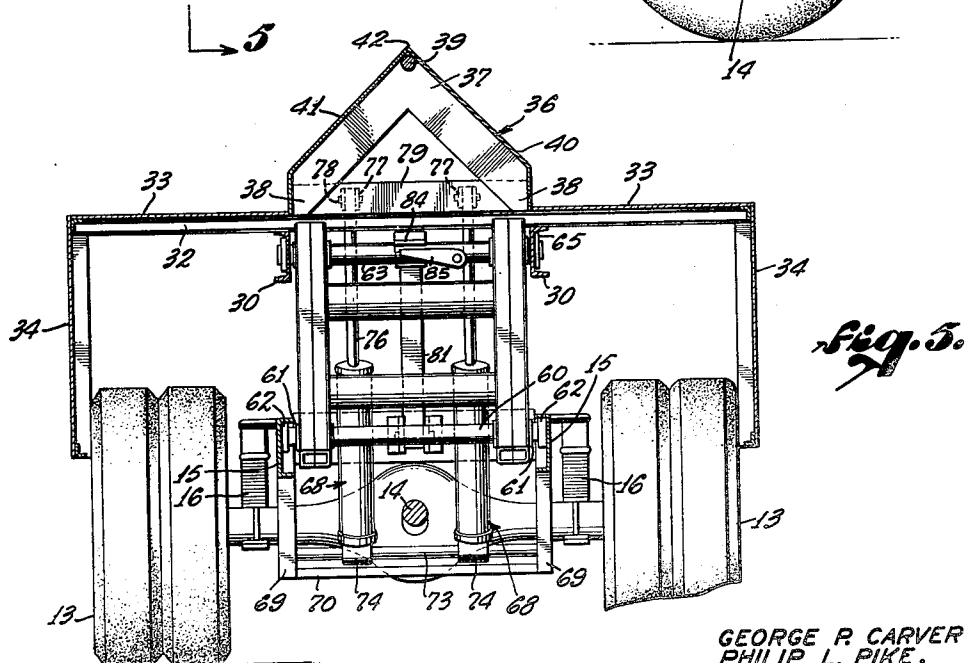
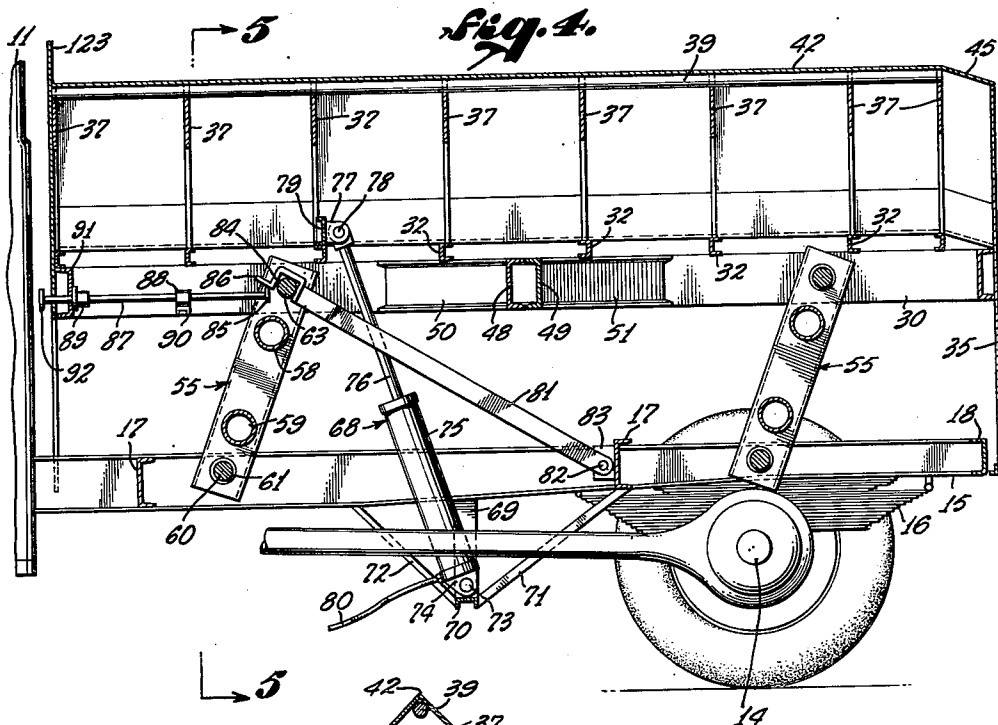
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3 Sheets-Sheet 2



