Sept. 18, 1956 J. R. WEBER 2,763,387

AUTOMATIC DUMPING TRUCKS

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Fig. 1.

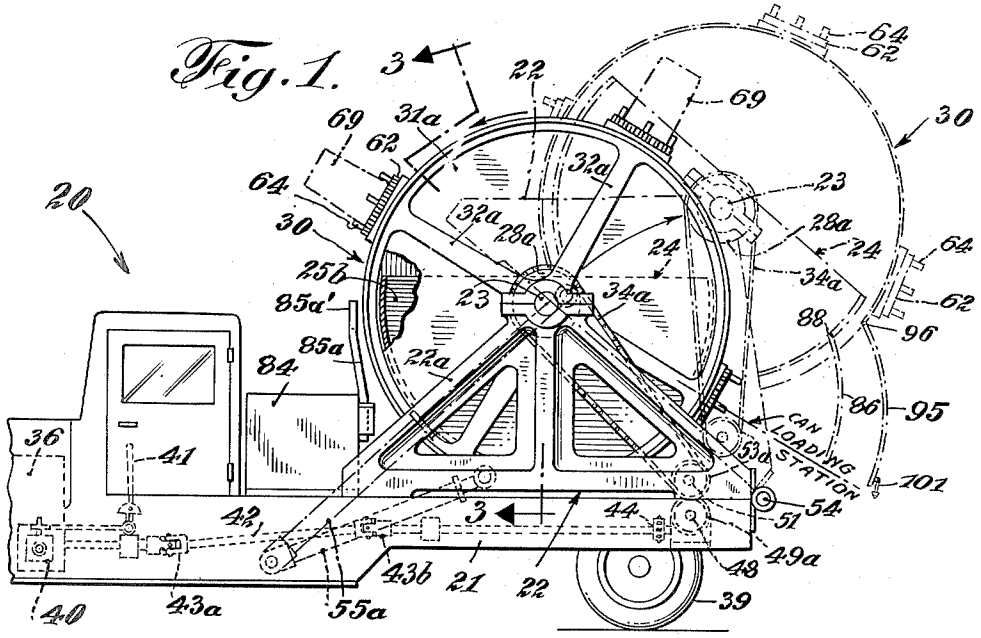
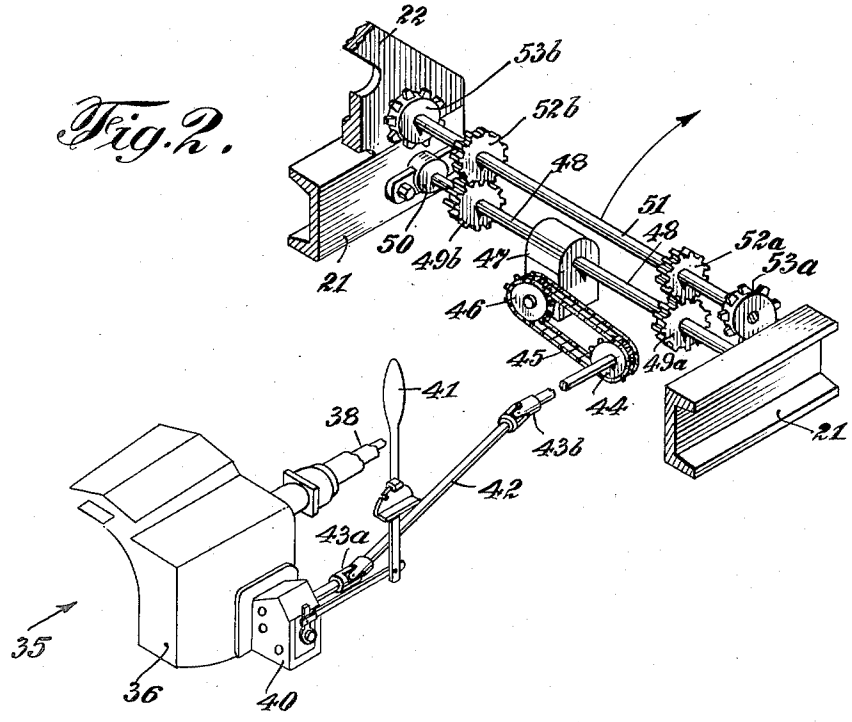


Fig. 2.



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Fig. 3.

