May 13, 1952 B. D. McINTYRE ET AL 2,596,908

DUMPING BOX AND SUPPORTING STRUCTURE THEREFOR WITH MEANS FOR RECEIVING CONTENTS OF SAID BOX

Filed Feb. 27, 1948 3 Sheets-Sheet 1

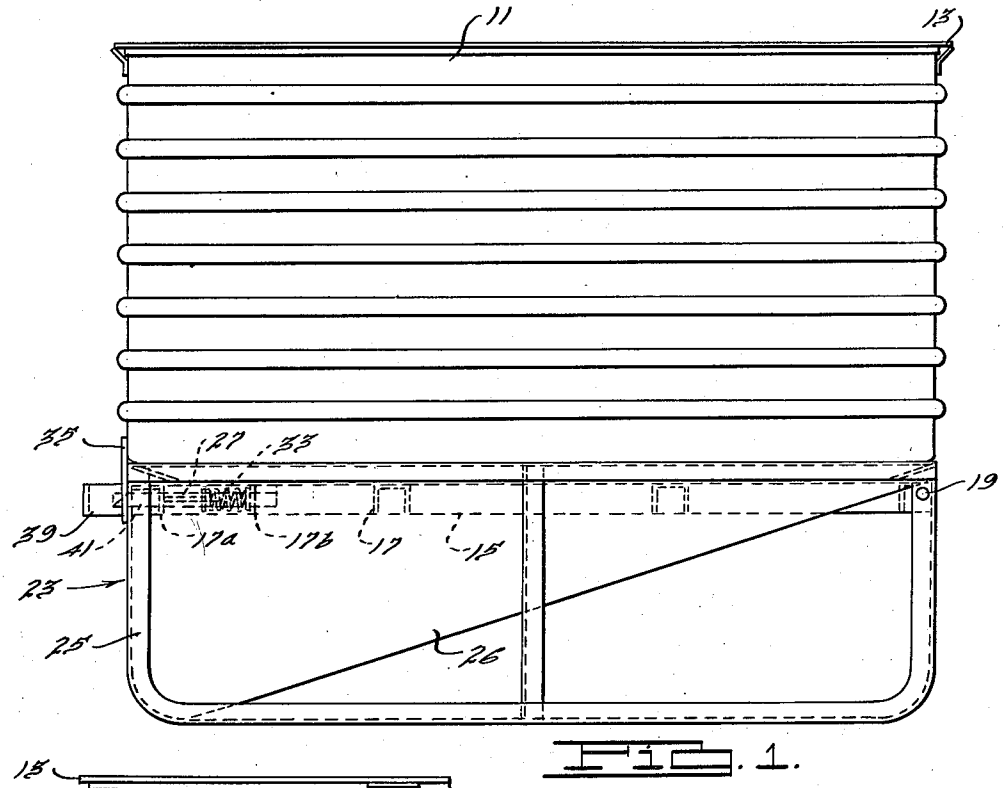


Fig. 1.

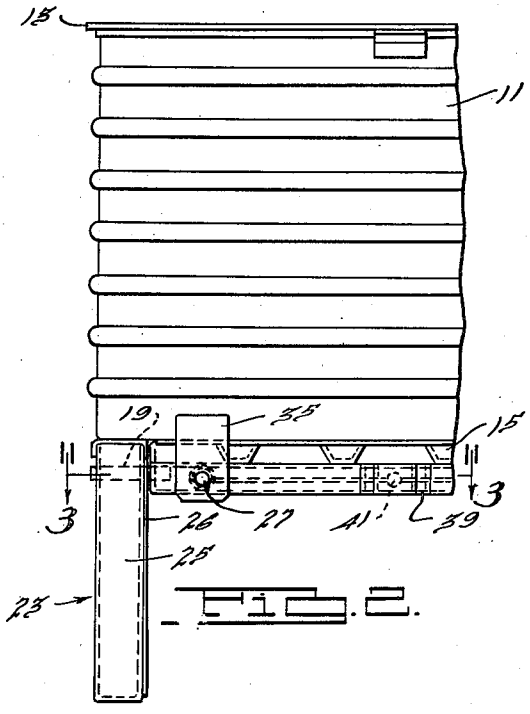


Fig. 2.