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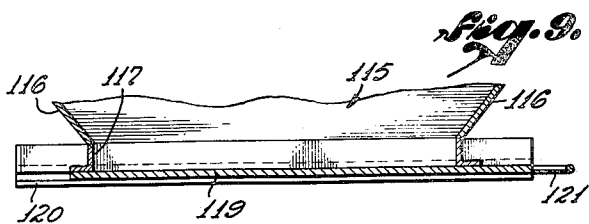
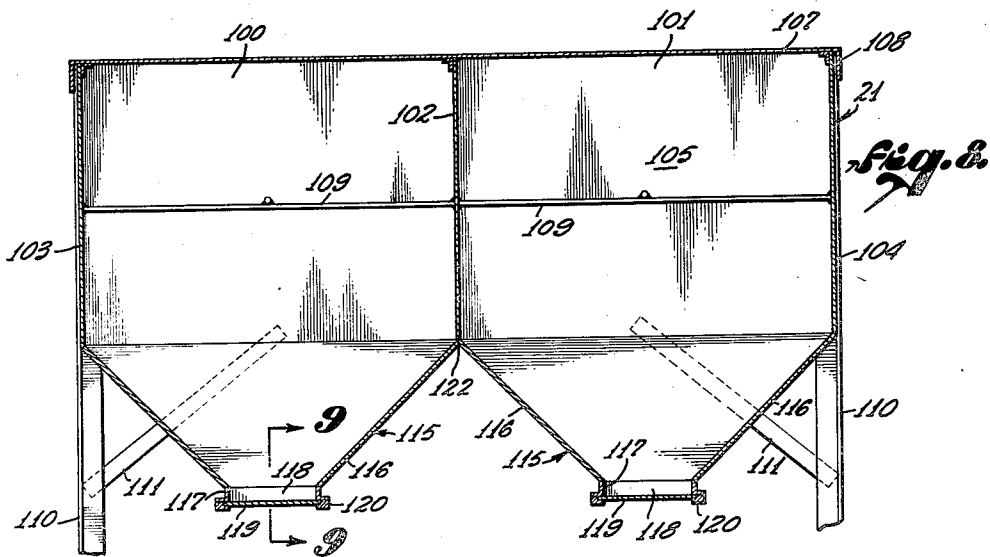
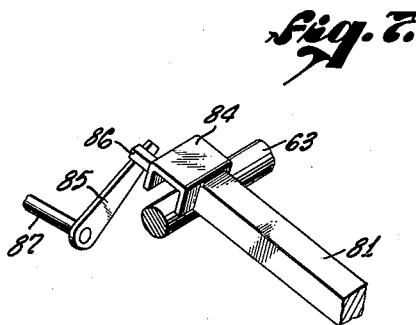
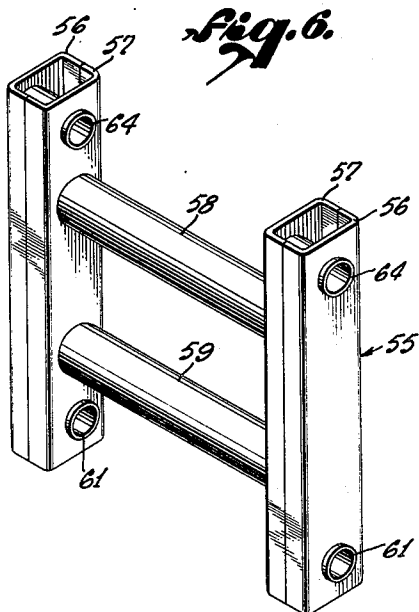
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BULK DELIVERY SYSTEM FOR DROP DELIVERY BINS

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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

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BULK DELIVERY SYSTEM FOR DROP
DELIVERY BINSGeorge P. Carver, Northridge, and Philip L. Pike,
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6 Claims. (Cl. 214—75)

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The invention relates to gravity or drop feed bins and has particular reference to a system wherein a great number of bins specially constructed may be filled at some convenient point adjacent a source of supply and thereafter delivered in filled condition to places where they may be used and thereafter returned empty to the source of supply for a refilling.