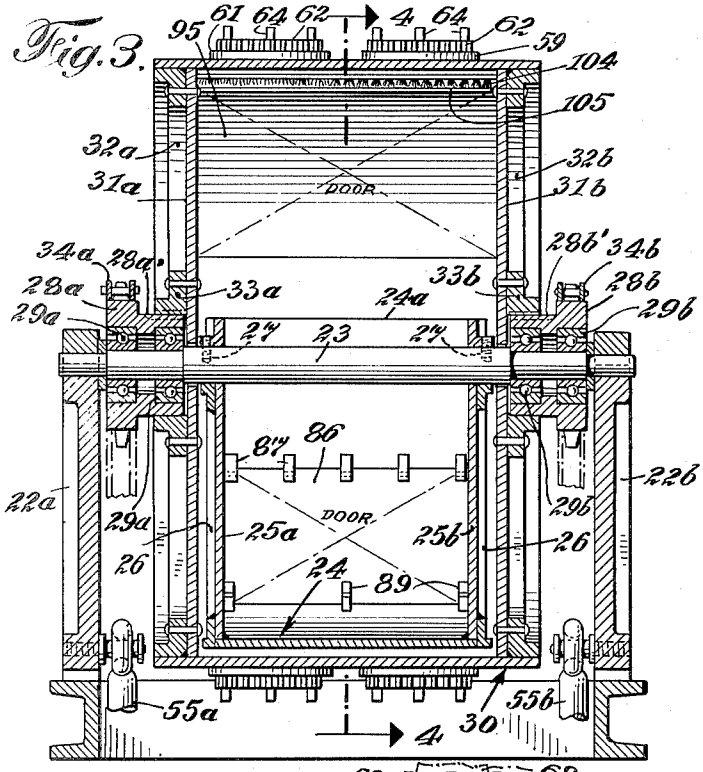


Fig. 5.

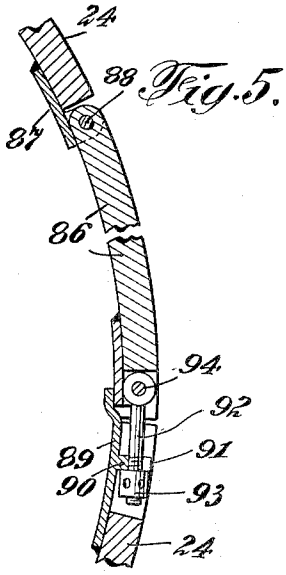


Fig. 6.

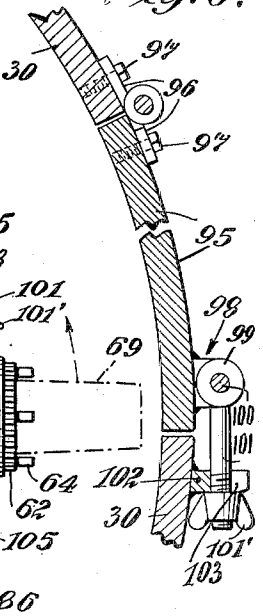
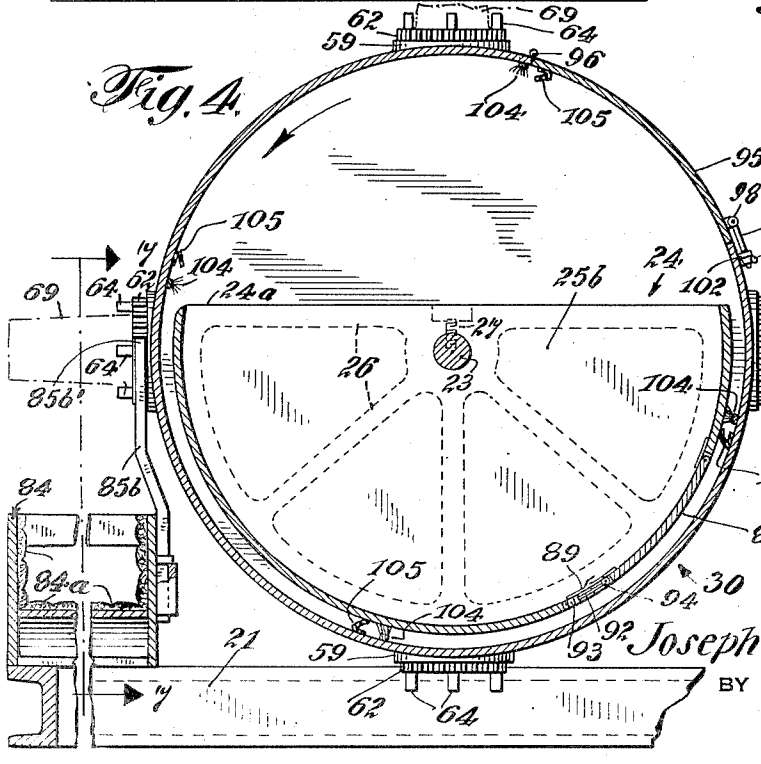


Fig. 4.