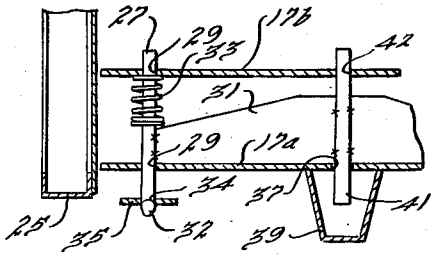


Fig. 3.

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Filed Feb. 27, 1948 3 Sheets-Sheet 2

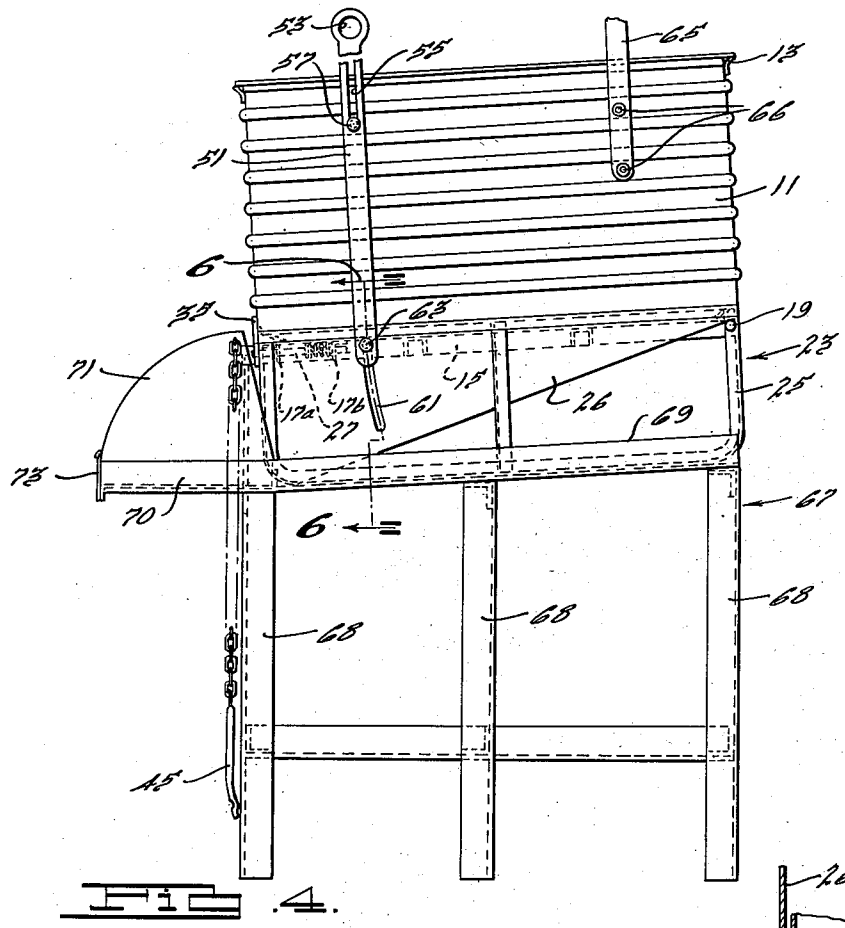
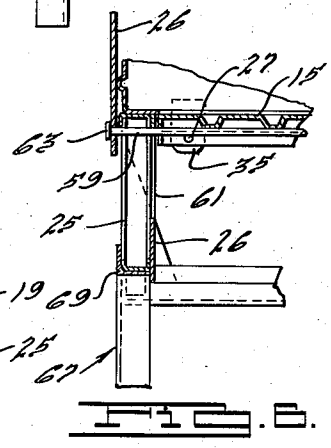


FIG. 4.