A development of recent years and particularly years since the termination of the last World War has been the exceptional interest and attention given to manner and means of minimizing to the greatest possible extent the cost of labor in the handling and distribution of materials. Although economy in labor costs has always been an aim from the point of view of gaining a good competitive position, it has nevertheless been true that the cost of labor has lately risen to such a disproportionate item in the handling of materials that very special emphasis has been placed upon such things as the bulk delivery of materials to locations as near as possible to the point of consumption where ready and efficient dispensation of the material is emphasized to the end that handling may be reduced virtually to a minimum.

By way of example only, in one particular field, namely, that of the raising of fowl and stock, it has been found that bulk delivery is exceptionally advantageous. Heretofore the almost universal practice has been to deliver feed in sacks, sacks having been found a convenient means not only for transportation but also for storing the feed. The size of the sacks have taken into consideration the amount of weight which an average man could be expected to handle and sacks of a corresponding size have found widespread use. The fact remains, however, that such sacks when filled with feed, grain or other materials are heavy and necessitate considerable labor in moving them about and also in lifting and emptying them. On such locations as, for example, poultry ranches where thousands of birds need be cared for, the job of feeding such a large number of birds necessitates considerable hand transportation of sacks of feed from a central supply to different locations on the ranch where the feed bags must be opened, lifted and emptied into appropriate feeders. To accomplish the job in this manner such a ranch must be equipped with small trucks for handling full bags of feed, suitable storage space and an ample supply of labor for carrying full bags to the feeding stations and returning empty bags to a central location where they can be either disposed of or returned to the supplier of the feed. These operations are not

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only time-consuming but also expensive from the point of view of current labor costs to the extent that the price of poultry and stock fed by the means hereinabove suggested has of necessity to be carried at a figure which has had the effect of curtailing purchases to a considerable extent.

It is therefore an object of the invention to provide a new and improved prepack and placement system for the delivery and return of materials adapted to be dispensed to the end that gravity or drop feed bins or dispensers may be loaded at some central point, then delivered to a location where the bulk material can be dispensed in greater or lesser quantities as may chance to be needed under any particular circumstance and thereafter may be returned for reloading or replenishing.

Another object of the invention is to provide a new and improved system for the redistribution of such materials as feed whereby the material in bulk may be located in some convenient dispenser at a location central with respect to its redistribution and there withdrawn in any quantity required by the demand, and further a system wherein the container for the bulk feed may be returned intact and undisturbed after it has been emptied so that it is necessary only to replenish the feed and again place the container at a dispensing location without the necessity of making any intermediate adjustments whatsoever on either the container itself or upon the truck or other transportation means which is utilized to move and transport it back and forth.

Still another object of the invention is to provide a new and improved drop or gravity feed bin of such size and dimensions that more than one bin at a time may be loaded upon a truck for transportation, the bin or the truck or both being further built so that as any bin is lifted from the ground for transportation it will become automatically aligned on the truck, thus occupying a minimum amount of space during transportation down a highway while at the same time all bins upon a truck are uniformly positioned so that the truck, upon reaching its destination, may be manipulated in order to fit one or more bins efficiently and quickly in any desired location.

Still further among the objects of the invention is to provide a new and improved system for the prepacking and placement of gravity delivery bins wherein a motorized truck may be used to transport the bins so constructed that the body of the truck may be positioned under the bins in order to lift them for transportation purposes

aligned upon the truck, and wherein the elevating mechanism for the truck can be located in an elevated condition for transportation without danger of dumping any of the bins until a suitable latch has been manipulated for release of the elevating mechanism, thereby to deposit the bins at only the desired location.

The objects contemplate the provision of a prepack and placement system for gravity feed bins which is especially simple in its design and operation to the end that a substantially maximum of economy may be effected in the delivery of bulk materials for redistribution.

With these and other objects in view, the invention consists in the construction, arrangement and combination of the various parts of the device whereby the objects contemplated are attained, as hereinafter set forth, pointed out in the appended claims and illustrated in the accompanying drawings.