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Fig. 7.

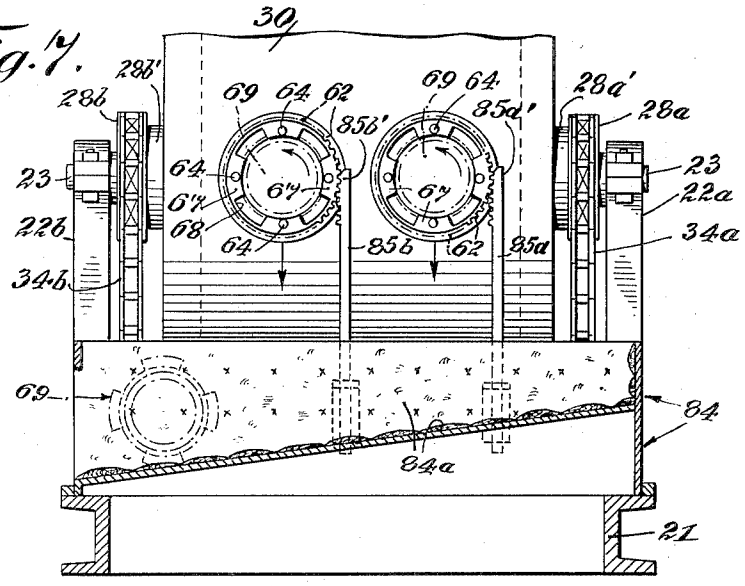


Fig. 8.

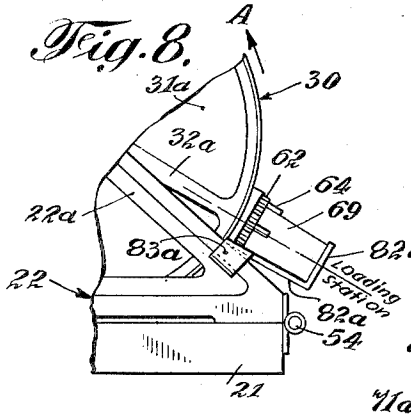


Fig. 9.

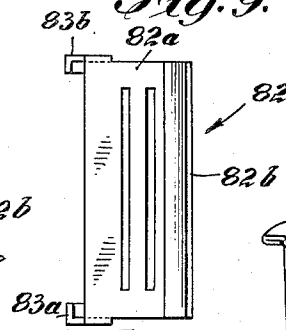


Fig. 10.

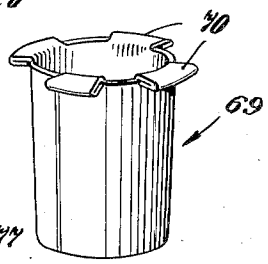


Fig. 11.

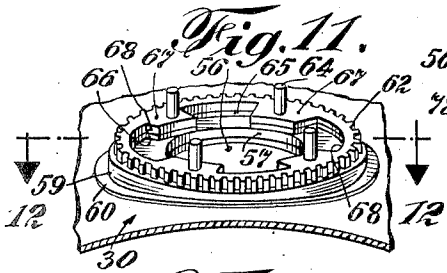


Fig. 13.

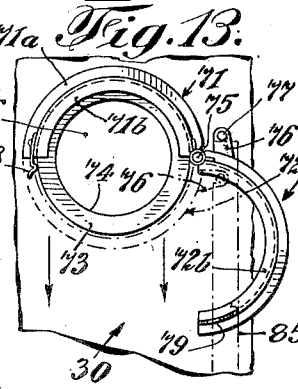


Fig. 14.

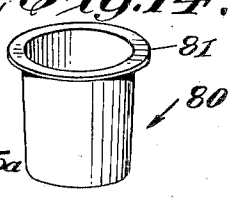
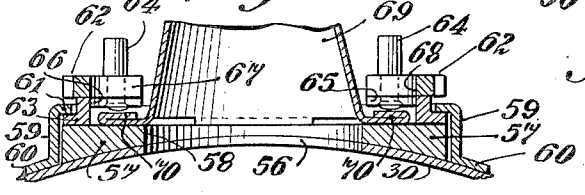


Fig. 12.



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2,763,387

AUTOMATIC DUMPING TRUCKS

Joseph Rudolph Weber, New York, N. Y.

Application November 19, 1952, Serial No. 321,314

9 Claims. (Cl. 214—302)

This invention relates to improvements in trucks for collection of garbage, refuse, ashes, rubbish and other waste materials, and more particularly to an automatic self-loading vehicle of this character.