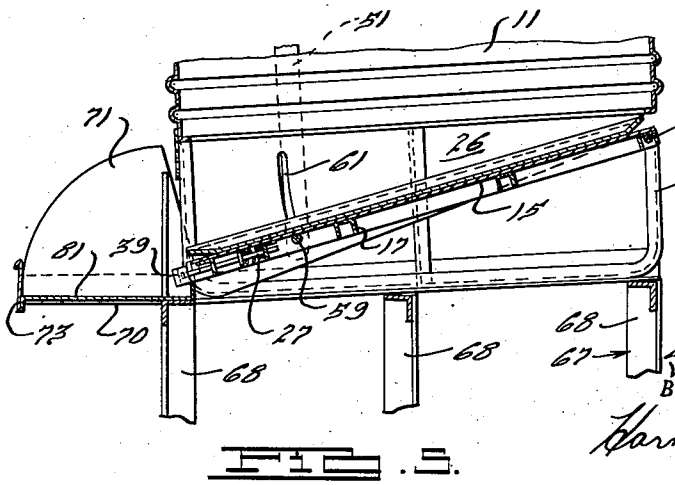


FIG. 5.

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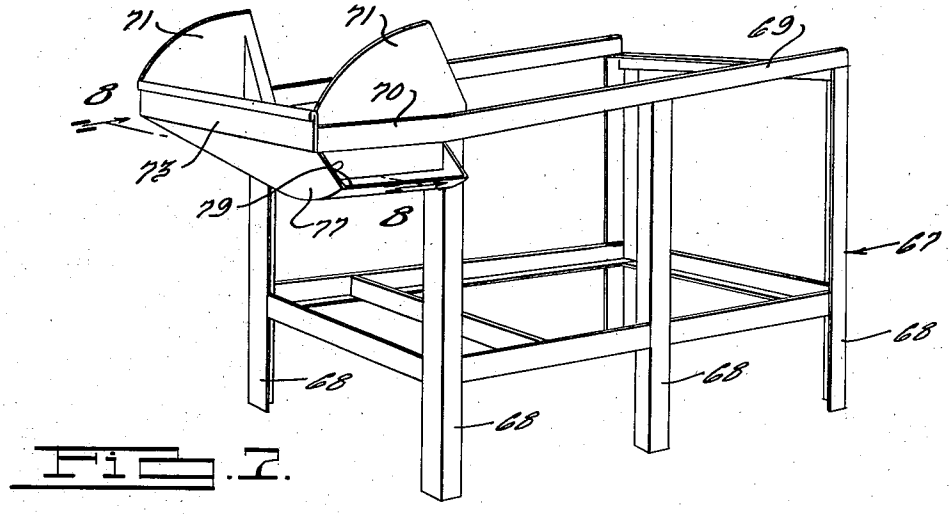


Fig. 7.

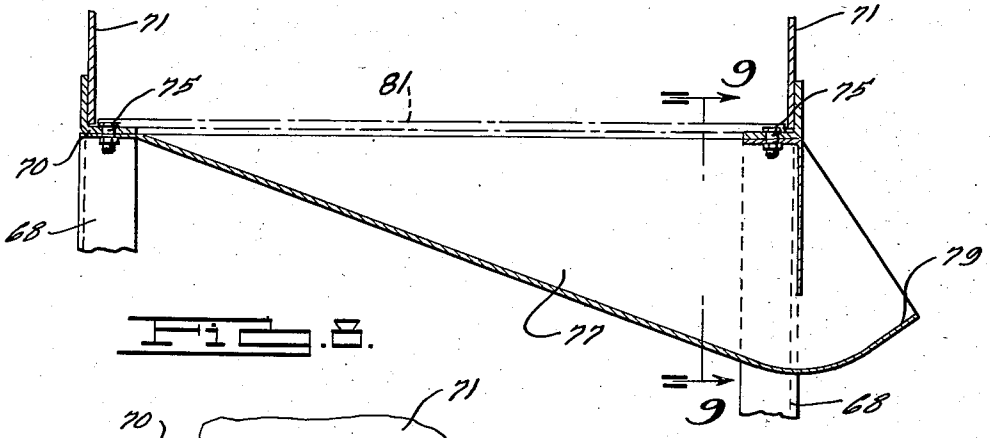


Fig. 8.

