

July 29, 1969

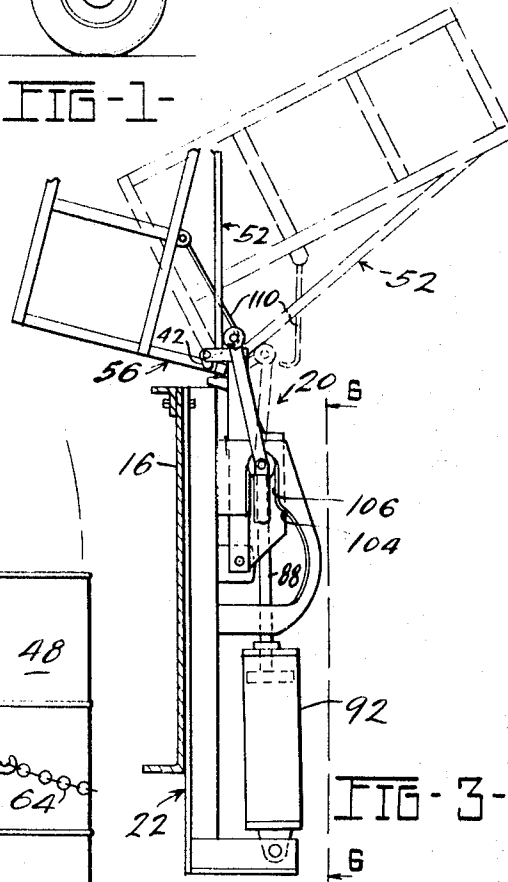
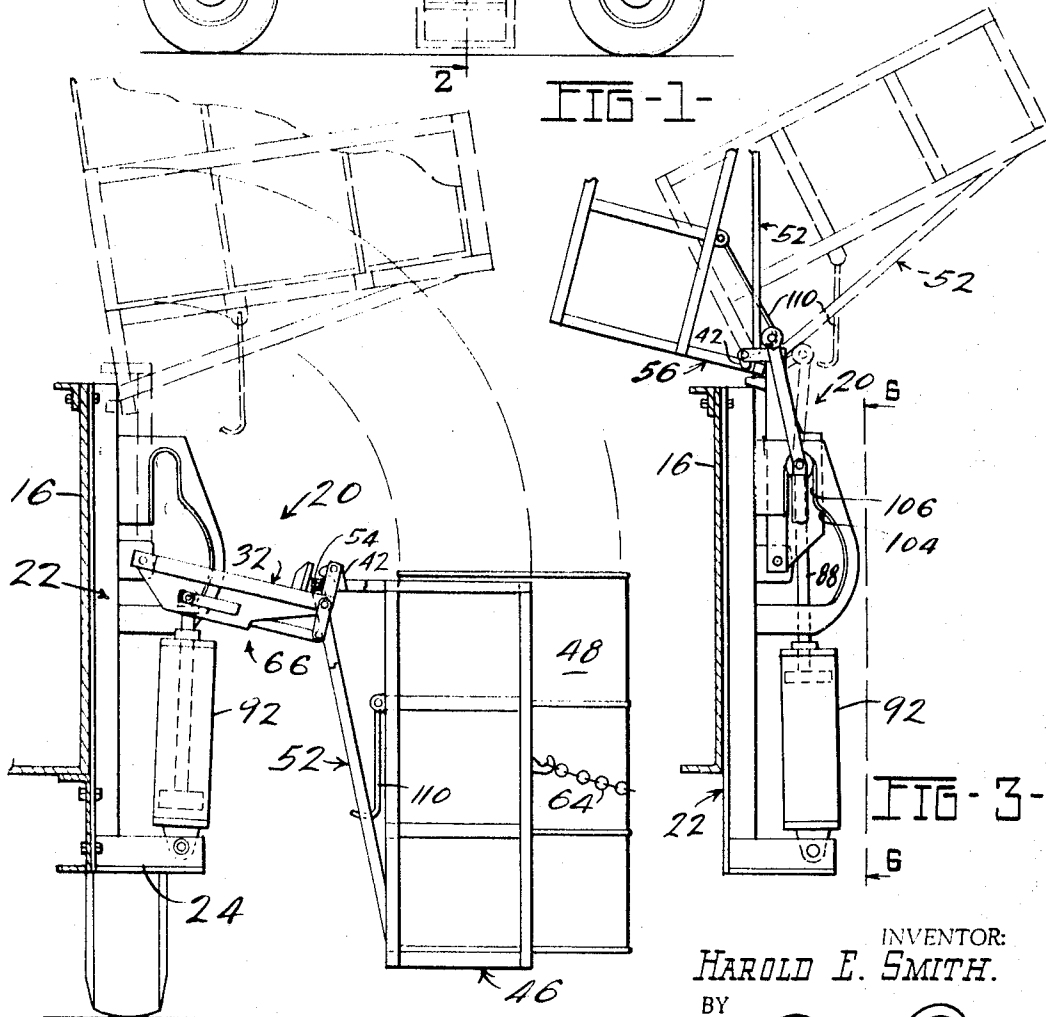