The invention provides a garbage collecting truck permitting more sanitary loading and removal of waste materials by the crew.

The invention further provides a truck for efficient automatic collection of waste materials that prevents escape of garbage during and after loading operation which is automatic, as well as the release of empty garbage cans.

Still further, the invention provides a self-loading vehicle featuring a stationary tank which is permanently covered to prevent escape of flying refuse therefrom and thus requires no hydraulic packing of the accumulated waste materials.

As a more specific feature, the invention provides a stationary tank surrounded by a rotatable drum; the interior of the drum may be lined with lead to prevent harmful effects of atomic radiating material.

The invention resides essentially in the provision of a stationary tank with an open top and a closed rotatable drum that surrounds the tank and is unidirectionally driven by the truck engine from the rear toward the front end of the truck, the drum carrying a plurality of cradles and having an equal number of radially disposed openings in its curved peripheral wall. Garbage cans, which may be of a specific form to be attachable to the cradles, are attached to the drum at the rear end of the truck and then inverted while rotating along the periphery of the drum to dump the garbage into the open-top stationary tank. The cans are thereupon automatically removed from the drum and collected in a chute between the front end of the tank and the driver's compartment. Stationary stops are provided in the proximity of the chute to open the cradles and permit the empty cans to drop by gravity into the preferably padded inclined chute. The drum is operatively connected with the truck engine to be rotated thereby, the connecting mechanism being so constructed that a ready tilting of the tank is possible by means of conventional tilting devices, such as a pair of jacks or the like.

Various other features and advantages of the novel structure will become apparent and will be pointed out in the course of the following detailed description of some at this time preferred embodiments which are illustrated in the accompanying drawing, and the invention will be finally pointed out in the appended claims.

In the drawing, wherein similar characters of reference indicate similar elements,

Fig. 1 is a side elevational view of the self-loading garbage truck, the tilted tank and drum being shown in dot-dash lines;

Fig. 2 shows in perspective view a preferred embodiment of the mechanical connection between the truck engine and the rotatable drum;

Fig. 3 is a substantially vertical sectional taken on line 3—3 in Fig. 1;

Fig. 4 is a vertical section taken on line 4—4 in Fig. 3;

Fig. 5 is an enlarged section showing the hinged door in the cylindrical wall of the open-top tank for the dumping of accumulated refuse therethrough;

Fig. 6 is an enlarged section showing the hinged door in the cylindrical drum;

Fig. 7 is a partial section taken on line 7—7 in Fig. 4, showing the padded chute for collection of empty garbage cans and the stops for automatic openings of the cradles;

Figs. 8 and 9 illustrate the loading platform at the rear end of the truck;

Fig. 10 illustrates a special garbage can;

Fig. 11 is a perspective view of a cradle attached to the rotatable drum for retention of the can shown in Fig. 10;

Fig. 12 is a section taken on line 12—12 in Fig. 11, with the can of Fig. 10 attached to the cradle;

Fig. 13 shows a modified cradle; and

Fig. 14 shows a modified garbage can attachable to the cradle of Fig. 13.

Referring now in detail to the illustrated embodiments, there is shown in Fig. 1 the chassis 21 of a garbage truck 20, said chassis supporting a frame 22 in which a shaft 23 is non-rotatably held between two upright brackets 22*a*, 22*b* (see Fig. 3). Shaft 23 has fixedly attached thereto the vertical side walls 25*a*, 25*b* of a tank 24 having an open top 24*a*, the side walls being reinforced by a number of ribs or columns 26. Tank 24 is fixed to shaft 23 by screw bolts 27.

Shaft 23 also supports two sprocket wheels 28*a*, 28*b* which rotate on bearings 29*a*, 29*b*. To the hubs 28*a'*, 28*b'* of the sprockets 28*a*, 28*b* are fixed circular side walls 31*a*, 31*b* of a closed drum 30 having a plurality of radial reinforcing ribs 32*a*, 32*b* emanating in the hubs 33*a*, 33*b* which are keyed to the hubs 28*a'*, 28*b'*, respectively. When the sprockets 28*a*, 28*b* are driven by chains 34*a*, 34*b*, the closed drum 30 rotates around the stationary open-top tank 24 and entirely encloses said tank to prevent escape of waste materials therefrom.

The preferred mechanism that connects the sprockets 28*a*, 28*b* with the engine 35 of the truck 20 is shown in Fig. 2. From the conventional automotive transmission 36 extends a drive shaft 38 that imparts rotational motion to the rear wheels 39. Attached to the transmission 36 is a power take-off box 40 that is controlled by a lever 41, and a shaft 42, provided with universal joints 43*a*, 43*b*, rotates a gear 44 and the chain drive 45. Chain 45 sets in motion a gear 46 which is coupled to a gear box 47, the latter preferably consisting of a threaded worm and a worm gear (not shown) which are best suited to prevent slippage.