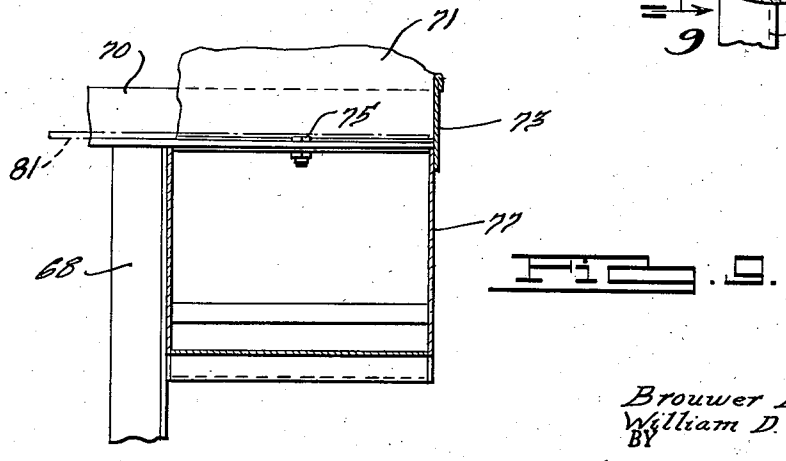


Fig. 9.

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UNITED STATES PATENT OFFICE

2,596,908

DUMPING BOX AND SUPPORTING STRUCTURE THEREFOR WITH MEANS FOR RECEIVING CONTENTS OF SAID BOX

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Application February 27, 1948, Serial No. 11,536

8 Claims. (Cl. 222—185)

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This invention relates to a dumping box structure and to a combination dumping box and supporting structure, and is an improvement over our copending application, Serial No. 688,462, filed August 5, 1946, now Patent No. 2,440,056, dated April 20, 1948.

The aforementioned copending application illustrates generally a dumping box of the type having a bottom closure pivotally connected with the box portion adjacent the rear wall thereof for swinging movement toward and away from the box and incorporating arm means for holding the bottom closure in its upwardly swung closed position, which means are releasable to permit the bottom closure to swing downwardly to an open dumping position. A supporting structure is also illustrated in this copending application for supporting the box portion on a supporting surface whereby to permit the entrance of the fork of a lift truck between a supporting surface and the bottom closure so that the bottom closure can be swung into its upwardly swung closed position by means of a lift truck fork or platform.

The principal objects of this invention are to provide a dumping box of the aforementioned type which is provided with improved mechanism for latching and releasably retaining the bottom closure in its upwardly swung closed position; to provide a dumping box of the aforementioned type which may be lifted by means of a suitable lifting device such as a lifting crane, lift truck or the like and which is constructed so that the bottom closure can be swung to its closed position when the box structure is lifted by the lifting device; to provide an improved supporting stand on which the dumping box may be mounted, adjacent a machine, assembly line, or the like, so as to provide easy access to the material disposed within the dumping box; to provide a supporting stand of the aforementioned type which is adapted both for side and front delivery and which can be readily and speedily changed from one type of delivery arrangement to the other; to provide generally a dumping box and combination dumping box and supporting stand structure which is especially efficient in operation, rugged in construction, inexpensive to manufacture and which will greatly reduce many of the current problems now existing in the material handling field.