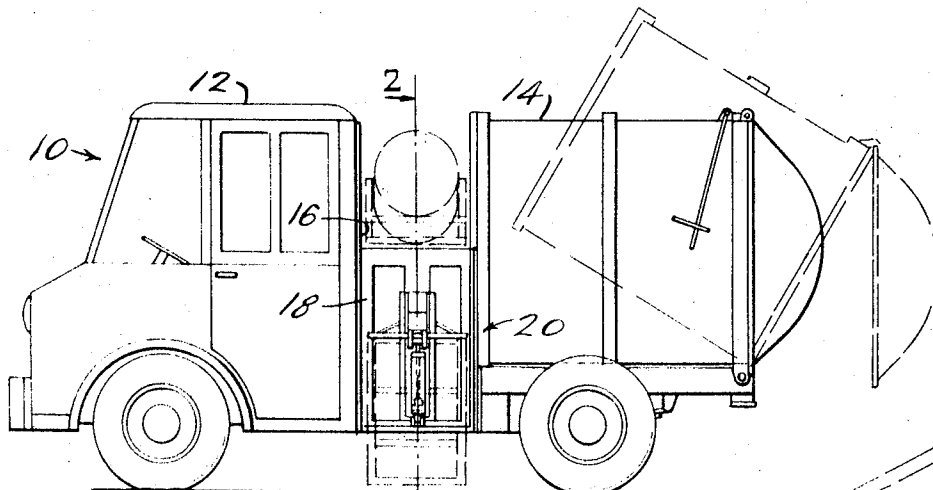
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3,458,071