In the drawings:

Figure 1 is a side elevational view of a motor truck adapted to the transportation of gravity delivery bins so constructed as to conform with the transportation problems involved.

Figure 2 is a rear elevational view of the apparatus shown in Figure 1 with the truck body elevated for transportation.

Figure 3 is a view similar to Figure 2 with the truck body lowered for deposit of the bins upon the ground.

Figure 4 is a longitudinal vertical elevational view showing the truck body adapted for transportation of the bins.

Figure 5 is a cross-sectional view of the truck body taken on the line 5-5 of Figure 4.

Figure 6 is a perspective view of one of a pair of frame joints adapted to connect the truck body with a platform thereon.

Figure 7 is a fragmentary perspective view of a latch for holding the platform in elevated position.

Figure 8 is a longitudinal transverse sectional view of one of the bins with the lower portions of the legs removed.

Figure 9 is a fragmentary sectional view taken on the line 9-9 of Figure 8.

In an embodiment chosen for the purpose of illustrating the invention there is shown a motor truck 10 of substantially conventional design including a cab 11, front wheels 12 and rear wheels 13 constituting part of a motor truck chassis. For the purpose of illustration the chassis may be identified as including in addition to a rear axle 14 a set or pair of longitudinal frame members 15 carried by leaf springs 16 upon the axle. The longitudinal frame members are stiffened by cross beams, ties or channels 17 and an end cross channel member 18.

Located upon the chassis is a platform designated generally by the character 20 which is specially constructed for the purpose of transporting gravity or drop delivery bins 21.

The platform construction may be of a suitable sort sufficient to provide necessary strength and rigidity for the transportation problem entailed and is here shown as constructed of deck frame members or channels 30 longitudinally disposed and in spaced relationship one from another somewhat corresponding to the relationship of the longitudinal frame members on the chassis. Upon the deck frame members are transverse channels 32 which form a support for a flat deck 33. In the construction here illustrated skirts 34 are provided along the sides of the platform

extending from the deck downwardly to a level approximately corresponding to the bottom of the longitudinal frame members of the chassis when the platform is in the elevated position shown in Figures 1, 2, 4 and 5. A similar skirt 35 extends across the rear of the platform.

Midway between the sides of the deck and the sides, incidentally, of the platform is a centering structure 36 herein comprising a longitudinal projection extending from the forward end to the rearward end of the deck. The centering structure may be considered as comprising angular trusses 37, the lower ends 38 of which are carried by the transverse channels 32 to which they may be secured by welding. A bar 39 may be utilized along the tops of the trusses and attached thereto so as to properly space and anchor the tops of the trusses.

Forming an enclosure for the trusses and the body of the projection are metal plates 40 and 41 which extend upwardly at equal angles joining each other at an apex or ridge line 42. Vertical plates 43 and 44 join the plates 40 and 41, respectively, to the deck 33.

It should be noted that at the rearward end of the platform the apex 42 or ridge line pitches downwardly for a short distance at 45 and that, as indicated in Figure 1, the skirts 34 are also extended inwardly at the portions 46 and further that the deck 33 is pitched slightly downwardly at the portion 47. This downward and inward pitch is also discernible in Figures 2 and 3, and may be referred to as beveled portions of the respective plates.

To reinforce the platform against distortion and to add to its rigidity, there may be provided a pair of channels 48 and 49 forming a composite transverse beam approximately midway between the ends of the platform. Triangular channel braces 50 and 51 may be extended from the transverse beam to the deck channels 30.

For securing the platform to the chassis there are provided frame joints 55, one located near the rear and the other near the front end of the chassis and platform. A detail of one of the frame joints is shown in Figure 6. The joints as illustrated are constructed of channel sections 56 and 57 in abutting relationship in which position they may be welded if desired and the composite channel sections are in turn connected together by tubes 58 and 59 to comprise a rigid frame joint.

The frame joints are attached as indicated in Figure 4 to the longitudinal frame members 15 of the chassis by means of a solid shaft or pin 60 which is shown, particularly in Figure 5, as extending from one side to the other and through sleeves 61 in the composite channel sections. The ends of the shaft may be suitably anchored in blocks 62 on the frame members.