These and other objects of this invention will become apparent from the following detailed description taken in conjunction with the accompanying drawing in which

Figure 1 is a side elevational view of a dumping box constructed in accordance with one form of the invention;

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Fig. 2 is a fragmentary front elevational view of the structure illustrated in Fig. 1;

Fig. 3 is an enlarged sectional view of the structure illustrated in Fig. 2 taken along the line 3—3 thereof;

Fig. 4 is a side elevational view of a further embodiment of a dumping box structure, supported on a supporting stand, with the bottom closure in its upwardly swung closed position;

Fig. 5 is a fragmentary view similar to Fig. 4 illustrating the bottom closure of the dumping box in its downwardly swung dumping position;

Fig. 6 is an enlarged sectional view of the structure illustrated in Fig. 4 taken along the line 6—6 thereof;

Fig. 7 is a perspective view of the supporting stand illustrated in Fig. 4;

Fig. 8 is an enlarged sectional view of the structure illustrated in Fig. 7 taken along the line 8—8 thereof; and

Fig. 9 is an enlarged sectional view of the structure illustrated in Fig. 8 taken along the line 9—9 thereof.

Referring now to the drawing and more particularly to Figs. 1 to 3 it will be seen that a dumping box 11 is illustrated which is preferably formed with corrugated metal walls having a beaded upper edge 13. The bottom closure for the box 11 is indicated at 15 and is likewise preferably made of corrugated sheet metal braced by a plurality of longitudinally spaced generally U-shaped cross members 17. The bottom closure 15 is pivotally connected with the box portion 11, adjacent the rear wall thereof, by means of pivot pins 19, mounted in a supporting leg structure 23. The supporting leg structure 23 supports the box in an elevated position above a supporting stand or other supporting surface, and comprises runnerlike legs 25 preferably formed of structural members of generally U-shaped cross section. Side plates 26 are secured to the box and supporting legs 25 below the bottom closure 15, and have an inclined lower edge, as can be seen in Fig. 1. The side plates 26 cooperate with the bottom closure 15, when the latter is in a downwardly swung open or dumping position, to form a laterally closed chute down which elements carried within the box 11 may slide.

In order to releasably retain the bottom closure in its upwardly swung closed position, latch means are provided, which include a pair of laterally spaced plungers 27 slidably supported in, and extending through, apertures 29 in the for-

wardmost pair of bottom closure cross members 17, indicated at 17a and 17b. Extending between and secured to the plungers 27, adjacent the forwardmost cross member 17a is a connector plate 31 which ties the two plungers together for coordinated movement. A coil spring 33 is disposed on each plunger 27 between the back face of the connector plate 31 and the front face of the cross member 17b. The coil springs 33 normally urge the plungers 27 and the connector member 31 forwardly, and the movement of the plungers is limited by the engagement of the connector plate 31 with the cross member 17a. The outer ends of each of the plungers 27 are tapered at 32 and are adapted, when the bottom is in its closed position, to be received in, and project through, apertures 34 in latch plates 35 which are welded or otherwise suitably secured to the front wall of the box portion 11. The front cross member 17a is provided with a central aperture 37, over which is welded or otherwise suitably secured a guard or bracket 39, including front and side walls. Projecting through the aperture 37 and into the confines of the guard or bracket 39 is the outer end of a pin 41. The inner or back end of the pin 41 projects through an aperture 42 in cross beam 17b and the intermediate portion of the pin is welded or otherwise suitably secured to the connector plate 31. Therefore, by inserting a tool 45, shown in Fig. 4, into the space between the front wall of the guard 39 and the outer end of the pin 41, the pin can be moved rearwardly, and the plungers 27 will be moved rearwardly, against the action of the springs 33, thus, withdrawing the forward ends of the plungers from the latch plate 35. The bottom closure 15 will then drop down into its downwardly swung open or dumping position. When the bottom closure 15 is raised to its upper closed position, the tapered plunger ends 32 will cam over the lower ends of the latch plates 35 and will be forced rearwardly against the action of the springs 33 until the plungers come into alignment with the apertures 34 in the plate. The springs 33 will then force the forward ends of the plungers 29 through the apertures 34 so as to releasably latch the bottom closure 15 in its upwardly swung closed position.