Gear box 47 causes rotation of a shaft 48 and of a pair of gears 49*a*, 49*b* that are fixed thereto. Shaft 48 is mounted in suitable bearings 50 that are attached to the chassis 21. Gears 49*a*, 49*b* in turn drive a pair of gears 52*a*, 52*b* fixed to a shaft 51 above shaft 48, the shaft 51 being rotatably supported in the tiltable frame 22. Also attached to shaft 51 are sprocket wheels 53*a*, 53*b* which drive sprockets 28*a*, 28*b* on shaft 23 by means of chains 34*a*, 34*b*, as shown in Figs. 1 and 3.

When the frame 22 is tilted around a rear horizontal axis 54 by a pair of jacks 55*a*, 55*b*, together with shaft 23, open-top tank 24 and rotatable drum 30, the shaft 51 with its gears 52*a*, and 52*b* and sprockets 53*a*, 53*b* is simply lifted above and away from shaft 48, after the lever 41 is actuated to disconnect the shaft 42 from the power take-off box 40 and to stop the rotation of shaft 48. The frame 22 with all the elements it supports is shown tilted in dot-dash lines in Fig. 1.

The twin jacks 55*a*, 55*b* are pivotally connected to the

chassis 21 and to the frame 22. They are actuated by a pressure tank, a heavy duty oil pump or a pump drive shaft connected to the power take-off to fit the truck transmission. If a pump is employed, a three-way control valve actuated by levers in the driver's compartment may be provided.

The means of power transmission from the engine to the rotatable drum 30 may be of any convenient design and form, such as shafts, a worm drive, endless screws, gear boxes, hydraulically actuated ratchets or other known devices, including pulleys and belts.

The closed rotatable drum 30 has a plurality of radially spaced openings 56, four pairs of such openings being shown in the drawing. The number of openings may be varied depending on the size of drum 30. Each of the openings 56 is surrounded by a cradle, for example, such as is shown in Figs. 11 and 12, or in Fig. 13. In the embodiments of Figs. 11 and 12, the opening 56 is surrounded by an annulus 57 which has an opening 58 registering with the opening 56 in the drum. A retaining ring 59 has its outer flange 60 welded to the drum 30 and its inner flange 61 so spaced from the annulus 57 to retain the outer annular flange 63 of a gear 62. The annulus 57 has attached thereto or is integral with a washer 65 with four radially disposed slots 66 therein. Similarly, the gear 62 has four inwardly extending projections or prongs 67 each of which carries a pin 64, these prongs forming therebetween four recesses 68 of a shape similar to that of slots 66 in the washer 65.

A garbage can 69 is shown in Fig. 10. The open end of can 69 is surrounded by four ears 70 which are of such shape as to fit into the recesses 66 and 68 in the respective members 65 and 62, when these recesses are superposed as shown in Fig. 11. The operator then rotates gear 62 by exerting pressure against the pins 64 so that the inwardly extending projections 67 of gear 62 slide over the outwardly extending ears 70 on the can 69 whereby to lock the can to the drum 30. The open top of the can is then above the opening 56 in the drum, and as the drum 30 travels around the tank 24, it inverts the can 69 while it is above the open top 24*a* of the tank to dump the refuse therein, as may be readily observed in Fig. 4. A can 69, attached by its ears 70 to the cradle of Fig. 11 is shown in section in Fig. 12.

A somewhat different cradle for a garbage can is shown in Fig. 13. Here, the cradle consists of two semicircular portions 71, 72, the outer flange 71*a* of portion 71 being welded to the periphery of the drum 30 around an opening 56. The inner flange 71*b* of portion 71 is spaced from a washer 73 that has an opening 74 registering with the opening 56 in the drum 30. The second portion 72 of the cradle is pivotally attached to the stationary portion 71 at 75 and carries a bracket 76 with a radially projecting butt or pin 77. Attached to the stationary portion 71 is a resilient latch 78 that enters the hole 79 in the free end of pivotable portion 72 when the latter is brought into the position shown in dot-dash lines in Fig. 13. The annular outer flange 81 surrounding the open top of a can 80, shown in Fig. 14, is inserted below the inner flange 71*b* of the stationary cradle portion 71 and the portion 72 is then pivoted around 75 to retain with its inner flange 72*b* the can 80 against the periphery of the drum 30. The latch 78 enters hole 79 in portion 72 to lock the latter to the stationary portion 71. The filled garbage can then travels with the periphery of the drum 30, is inverted above the open top 24*a* of the tank 24, and is then carried toward the front end of the truck 20 to be brought in a position for release from the drum.