APPARATUS FOR DIVESTING A RECEPTACLE OF ITS CONTENTS

Filed June 26, 1967

3 Sheets-Sheet 1



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APPARATUS FOR DIVESTING A RECEPTACLE OF ITS CONTENTS

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3 Sheets-Sheet 2

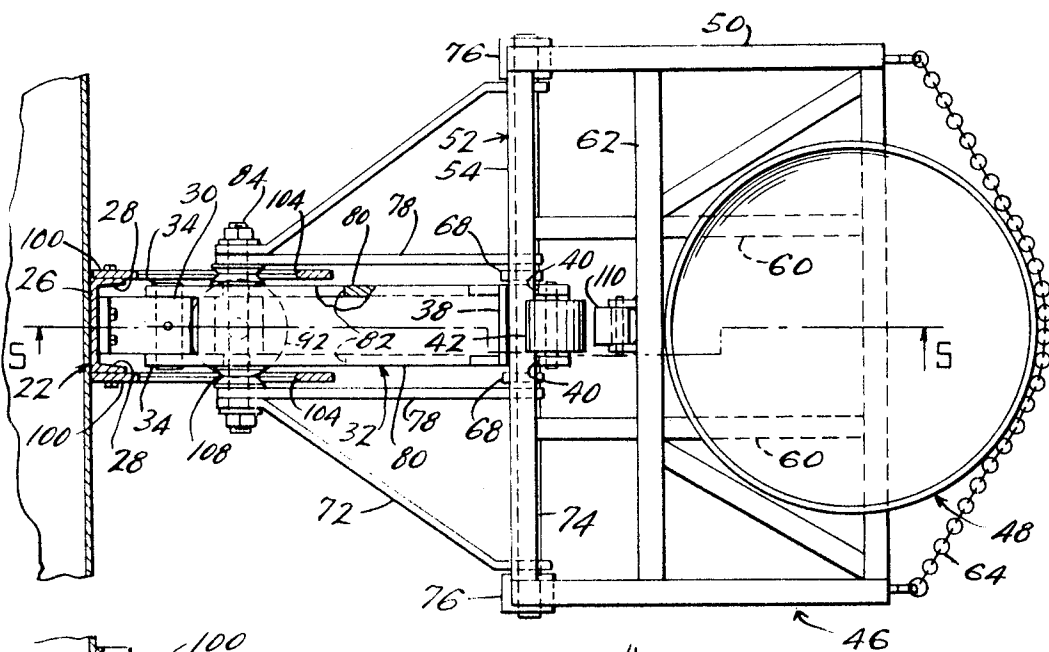


FIG-4-

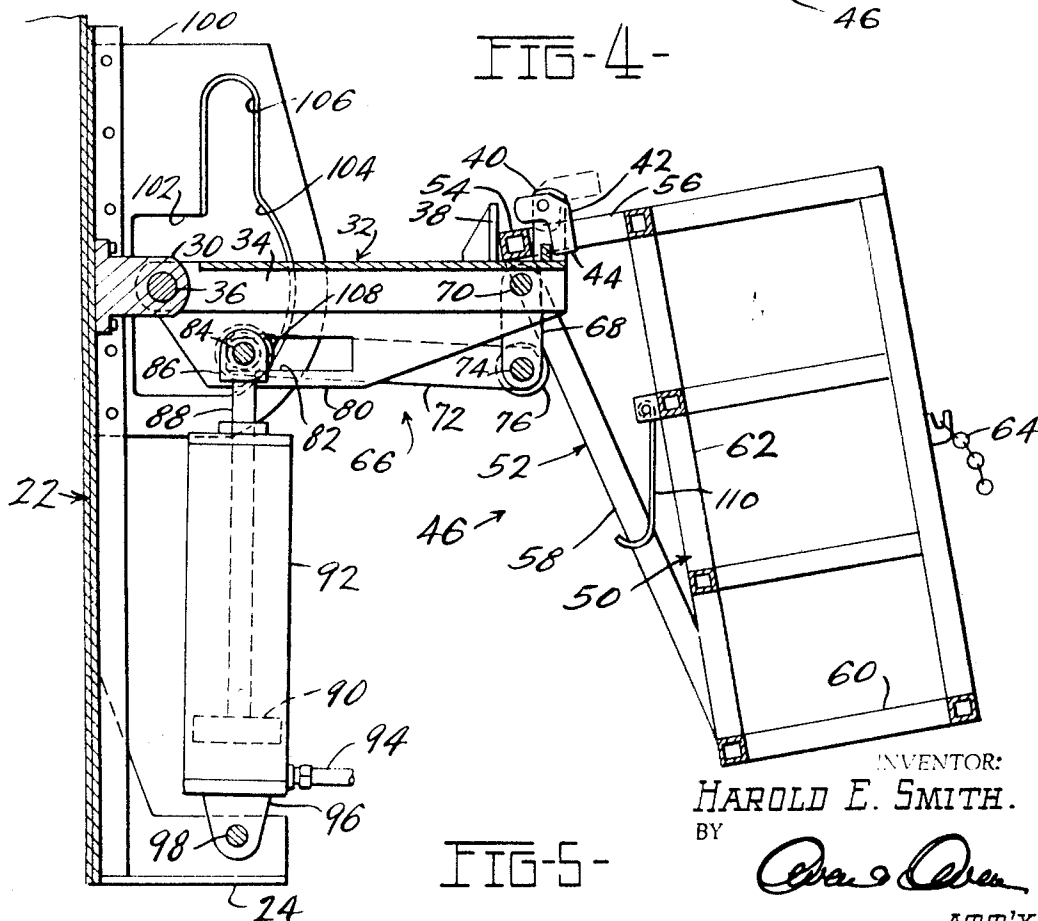


FIG-5-

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3 Sheets-Sheet 3

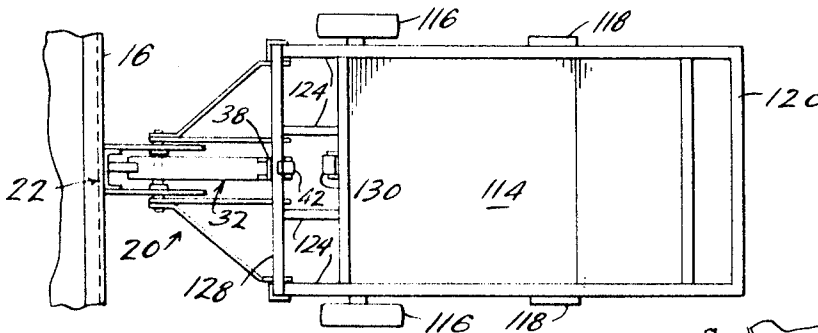


FIG-8-

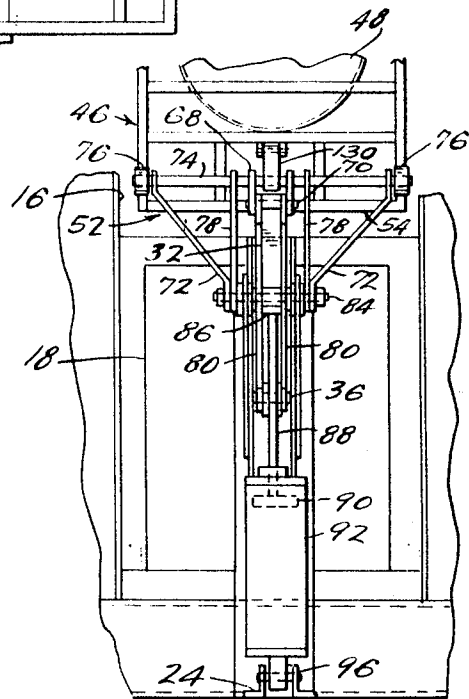


FIG-6-

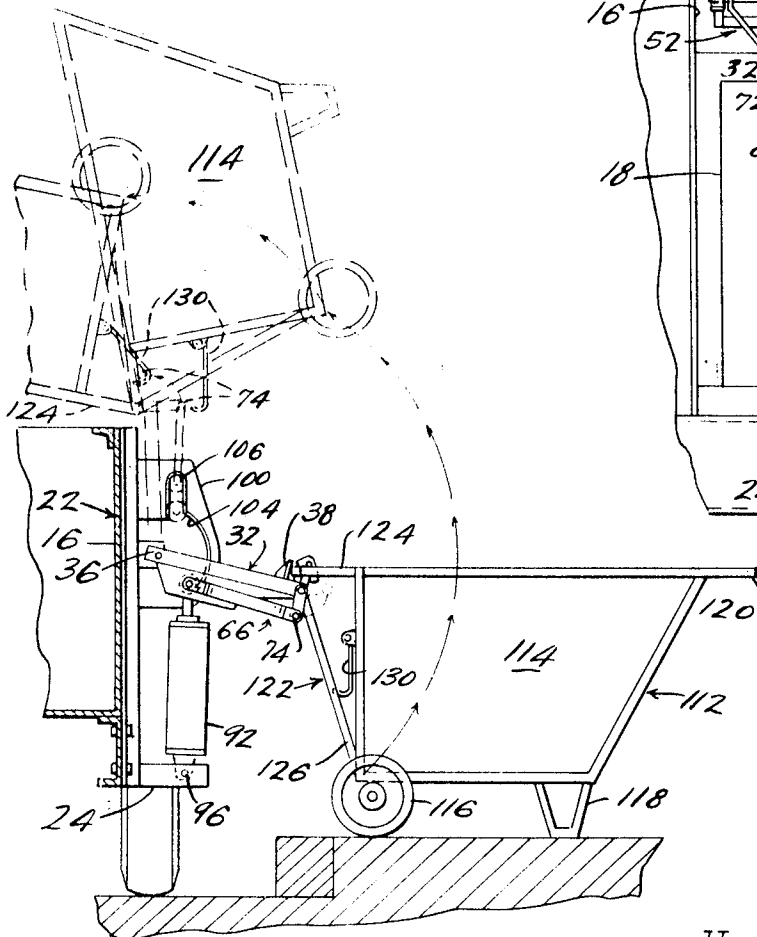


FIG-7-

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3,458,071 APPARATUS FOR DIVESTING A RECEPTACLE OF ITS CONTENTS

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Int. Cl. B65f 3/04

U.S. Cl. 214—302

10 Claims

ABSTRACT OF THE DISCLOSURE

A mechanism for dumping a garbage container into a refuse truck is provided. A garbage container is latched on an arm of the mechanism which is then raised in an arcuate path with additional links engaging a lower portion of the container and moving the container to an inverted position over a refuse-receiving chamber of the refuse truck. The entire operation is powered by a single fluid-operated cylinder and piston.