The upper ends of the frame joints 55 may be similarly anchored to the deck frame members by extension of a shaft 63 in each case extending through sleeves 64. In this instance the shaft 63 is shown extending through plates 65 on the outside of the webs of the deck frame members 30. In this connection it should be noted that the connection between the frame joints and both the deck frame members and the frame members of the chassis is a pivotal connection. The frame joints are of the same length from center to center of the shafts 60 and 63, respectively, and the shafts of the chassis located equidistant to the shafts which are secured to the deck frame members. Thus constructed there is provided a

structural parallelogram, thereby making certain that when the platform is raised it maintains a level relationship with respect to the chassis at all times.

In order to supply the force necessary to elevate the platform there is provided a pair of hydraulic rams 68 arranged parallel one with respect to the other transverse to the chassis.

In order to carry the hydraulic rams on the chassis, a framework consisting of parts 69 and 70 extends below the longitudinal frame members 15, and braces 71 and 72 hold the parts 69 in position. A shaft 73 extends through brackets 74 on cylinders 75 of the rams in order to pivotally attach the cylinders to the parts 69.

The rams include pistons 76 pivotally secured to brackets 77 by pins 78. The brackets in turn are mounted upon a cross channel 79 here shown as located above the surface of the deck 33. A hydraulic line 80 connected to a suitable pump, not shown, is directed into the lower end of the cylinder 75.

When the platform is in lowered position, namely, the position illustrated in Figure 3, the deck frame members 30 are adapted to rest upon the longitudinal frame members of the chassis in which position the platform rests directly upon the chassis. In elevated position a latch is provided to lock the platform in elevated position during transportation. The latch herein shown consists of a latch strip 81 pivotally secured by a pin 82 to a bracket 83 which in turn is carried by the rearward cross tie 17. At its upper end the latch strip has the form of a hook 84 which is adapted to engage about the shaft 63. The parts as illustrated in Figures 4 and 5 show the latch strip in the position occupied when the platform is elevated. Elevation is achieved by charging the hydraulic cylinder 75 with fluid under pressure, this in turn extending the piston 76 upwardly so that the platform is lifted while at the same time swinging about the shafts 61 and 63 as the frame joints 65 are raised from positions almost horizontal to the positions shown in Figure 4. In the position shown in Figure 4 the latch 84 falls into engagement with the shaft 63 and the platform remains locked in elevated position. Before the platform is lowered it is first necessary to again apply hydraulic pressure to the cylinder 75 which may have been released once the latch becomes engaged. This application of pressure will ease the pressure of the shaft 63 against the latch. After this has been done a lift 85 may be rotated against a wing 86 of the latch and the latch elevated to a position out of contact with the shaft 63. The lift is mounted for this purpose upon a rod 87 secured by bushings 88 and 89 to suitable supports 90 and 91. A handle 92 can be used to rotate the rod. After the latch has been released, the hydraulic pressure in the cylinder 75 may be gradually diminished through means commonly known in the trade and the platform permitted gradually to lower to its lowermost position.

The bins 21 adapted to cooperate with the truck and the platform thereon are to an extent specially constructed. As illustrated in Figure 8, the bins may be supplied with twin hoppers or compartments 100 and 101 separated one from another by a partition 102. Side walls 103 and 104 enclose the sides of the bins whereas the ends are enclosed by a wall 105 at the front and 106 at the rear. A removable top 107 is provided having flanges 108 adapted to overlie the walls.

Cross bracing 109 may be provided for additional rigidity.

To support the hoppers in elevated position there are provided vertical legs 110, one at each corner, which extend upwardly along sides of the hoppers to the tops of the side walls. To add to the rigidity of the support short bias braces 111 are extended upwardly from the rear legs to points on the rear wall 106. The same bias bracing may be used at the front ends of each of the bins. At the sides of the bins sway bracing 112 may be employed running from a location adjacent the bottoms of the legs 110 to a location adjacent the bottoms of the side walls 103.

In order to deliver material from the hoppers to suitable vehicles such as wheelbarrows, trucks, wagons, and the like, chutes 115 are provided consisting of four substantially equal walls 116 extending obliquely downwardly from the bottom edges of the side and end walls and terminating in an extension 117 which provides an opening or port 118. The port may be closed by a slide door 119 which fits slidably within a frame 120 secured to the bottom of the extension 117. In Figure 9 the slide door 119 is illustrated as equipped with a handle 121.