A loading platform 82 at the rear end of the garbage truck 20 is shown in Fig. 8, and separated from the frame 22 in Fig. 9. The platform 82 extends between the frame brackets 22*a*, 22*b* and is fastened thereto by a pair of lateral members 83*a*, 83*b*. The inclined plates 82*a*, 82*b* define the position of one or more filled garbage cans placed on the platform, and when the cradles that rotate

with the periphery of the drum 30 emerge from below the plate 82*a*, the operator attaches the filled cans thereto in the previously described manner, whereupon the cans travel with the cradles in the direction of arrow A (Fig. 8). The platform 82 may be replaced by a conventional truck tail gate (not shown).

A padded chute 84 is attached to the chassis 21, as best shown in Figs. 4 and 7, and is inclined in a direction toward left in Fig. 7 so that a crew member standing on the sidewalk can remove an empty can 69 that has been released by the cradle gear 62 or by the portion 72 of the cradle shown in Fig. 13. A pair of stationary stops 85*a*, 85*b* project above and are attached to the chassis 21, each stop having its upper end provided with teeth 85*a'*, 85*b'* to mesh with and to rotate the gears 62 on the drum 30. As the gears 62 rotate, the empty garbage cans 69 are released when the inwardly projecting flanges 67 are slid off the ears 70, whereupon the cans drop by gravity into the chute 84 that has its bottom and sides padded with a suitable cushioning material, such as rubber, latex or other elastic substance to reduce shock, noise and prevent damage to the cans. The cradles with gears 62 then continue their travel below the tank 24 and are ready to receive a pair of filled garbage cans 69 placed on the platform 82 at the rear end of the vehicle 20. The teeth on member 62 may be omitted together with the teeth at the upper ends of stops 85*a*, 85*b*, and said stops so placed to engage the pins 64 for partial rotation of flanges 67 and release of the cans 69. Also, the chute 84 may be removed during dumping and unloading procedure, together with stops 85*a*, 85*b* and chains 34*a*, 34*b*, if desired.

When the cradle is in the form shown in Fig. 13, the stops 85 engage the butts or pins 77 to unlock the pivotable portion 72 and release a can 80.

Fig. 5 shows in section the hinged door 86 in the rear cylindrical wall of the tank 24. As will be observed in Fig. 3, there are shown five hinges 87 fixed to the inner surface of tank 24, each hinge having a pin 88 between its lateral flanges to pivotally support the door 86. A member 89 is attached to the tank 24 below the door 86 and has a slot 91 in its flange 90 which receives a bolt 92 whose free end is threaded to receive a holed nut 93, the latter bearing against the flange 90 when the door 86 is closed. The other end of bolt 92 is pivotally attached to the door 86 by a pin 94. When the tank 24 is tilted into its dot-dash position shown in Fig. 1, the nut 93 is loosened whereupon the door 86 opens partly by gravity and partly under the weight of the accumulated garbage, and pivots around the pins 88 to permit discharge of refuse from the tank 24.

The hinged door 95 in the cylindrical wall of drum 30 is shown in Fig. 6. Hinges 96 are attached to the drum 30 and door 95, respectively, by a number of screw bolts 97. The lower end of the door 95 carries a bracket 98 with a pair of flanges 99 that support a horizontal pin 100. Bolt 101 pivots around pin 100 and has its lower end threaded to receive a wing nut 102. Bolt 101 fits into a recess 103 provided in member 102 that is fixed to the cylindrical wall of the drum 30 below the door 95. When the tank 24 is to be tilted, door 95 is brought into a position radially outwardly of the tank door 86, as shown in Fig. 1 in dot-dash lines, so that an unimpeded discharge of refuse may take place.

The inner surface of the drum 30 carries a number of horizontally disposed brushes 104 and an equal number of suitably shaped resilient flaps 105 which prevent entry of refuse into the space between the inner surface of drum 30 and the outer surface of the tank 24.

While I have shown some at this time preferred embodiments of my invention, it will be understood that various changes and modifications will occur to persons skilled in the art within the spirit thereof, and I therefore do not desire to be limited to the exact details of

the structure shown and described, but only by the scope of the appended claims.