This invention relates to a mechanism for dumping a receptacle and specifically to a mechanism for lifting and inverting a refuse container.

The mechanism according to the invention is particularly useful when applied to a refuse vehicle and when used to dump larger receptacles of refuse into a receiving chamber of the vehicle. This substantially reduces fatigue of the garbage men and increases their productive capacity. Further, individual garbage cans can be dumped into a larger receptacle which can then be dumped from time to time, if desired. In one form, the receptacle can be a wheeled cart which can be pushed to the location of the garbage cans, particularly when located remotely from the refuse vehicle.

The new dumping mechanism is of unique, low cost, and reliable construction. It employs but a single drive unit in the form of a fluid-operated cylinder and piston which raise and lower an arm which is supported by the refuse vehicle. The mechanism is provided with a unique linkage for completely inverting the refuse receptacle when over the refuse-receiving chamber of the vehicle to be sure that the contents thereof are fully removed.

It is, therefore, a principal object of the invention to provide an improved receptacle dumping apparatus particularly designed for a refuse vehicle.

Another object of the invention is to provide a refuse receptacle dumping mechanism which employs a single drive unit, is of low-cost construction, and is reliable in operation.

Many other objects and advantages of the invention will be apparent from the following detailed description of preferred embodiments thereof, reference being made to the accompanying drawing, in which:

FIG. 1 is a somewhat schematic, side view in elevation of a refuse vehicle with a dumping mechanism according to the invention;

FIG. 2 is a left side view in elevation of the dumping mechanism shown in FIG. 1;

FIG. 3 is a view similar to FIG. 2 but with the dumping mechanism in its uppermost position;

FIG. 4 is a top view of the mechanism on a larger scale;

FIG. 5 is a view in vertical cross section taken along the line 5—5 of FIG. 4;

FIG. 6 is a front view of the dumping mechanism with the mechanism in an upper position;

FIG. 7 is a left side view in elevation of the mechanism with a different type of refuse receptacle; and

FIG. 8 is a top view of the mechanism and receptacle shown in FIG. 7.