In operation the bins are ordinarily filled at some central source of supply which may be a feed supply station or other deposit where large quantities of the material to be prepacked are stored in bulk. The bins may be filled with a quantity of material equal to the quantity desired to be delivered at any specified point of distribution. A large number of bins may be thus filled simultaneously and stacked in a specified yard preparatory to delivery. In order to transport the bins the truck 10 is backed up underneath one of the bins and, in the event that the truck is not precisely aligned so that the ridge 42 is parallel to a ridge 122 between adjacent chutes 115, the platform of the truck may be raised slightly a distance sufficient to elevate the bin a few inches above the ground and, because sides 116 of adjacent chutes which face each other are pitched at substantially the same angle as the plates 40 and 41 of the projection 36, the bin will be oriented so that the space between chutes is in precise alignment with the projection. Where two bins are to be carried at one time by the platform on the truck, the platform may then be lowered sufficiently to rest the legs of the bin again on the ground and the truck backed up far enough so that a plate 123 at the front end of the platform is brought against the adjacent end wall of the bin. The platform may then be elevated by supplying power to the hydraulic ram sufficient to lift the legs of the bin from contact with the ground. With the first bin in place at the forwardmost end of the platform the truck then can be backed up under a second bin and the process repeated. The first initial lift again orients the bin with relation to the projection on the platform and this is followed by lowering the platform a distance sufficient to project the platform beneath the second bin but insufficient to rest the initially loaded bin upon the ground. The truck may then be backed under the bin to a point where the second bin is pressed against the bin already on the truck.

The beveled portions of the plates greatly facilitate steering the truck platform into the relatively snug space between the legs of the bin. Should the beveled portion strike the bin, the bin

may be shifted slightly in order to let the platform enter.

After locating the platform beneath the second bin the platform is again raised to a full upwardly extended position sufficient to have the latch 84 engage the shaft 63. This is the position illustrated in Figure 1. With two bins of the size and proportion there shown the truck can be driven off down the highway to the point of delivery of at least one of the bins.

At the point of delivery the truck is drawn up to the delivery location and the platform lowered until both bins rest upon the ground. If one bin only is to be delivered, the truck can be driven forward far enough so that when the platform is raised only one of the bins is raised with it and thus carried to a second delivery station where the remaining bin can remain deposited upon the ground.

Once at its location, feed or other material in the hopper can be drawn off at will directly into wheelbarrows or carts, thus eliminating any intermediate handling such as would be necessary were bags employed. When any of the bins have been emptied the truck 10 can be utilized to transport empty bins back to the source of supply in the same manner as was described for the full bins.

By utilization of a specially constructed platform on a conventional auto truck and bins having centering structure adapted to cooperate with the platform, a ready means of lifting, transferring and transporting loaded and unloaded material bins is provided. The loading and transportation is both greatly facilitated by the automatic centering and aligning of the bins on the truck platform when the platform is elevated. By this arrangement and by providing a sufficient clearance between the top of the platform in lowermost position and the bottom of the bins, one or more bins may be picked up and deposited by the truck quickly and efficiently without it being necessary to handle or shift the bins by hand, the operation of the truck and its platform being the sole means necessary to pick up, transport and deposit the bins in any location desired. The construction described is particularly safe in the provision of a latch for anchoring the platform in elevated position during transportation and also by the provision of a skirt on the platform built low enough so that it covers the horizontal portions of the chassis at all times whether in elevated or lowered position.

While we have herein shown and described our invention in what we have conceived to be the most practical and preferred embodiment, it is recognized that departures may be made therefrom within the scope of our invention, which is not to be limited to the details disclosed herein but is to be accorded the full scope of the claims so as to embrace any and all equivalent devices. Having described our invention, what we claim as new and desire to secure by Letters Patent is:

1. A system for the prepacking and placement of gravity delivery bins comprising the combination of a plurality of similarly constructed bins including an elevated hopper, a delivery port in the hopper and means providing a longitudinally disposed aligning structure extending centrally throughout the length of the bin, a power truck for lifting and transporting said bins comprising a chassis and a bin support thereon, said bin support comprising aligning structure disposed

longitudinally and throughout the length of a carrying body of the truck and complementary to the aligning structure of the bins, and a power lift device cooperable with the bin support and the chassis adapted to lift the bin support into engagement with the bins thereby to align said bins wherever located on the truck and elevate the bins from the ground for transportation.