The modified dumping box illustrated in Figs. 4 through 6 includes, in addition to the structure previously described, structure for permitting the bottom closure to be swung to its closed position and the box to be lifted by means of a lifting device such as an overhead crane. This structure includes substantially vertically extending straps 51 which are slidably connected to the opposite side walls of the dumping box 11, adjacent the front wall thereof. Each of the straps 51 has its upper end provided with an eyelet 53 which is adapted to receive a conventional crane hook or a hook on a cable sling. Each strap 51 is provided with a slot 55 adjacent the upper end thereof, and a headed pin 57, which is welded or otherwise suitably secured to the side wall of the box 11, is slidably received in the slot 55 to permit the strap 51 to move substantially vertically with respect to the side wall of the box 11. The lower end of the strap 51 is pivotally connected to the bottom closure 15, by means of a laterally extending pivot bar 59 which is supported in the bottom closure 15 and has its opposite ends projecting outwardly through arcuate slots 61 in the side plates 26, and pivotally connected to the lower end of the straps 51, at 63. Straps 65, having eyelets on the upper end thereof in the same manner as the straps 51, are fixedly secured to the side walls of the dumping box 11 at 66, adjacent the back wall thereof so as to provide, with the straps 51, four eyelets, connectible with a crane hook through a cable sling or the like, so that the dumping box structure may be lifted by a lifting device such as an overhead crane. It will be appreciated that when the straps 51 are lifted by the crane the bottom closure 15 will be swung to its closed position and will be effectively and positively locked in this position as long as the box is being lifted by the crane. If desired the latch mechanism described in the previous embodiment, and which is shown in Figs. 4 through 6, may be eliminated, but preferably it is employed so that the box is adapted for use with both a crane-type lifting device as well as a lift truck device, as previously described.

Referring now to Figs. 7 through 9, a supporting stand 67 is illustrated which includes legs 68 and a top frame 69. A portion of the top frame 69 projects forwardly of the leg structure 68 to provide in effect a forwardly projecting ledge or shelflike frame structure 70, including side walls 71 and a front end wall 73. Detachably secured to the under side of the forwardly projecting frame structure 70, by means of bolts 75 or the like, is a laterally enclosed side delivery chute 77, the bottom wall of which is downwardly inclined, transversely with respect to the supporting stand. The chute 77 is provided with a delivery opening 79 at one end thereof and adjacent one side of the stand 67. When the side delivery chute 77 is secured to the under side of the forwardly projecting frame structure 70, the supporting stand is adapted for use for side delivery of elements, and if it is desired to use the stand for front delivery purposes a plate 81 is mounted on the frame structure 70, between the side walls 71, the front wall 73 so as to close off the upper end of the side delivery chute 77 and provide a forwardly projecting ledge or shelf for front delivery purposes.

When the dumping box is mounted on the supporting stand 67, as illustrated in Figs. 4 through 6, the runnerlike legs 25 are supported on the top frame 69 so that the bottom closure 15 is disposed in a plane above that of the forwardly projecting frame structure 70. When the bottom closure 15 is released, it will pivot downwardly to its dumping position, as illustrated in Fig. 5, and the side plates 26 on the box cooperate with the side plates 71 of the supporting stand to provide a laterally enclosed chute which is open at the front end thereof so that material or elements within the dumping box will slide along the inclined dropped bottom 15 and into the top frame structure 70 between the side walls 71 and the front wall 73. If the plate 81 is not used the material will drop into the side delivery chute 77 so that the material will be disposed adjacent the opening 79 at one end thereof so as to be readily accessible to a machine operator or the like. However, when front delivery is desired the plate 81 is positioned on the frame structure 70 so as to cover and close off the side delivery chute 77 and the material from the box will therefore be discharged onto the plate 81 within the confines of the side plates 71 and the end wall 73, thus permitting front delivery of the material from the box.