I claim:

1. In a dumping truck having an engine, a chassis and a refuse tank tilting device, in combination: an open-top refuse tank supported by said chassis and tiltable by said tank tilting device, a drum having a substantially cylindrical wall rotatably supported by said chassis and surrounding said tank, said drum having a plurality of radially spaced openings in said cylindrical wall with said openings passing over the open top of said tank on rotation of said drum, a locking member attached to said drum in the proximity of each of said openings for reception and locking of garbage cans to said drum with the aperture of a can in juxtaposition with a selected one of said openings, an operative connection between said engine and said drum for rotational movement thereof, lock release members in the path of said locking members attached to said chassis for continuously releasing garbage cans attached to said drum on passing of the cans over the open top of and on emptying the contents thereof into said tank, and a door in said drum for dumping of refuse from said tank therethrough.

2. In a dumping truck having an engine, a chassis and a refuse tank tilting device, in combination: an open-top refuse tank supported by said chassis and tiltable by said tank tilting device, a closed drum having a substantially cylindrical wall rotatably supported by said chassis and surrounding said tank, said drum having a plurality of radially spaced openings in said cylindrical wall with said openings passing over the open top of said tank on rotation of said drum, a locking member attached to said drum in the proximity of each of said openings for reception and locking of garbage cans to said drum with the aperture of a can in juxtaposition with a selected one of said openings, an operative connection between said engine and said drum for rotational movement thereof, a lock release member in the path of said locking members attached to said chassis for continuously releasing garbage cans attached to said drum on tilting of the cans over the open top of and on emptying the contents thereof into said tank, a receptacle adjacent said lock release member for reception of garbage cans released by said lock release member, and a door in said tank and said drum, said doors being juxtaposable on tilting of said drum and said tank by said tank tilting device.

3. In a dumping truck for automatically tilting, emptying, releasing and collecting garbage cans, having an engine, a chassis and a refuse tank tilting device, in combination: a non-rotatable open-top refuse tank supported by said chassis and tiltable by said tank tilting device, a closed drum having a substantially cylindrical wall rotatably supported by said chassis and surrounding said tank, said drum having a plurality of radially spaced openings in said cylindrical wall with said openings passing over the open top of said tank on rotation of said drum, a cradle attached to said drum in the proximity of each of said openings for reception and locking of garbage cans to said drum with the aperture of a can in juxtaposition with a selected one of said openings, an operative connection between said engine and said drum for rotational movement thereof, a cradle opening member in the path of said cradles attached to said chassis for continuously releasing garbage cans attached to said drum on passing of the cans over the open top of and on emptying the contents thereof into said tank, a receptacle adjacent said cradle opening member for reception of garbage cans released by said cradle opening member, and a door in said drum and said tank, said doors being juxtaposable with one another on tilting of said drum and said tank by the said tank tilting device.

4. In a dumping truck having an engine, a chassis and a refuse tank tilting device, in combination: an open-top refuse tank supported by said chassis and tiltable by said tank tilting device, a drum having a substantially cylindrical peripheral wall and a pair of vertically disposed lateral walls, said drum being rotatably supported by said chassis and surrounding said tank, and said drum having a plurality of radially spaced openings in said cylindrical wall with said openings passing over the open top of said tank on rotation of said drum, a cradle attached to said drum in the proximity of each of said openings for reception and locking of garbage cans to said drum at the rear end of said truck with the aperture of a can in juxtaposition with a selected one of said openings, an operative connection between said engine and said drum for rotational movement thereof, cradle opening members in the path of said cradles attached to said chassis for continuously releasing garbage cans attached to said drum on passing of the cans over the open top of and on emptying the contents thereof into said tank, a padded receptacle adjacent said cradle opening members for reception of garbage cans released by said cradle opening members, and a door in said drum and said tank, said doors being juxtaposable with one another on tilting of said drum and said tank by said tank tilting device.

5. In a dumping truck having an engine, a chassis and a refuse tank tilting device, in combination: an open-top refuse tank supported by said chassis and tiltable by said tank tilting device, a pair of bearing members attached to said chassis, a shaft extending between said bearing members and traversing said tank, a closed drum having a cylindrical wall rotatably supported by said shaft and surrounding said tank, said wall having a plurality of radially spaced openings in said cylindrical wall with said openings passing over the open top of said tank on rotation of said drum, a cradle attached to said drum in the proximity of each of said openings for reception and locking of garbage cans to said drum with the aperture of a can in juxtaposition with a selected one of said openings, an operative connection between said engine and said drum for rotational movement of the latter, a cradle opening member in the path of said cradles attached to said chassis for continuously releasing garbage cans attached to said drum on passing of the cans over the open top of and on emptying the contents thereof into said tank, a padded receptacle adjacent said cradle opening member for reception of garbage cans released by said cradle opening member, and a door in said drum and said tank, said doors being juxtaposable with one another on tilting of said drum and said tank by said tank tilting device.