2. A system for the prepacking and placement of drop delivery bins comprising the combination of a plurality of similarly constructed bins having an elevated hopper, delivery chute means at the bottom of the hopper having side walls complementarily disposed and comprising a temporary support for the bin during transportation, and a power truck for lifting and transporting said bins comprising a chassis and a bin support thereon, said bin support comprising a longitudinally disposed structure complementary to the side walls of the chute means, and a power lift device cooperable with the bin support and the truck adapted to lift the bin support against the complementarily disposed side walls of the chute means thereby to elevate the bins from the ground for transportation.

3. A system for the prepacking and placement of drop delivery bins comprising the combination of a plurality of similarly constructed bins having an elevated hopper, a pair of chutes at the bottom of the hopper having adjacent side walls complementarily disposed and extending angularly downwardly and outwardly from a central ridge, a vertical dividing wall extending upward from the ridge and comprising a wall separating laterally adjacent bins, a power truck for lifting and transporting said bins comprising a chassis and a platform thereon, said platform comprising a horizontal deck member, a longitudinally disposed ridge dividing said deck, said ridge having sides respectively complementary to the side walls of the chutes and adapted to engage therewith upon movement of the deck into contact with the chutes, and a power lift device cooperable with the platform and the chassis adapted to lift the platform against the bins thereby to elevate the bins in aligned position above the ground for transportation.

4. A system for the prepacking and placement of drop delivery bins comprising the combination of a plurality of similarly constructed bins including a hopper, legs at the sides of the hopper supporting said hopper in an elevated position, a pair of chutes at the bottom of the hopper having adjacent side walls forming angles therebetween equal with respect to a vertical plane and a horizontal frame surrounding the opening at the bottom of each chute, and a power truck for lifting and transporting said bins comprising a chassis and a bin-carrying platform thereon, said platform comprising a flat horizontal deck, a longitudinally disposed ridge dividing said deck, said ridge having sides pitched at angles corresponding to the angle of respectively adjacent side walls of said pairs of chutes, the sides of said ridge being joined at an apex at a distance above the platform corresponding to the distance between the bottom of the bin and the bottom of the chutes, and a power lift device cooperable with the platform and the chassis adapted to lift the platform against the bottoms of the bins and move the ridge into space between the chutes thereby to align the bins on the platform and elevate the bins from the ground for transportation.

5. In a system for the placement and return

of drop delivery bins comprising bins having elevated bottoms and chutes therein, the combination of a delivery truck comprising a chassis including a set of longitudinal frame members having cross ties therebetween, a bin support above said chassis having a set of longitudinal frame members, means attaching the bin support to the chassis comprising forward and rear frame joints of equal length, opposite ends of said frame joints being pivotally secured respectively to the sets of longitudinal frame members, a cross element on one of said sets of frame members, a latch strip having one end pivotally secured to the other of said sets of frame members and the other end in releasable engagement with said cross element, a manual release for said other end of the latch strip, and a hydraulic ram device for lifting and lowering the bin support having one end pivotally secured to the chassis and the other end pivotally secured to the bin support.

6. In a system for the prepacking and placement of drop delivery bins comprising bins having elevated bottoms, chutes below said bins and centering structure beneath the bins, the combination of a delivery truck comprising a chassis including a set of longitudinal spring-mounted frame members having cross ties therebetween, a platform above said chassis having a skirt surrounding the chassis and a set of longitudinal deck frame members, a deck on said deck frame members and a longitudinal centering structure on said deck cooperable with the cen-

tering structure on the bins, means attaching the platform to the chassis comprising forward and rear frame joints of equal length and greater in length than the depth of said skirt, said joints being pivotally secured respectively to the sets of longitudinal frame members of the chassis and deck, a cross element on the set of deck frame members, a latch strip having one end pivotally secured to the chassis and the other end in releasable engagement with said cross element, a manual release for said other end of the latch strip, and a hydraulic ram device for lifting and lowering the platform having one end pivotally secured to the chassis and the other end pivotally secured to the platform.

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