Thus it will be appreciated that the dumping boxes herein illustrated may be lifted by the fork of a lift truck, which may engage the under side

of the bottom closure 15 so as to swing the same to its upwardly closed position prior to lifting the box and moving it either to a supporting surface or a supporting stand, such as is illustrated in the drawings. Likewise it will be appreciated that the dumping box may be provided with the strap means, by means of which the bottom closure may be closed when the box is lifted by a crane-type lifting device or the like and moved to any supporting surface or to a suitable supporting stand. The boxes herein illustrated thus are provided with a simple and positive mechanism by means of which the bottom closure may be releasably locked so that there will be no danger of the bottom closure 15 accidentally opening. Likewise, the boxes of this invention are adapted to be lifted by various types of lifting devices and are adapted to be mounted on a supporting stand so that either front or side delivery may be easily obtained, thus providing a more efficient operating material handling unit which may be used for many more purposes than any heretofore known in the art.

We claim:

1. A self-contained portable dumping box structure including a box portion, a bottom closure pivotally connected with said box portion adjacent the rear wall thereof for swinging movement toward and away from said box, a pair of laterally spaced spring pressed plungers slidably supported in said bottom portion and having the forward ends thereof resiliently held in a forwardly projecting relationship with respect to the forward edge of said bottom closure, means operatively connecting said plungers for coordinated movement, a pair of laterally spaced latch-engaging members connected with said box portion for releasably engaging said plungers and holding said bottom closure in an upwardly swung closed position with respect to said box portion, said plunger connecting means being operable to move said plungers out of engagement with said latch-engaging elements and thereby permit said bottom to swing downwardly about its pivotal connection, a supporting structure connected with said box portion for supporting the latter on a supporting surface, said supporting structure having an opening adjacent the rear wall of said box portion to permit the entrance of a fork of a lift truck between said bottom closure and said supporting surface whereby said bottom closure may be engaged by the fork of a lift truck and moved from its downwardly swung open position to its upwardly swung closure position and whereby said box may be lifted by said lift truck fork.

2. A self-contained dumping box structure including a box portion, a bottom closure pivotally connected with said box portion adjacent the rear wall thereof for swinging movement toward and away from said box portion, a pair of laterally spaced spring pressed plungers slidably supported in said bottom closure and having one end thereof resiliently held in a forwardly projecting relationship with respect to said bottom closure, plate means interconnecting said laterally spaced plungers, laterally spaced latch-engaging elements connected with said box portion for engaging said plungers and releasably retaining said bottom closure in its upwardly swung closed position, means connected with said plunger interconnecting means and projecting through and forwardly of said bottom closure and adapted to be actuated for moving said plungers rearwardly out of engagement with said latch-engaging elements whereby said bottom closure may swing to its downwardly swung open position, supporting structure connected with said box portion for supporting the latter on a supporting surface, said supporting structure having an opening adjacent the rear wall of said box portion to permit the entrance of the fork of a lift truck between a supporting surface and said bottom closure whereby said bottom closure may be engaged by the fork of a lift truck and swung from its downwardly swung open position to its upwardly swung closure position and whereby said box may be lifted by said fork, and confining means connected with said dumping box structure on each side of said bottom closure whereby to define with said bottom closure a laterally enclosed chute when the latter is in its downwardly swung open position.

3. A self-contained portable dumping box structure including a box portion, supporting structure connected with said box portion for supporting the latter on a supporting surface, a bottom closure pivotally connected with said box portion adjacent the rear wall thereof for swinging movement toward and away from said box portion, means on said box structure adapted to be connected to a lifting device such as a lifting crane or the like for use in lifting said dumping box structure and including a rigid strap connected at one end to said bottom closure so that swinging movement of said bottom closure in either direction will cause vertical movement of said strap, said strap having the opposite end projecting above the top of said box portion, means connecting said strap means to said box portion for relative vertical movement with respect thereto, means on the upper projecting portion of said strap means adapted to be connected to the lifting device whereby when the means including the strap means are lifted said bottom closure will be swung to its closure position prior to the lifting of said box structure by said lifting device.