Referring to FIG. 1, a refuse vehicle with which the invention can be employed is indicated by the numeral 10 and includes a driver's cab 12 and a refuse storage chamber 14. This can be tilted, as shown in the dotted lines, to empty the chamber. Between the cab 12 and the storage chamber 14 is a refuse-receiving chamber 16 formed between the back wall of the cab 12 and the front wall of the chamber 14 and between side panels 18 on opposite sides of the vehicle. The receiving chamber 16 has a compacting plunger (not shown) located at the bottom thereof with a fluid-operated cylinder extending into the lower part of the cab 12. When the plunger is operated, it forces refuse from the receiving chamber 16 into the storage chamber 14 where it is compacted to enable a substantially greater amount of refuse to be held in the chamber 14. The specific vehicle 10 does not form a part of the instant invention and will not be discussed in detail. A vehicle of this type is disclosed more fully in my copending application, Ser. No. 591,996, now abandoned.

In some instances, the side panels 18 will be high enough that excessive effort is required to dump garbage cans over one of the panels and into the chamber 16. To overcome this, a dumping mechanism generally indicated at 20 and embodying the invention can be employed. This mechanism can carry a substantially larger refuse receptacle which, from time to time, is lifted and inverted by the mechanism 20 to empty the contents thereof into the chamber 16. The mechanism 20 includes a vertical support or frame member 22 which can be suitably affixed to the panel 18 and terminates at its upper end in this instance at the edge of the panel 18. A horizontal support or frame member 24 extends outwardly from the lower end of the support 22 to complete the supporting framework for the dumping mechanism 20. The vertical support 22 can constitute a channel iron, as shown in FIGS. 4 and 5, having a main web 26 and side flanges 28, with the lower frame member 24 being of a similar design. A large pivot ear or block 30 extends outwardly from the web 26 at an intermediate location on the frame member 22. A pivotable lifting arm 32 has depending side flanges 34 forming pivot extensions on opposite sides of the pivot block 30 and connected to the block 30 through a pivot pin or bar 36. The arm 32 is sufficiently long that the outer end will extend above the panel 18 when in a generally vertical position. The outer end of the lifting arm 32 has upwardly extending projections 38 and 40 forming a notch to receive a refuse receptacle or refuse receptacle holder. The outer projection 40 has a gravity-operated latch 42 pivotally connected thereto and which is manually swung to the dotted line position as shown in FIG. 5 when a receptacle or holder is connected to the arm 32, and is then pivoted back to the vertical position against a stop 44 to prevent removal of the holder or receptacle. The latch 42 stays in the solid line position throughout movement of the arm 32 to hold the holder or receptacle in engagement with the arm 32.

In the embodiment shown in FIGS. 1-5, a refuse receptacle holder 46 is employed to carry a refuse receptacle 48 shown specifically in the form of a large drum. The holder 46 includes a receiving framework 50 for the drum and a connecting framework 52 extending from the receiving framework 50 and having a transverse connecting bar 54 which is received in the notch between the projections 38 and 40 to connect the receiving framework 50 and the drum 48 to the arm 32. The connecting framework 52 includes horizontally extending struts 56 and slanted struts 58 which extend from the bottom of the receiving framework 50 to the outer ends of the horizontal struts 56 where they are

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also affixed to the connecting bar 54. The struts 56 and 58 thereby form an inverted triangular framework with the receiving framework 50.

The receiving framework 50 can be of any suitable design; as shown, it includes horizontal frame members forming a platform 60 for the drum 48 and vertical members forming a back 62 against which the drum 48 is at least partially supported during dumping. A suitable chain 64 can be connected across the front of the receiving framework 50 to hold the drum in position, as shown in FIGS. 2 and 4.

The arm 32 is effective to lift the drum 48 and its contents but, by itself, is ineffective to pivot it to an inverted, dumping position. To accomplish this, dumping linkages 66 are employed. These linkages include a pair of short control links 68 which are pivotally connected by a pin or rod 70 to an outer portion of the arm 32 and specifically to the depending side flanges 34, as shown in FIG. 5. The dumping linkages further include diagonally-extending actuating links 72 (FIG. 4) which are connected by a long push bar 74 to the lower ends of the control links 68 but are substantially spaced from the links 68. Contacting rolls 76 are carried on the outer ends of the bar 74 and engage the diagonal frame members 58 of the connecting framework 52 when the links 72 move outwardly with respect to the arm 32. A second pair of actuating links 78 are connected at one end to the links 72 and are pivotally connected at the opposite ends to intermediate portions of the bar 74 to provide further support for the push bar.