6. In a dumping truck having an engine, a chassis and a refuse tank tilting device, in combination: an open-top refuse tank supported by said chassis and tiltable by said tank tilting device, a drum having a substantially cylindrical wall rotatably supported by said chassis and surrounding said tank, said drum having a plurality of radially spaced openings in said cylindrical wall with said openings passing over the open top of said tank on rotation of said drum, a cradle attached to said drum in the proximity of each of said openings for reception and locking of garbage cans to said drum with the aperture of a can in juxtaposition with a selected one of said openings, each of said cradles including a collar consisting of a first portion rigidly attached to said drum and a second complementary portion hingedly attached to said first portion at one end thereof, and a projection on said second portion, an operative connection between said engine and said drum for rotational movement thereof, a cradle opening member in the path of said projections of said second portions attached to said chassis for continuously releasing garbage cans attached to said drum on passing of the cans over the open top of and on emptying the contents thereof into said tank, a receptacle adjacent said cradle opening member for reception of garbage cans released by said cradle opening member, and a door in said drum and said tank, said doors being juxtaposable with one another on tilting of said drum and said tank by the said tank tilting device.

7. In a dumping truck having an engine, a chassis and a refuse tank tilting device, in combination: an open-top refuse tank supported by said chassis and tiltable by said tank tilting device, a drum having a cylindrical wall rotatably supported by said chassis and surrounding said tank, said drum having a plurality of radially spaced openings in said cylindrical wall with said openings passing over the open top of said tank on rotation of said drum, a cradle attached to said drum in the proximity of each of said openings for reception and locking of garbage cans to said drum with the aperture of a can in juxtaposition with a selected one of said openings, each of said cradles including a rockable member surrounding one of said openings, the rocking of said rockable member in one direction locking a garbage can to said drum and the rocking of said rockable member in the opposite direction releasing a garbage can from said drum, and a plurality of projections on said rockable member, an operative connection between said engine and said drum for rotational movement thereof, a cradle opening member in the path of said projections attached to said chassis for continuously releasing garbage cans attached to said drum on passing of the cans over the open top of and on emptying the contents thereof into said tank by engaging one of said projections on said rockable members, a receptacle adjacent said cradle opening member for reception of garbage cans released by said cradle opening member, and a door in said drum and said tank, said doors being juxtaposable with one another on tilting of said drum and said tank by the said tank tilting device.

8. In a dumping truck having an engine, a chassis and a refuse tank tilting device, in combination: an open-top refuse tank supported by said chassis and tiltable by said tank tilting device, a drum having a substantially cylindrical wall rotatably supported by said chassis and surrounding said tank, said drum having a plurality of radially spaced openings in said cylindrical wall with said openings passing over the open top of said tank on rotation of said drum, a sealing material between said tank and said drum, a cradle attached to said drum in the proximity of each of said openings for reception and locking of garbage cans to said drum with the aperture of a can in juxtaposition with a selected one of said openings, an operative connection between said engine and said drum for rotational movement thereof, cradle opening members in the path of said cradles attached to said chassis for continuously releasing garbage cans attached to said drum on tilting of the cans over the open top of and on

emptying the contents thereof into said tank, a receptacle adjacent said cradle opening members for reception of garbage cans released by the said cradle opening members, and a door in said drum and said tank for dumping of refuse therethrough on tilting of said drum and said tank by the said tank tilting device.

9. In a dumping truck having an engine, a chassis and a refuse tank tilting device, in combination: an open-top refuse tank supported by said chassis and tiltable by the said tank tilting device, a drum having a substantially cylindrical wall supported by said chassis and surrounding said tank, said drum having a plurality of radially spaced openings in said cylindrical wall with said openings passing over the open top of said tank on rotation of said drum, a cradle attached to said drum in the proximity of each of said openings for reception and locking of garbage cans to said drum with the aperture of a can in juxtaposition with a selected one of said openings, an operative connection between said engine and said drum for rotational movement thereof, said operative connection including a first and a second shaft disposed one substantially above the other, a first set of gears on the first of said shafts and a second set of gears on the second of said shafts, the first of said shafts being mounted in said chassis and the second of said shafts being attached to said tank, whereby said operative connection may be disengaged by lifting said second shaft above and away from said first shaft on actuation of the said tank tilting device, a cradle opening member in the path of said cradles attached to said chassis for continuously releasing garbage cans attached to said drum on tilting of the cans over the open top of and on emptying the contents thereof into said tank, a receptacle adjacent said cradle opening member for reception of garbage cans released by the said cradle opening member, and a door in said drum and said tank, said doors being juxtaposable with one another on tilting of said drum and said tank by the said tank tilting device.

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