4. A self-contained dumping box structure including a box portion, supporting structure connected with said box portion for supporting the latter on a supporting surface, a bottom closure pivotally connected with said box portion adjacent the rear wall thereof for swinging movement toward and away from said box portion, laterally spaced confining plates connected with said dumping box structure and defining with said bottom closure when the latter is in its downwardly swung open position a laterally enclosed chute, means on the box structure adapted to be connected to a lifting device such as a lifting crane or the like including strap means slidably connected to said box portion for generally vertical movement with respect thereto, the upper end of said strap means projecting above the top of said box portion and having means formed thereon adapted to be connected to the lifting device, said side confining plates having generally vertical slots therein, means connecting the lower end of said strap means to said bottom closure through said side plate slots, whereby when said means including said strap means are lifted by the lifting device the bottom closure will be swung to its upward closure position prior to the lifting of said box structure by said lifting device.

5. In combination, a supporting stand including a forwardly projecting portion having an opening in the bottom thereof, a laterally enclosed side delivery chute connected to the un-

derside of said forwardly projecting portion and normally communicating with said projecting portion opening, said side delivery chute having a transversely inclined bottom wall and a delivery opening adjacent one end thereof, a closure for said projecting portion opening adapted to be releasably supported on said projecting portion whereby said stand may be used for front delivery when said closure is employed and said stand may be used for side delivery when said closure is removed from said projecting portion, a dumping box structure removably supported on said stand and including a bottom closure pivotally connected with said box portion adjacent the rear wall thereof for swinging movement toward and away therefrom, means for supporting said box on said stand far enough above the plane of said stand projecting portion to permit the material within said box to slide along said bottom closure when the latter is in its downwardly swung open position and into said stand projecting portion.

6. In combination, a supporting stand including a forwardly projecting frame portion having an opening in the bottom thereof, a laterally enclosed side delivery chute secured to the underside of said forwardly projecting portion and normally communicating with said frame portion opening, said side delivery chute having a bottom wall inclined transversely of said supporting stand and having a delivery opening adjacent one end thereof, a closure for said projecting frame portion opening adapted to be releasably supported on said frame portion whereby said stand may be used for front delivery when said closure is employed and may be used for side delivery when said closure is removed, a self-contained portable dumping box removably supported on said stand and including a bottom closure pivotally connected with said box for swinging movement toward and away therefrom, means for supporting said box on said stand with said bottom closure above said stand projecting portion, side plates associated with said box structure and cooperating with said bottom closure and said supporting stand side walls to define a laterally enclosed chute open beneath the lower edge of the front of the box whereby the forward edge of the bottom closure will in a downwardly swing open position engage said stand projecting frame portion so as to permit sliding of material in said box onto said projecting frame portion within the confines of said chute and whereby to permit the stand to be used either for front or side delivery purposes.

7. In combination, a supporting stand including a forwardly projecting portion having an opening in the bottom thereof, a laterally enclosed side delivery chute secured to the underside of said forwardly projecting portion and communicating with said projecting portion opening, said side delivery chute having a bottom wall inclined transversely of said supporting stand and having a delivery opening adjacent one end thereof, a self-contained portable dumping box removably supported on said stand and including a bottom closure pivotally connected with said box for swinging movement toward and away therefrom, means for supporting said box on said stand far enough above the plane of said stand projecting portion to permit the material within said box to slide along said bottom closure when the latter is in its downwardly swung open position and into said side delivery chute.

8. A supporting stand adapted for use in supporting a dumping box structure, including a supporting structure for supporting a box above a stand supporting surface, a forwardly projecting portion having an opening in the bottom thereof, a laterally enclosed side delivery chute secured to the underside of said forwardly projecting portion and normally communicating with said projecting portion opening, said side delivery chute having the bottom wall thereof inclined transversely with respect to said supporting stand and being provided with a delivery opening adjacent one end thereof, a removable closure plate for said projecting portion opening releasably supported on said projecting portion whereby said stand may be used for front delivery when said closure is employed and may be used for side delivery when said closure plate is removed.

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