Guide plates 80 are functionally integral with the arm 32 and depend from the flanges 34. The guide plates 80 have elongate guide slots 82 which are generally parallel with the arm 32 and have a predetermined length which will be discussed more fully subsequently. A guide rod or axle 84 extends through the slots 82 and is guided thereby, with the outer ends of the guide rod 84 being pivotally connected to all four of the links 72 and 78. When the guide rod 84 is at the left end of the slot 82, as shown in FIG. 2, the control links 68 are generally perpendicular to the longitudinal extent of the arm 32 with the holder 50 then being substantially upright.

An intermediate portion of the guide rod 84 between the guide plates 80 has a pivotal connecting ear 86 (FIG. 5) rotatable thereon and connected with a piston rod 88 having a piston 90 at its opposite end in a fluid-operated cylinder 92 to which fluid can be supplied through a line 94 at the lower end thereof. The cylinder 92 has a lower ear 96 which is pivotally connected by a pin 98 to the lower supporting frame member 24.

When fluid is supplied to the blind end of the cylinder 92, the piston 90 moves upwardly and, through the guide rod 84, causes the arm 32 to rotate in a counterclockwise direction, as shown in the drawings. As the arm 32 moves upwardly, the guide slot 82 moves toward a position parallel to the piston rod 88 and the closer the slot approaches this position, the greater is the tendency for the piston rod 88 to push the guide rod 84 toward the right end of the slot 82. As the rod 84 moves in this direction, the links 72 and 78 move the push bar 74 and the control links 68 outwardly with respect to the arm 32 and thereby cause the holder 46 and the drum 48 to move to the inverted, dumping position, as shown in FIG. 3.

The position of the arm 32 at which the rod 84 will begin to move outwardly in the slot 82 would ordinarily depend upon the weight of the drum 48 and its contents. When the load is light, the rod 84 would tend to move outwardly sooner, with the result that the drum 48 could be inverted before it reaches its positions over the chamber 16.

In order to maintain the movement of the drum 48 consistent regardless of the load carried thereby, a pair of restraining plates 100 (FIGS. 4 and 5) are affixed to the side flanges 28 of the channel 22 and extend substantially perpendicular to the panel 18. Each of the

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restraining plates 100 has an opening 102 therein which includes an arcuate edge 104 having a center of curvature at the pivot rod 36 and a generally vertical slot 106 at an upper portion of the curved edge 104 and extending substantially parallel to the piston rod 88. As shown, the edge 104 and the slot 106 have V-shaped marginal configurations which cooperate with rollers 108 rotatably carried by the guide rod or axle 84. As the piston rod 88 moves upwardly, the guide rod 84 is maintained near the left end of the slot 82 since it is restrained from movement outwardly in the slot 82 by the curved edge 104. For this purpose, the radius of the curved edge is substantially equal to the distance from the guide rod 84 to the pivot rod 36 plus the radius of the rollers 108.

When the rollers 108 reach the upper end of the curved edge 104, the holder 46 and the drum 48 are approximately in the position shown in dotted lines in FIG. 2. From this point on, the arm 32 pivots only slightly more toward the vertical; however, the guide rod 84 moves in a substantially vertical direction through the guide slot 82 with the rollers 108 moving toward the end of the slot 106, at which time the push bar 74 pivots around the pivot rod 70 and moves the holder 46 through an arc of almost ninety degrees to the inverted position shown in FIG. 3. Thus, the arcuate movement of the arm 32 and the subsequent arcuate movement of the bar 74 and the control links 68 to complete the inversion of the holder are controlled by the restraining plates 100 and such movements are the same regardless of the weight of the load carried in the drum 48.

When the holder 46 reaches the inverted position, a hook 110, pivotally connected to an intermediate part thereof, swings over under the force of gravity and engages the bar 74 between the links 68 to limit the extent of movement of the holder and to enable it to be returned to the upright position when the piston rod 88 is retracted and the rod 84 is initially moved vertically downwardly in the slot 82 and the slot 106.

In some localities, and especially where the garbage cans are not brought to the curb by the home owner but are in remote locations to the rear of the house, it is preferable to have a portable refuse receptacle which can be taken to the site of the cans. This saves a double trip of walking to the can, bringing the can to the refuse vehicle, returning the can, and returning to the refuse vehicle. Under such circumstances, a portable refuse cart 112 (FIGS. 7 and 8) is advantageous. The cart 112 includes a container or receptacle 114 having wheels 116 at a forward portion thereof, legs 118 at the lower rear portion and a handle 120 at the upper rear portion. A connecting frame 122 is located at the front portion of the cart and includes horizontal struts 124 and slanted struts 126 connected to a transverse connecting bar 128 which is received in the notch of the arm 32 in the same manner as the bar 54.

The cart also has a hook 130 which engages the push bar 74 when the cart is inverted. In this instance, the handle 120 of the cart can contact the opposite side of the chamber 16 when inverted to stop the cart suddenly and provide an effective emptying force for the container 114. The arm 32 preferably is designed so that it can be lowered below the level of the bar 128 of the cart 112. The cart can then be moved to a position such that the arm can be raised to enable the notch to receive the bar 128 and lift the cart, in the same manner as previously.

I claim:

1. Apparatus for dumping a garbage container associated with a connecting framework, said apparatus comprising an upright frame member, an arm having an end pivoted to said frame member, said arm having a latch assembly at an outer end portion thereof to engage a portion of said connecting framework, a control link pivotally connected to the outer end portion of said arm, means carried by said control link and engageable with said connecting framework at a location spaced from said

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latch assembly, an actuating link pivotally connected with said control link, said arm having guide means at an intermediate portion thereof disposed in a direction toward said control link, a guide rod carried in said guide means and connected to said actuating link, and a fluid-operated piston having a piston rod connected to said guide rod.

2. Apparatus according to claim 1 characterized further by restraining means carried by said upright frame member and cooperating with said guide rod to control movement of said piston rod relative to said actuating link as said arm is pushed upwardly by said piston.

3. Apparatus according to claim 1 wherein said guide means comprises a plate functionally integral with said arm and forming a guide slot generally parallel to said arm.

4. Apparatus according to claim 1 wherein said latch assembly comprises means forming a notch at the outer end portion of said arm, and a gravity-operated latch for holding said connecting framework in said notch when said arm is in a raised position.

5. Apparatus according to claim 1 characterized further by receiving means for holding the garbage container affixed to said connecting framework.

6. Apparatus according to claim 1 characterized further by said garbage container comprising a portable refuse cart associated with said connecting framework.

7. Apparatus for disposing of the contents of a large container comprising a supporting frame, an arm pivotally supported by said frame, said arm having connecting means at an outer end portion thereof for effecting a connection with the container, control link means pivotally connected to an outer end portion of said arm for directing a force toward the container to pivot the container

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around said connecting means, means connected with said arm for moving said arm in an arcuate path to lift the container in an arcuate path to a position overhead, means for moving said control link means for pivoting said container around said engaging means to an inverted position after said container has been lifted, and common drive means for said means for moving said arm and said means for moving said control link means.

8. Apparatus according to claim 7 wherein said common drive means for moving said arm and said means for moving said control link means is a fluid-operated means.

9. Apparatus according to claim 7 wherein said means for moving said control link means comprises an actuating link connected with said control link means, a reciprocative rod connected with said actuating link, and guide means carried by said arm for restricting movement of the portion of said actuating link connected with said piston rod in a direction generally parallel with said arm.

10. Apparatus according to claim 9 wherein said moving means further comprises restraining means carried by said supporting frame and having an opening with an edge of predetermined configuration to restrict movement of said actuating link until said container has been lifted and said arm is in an upper position.

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HUGO O. SCHULZ, Primary Examiner