

[72] Inventor **Richard G. Glanz**
 3038 N.E. 139th Ave., Portland, Oreg.
 97230
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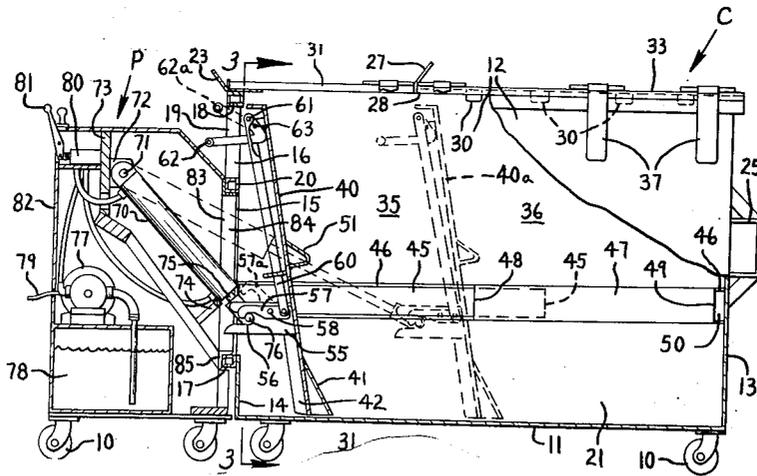
Primary Examiner—Billy J. Wilhite
 Attorney—Lee R. Schermerhorn

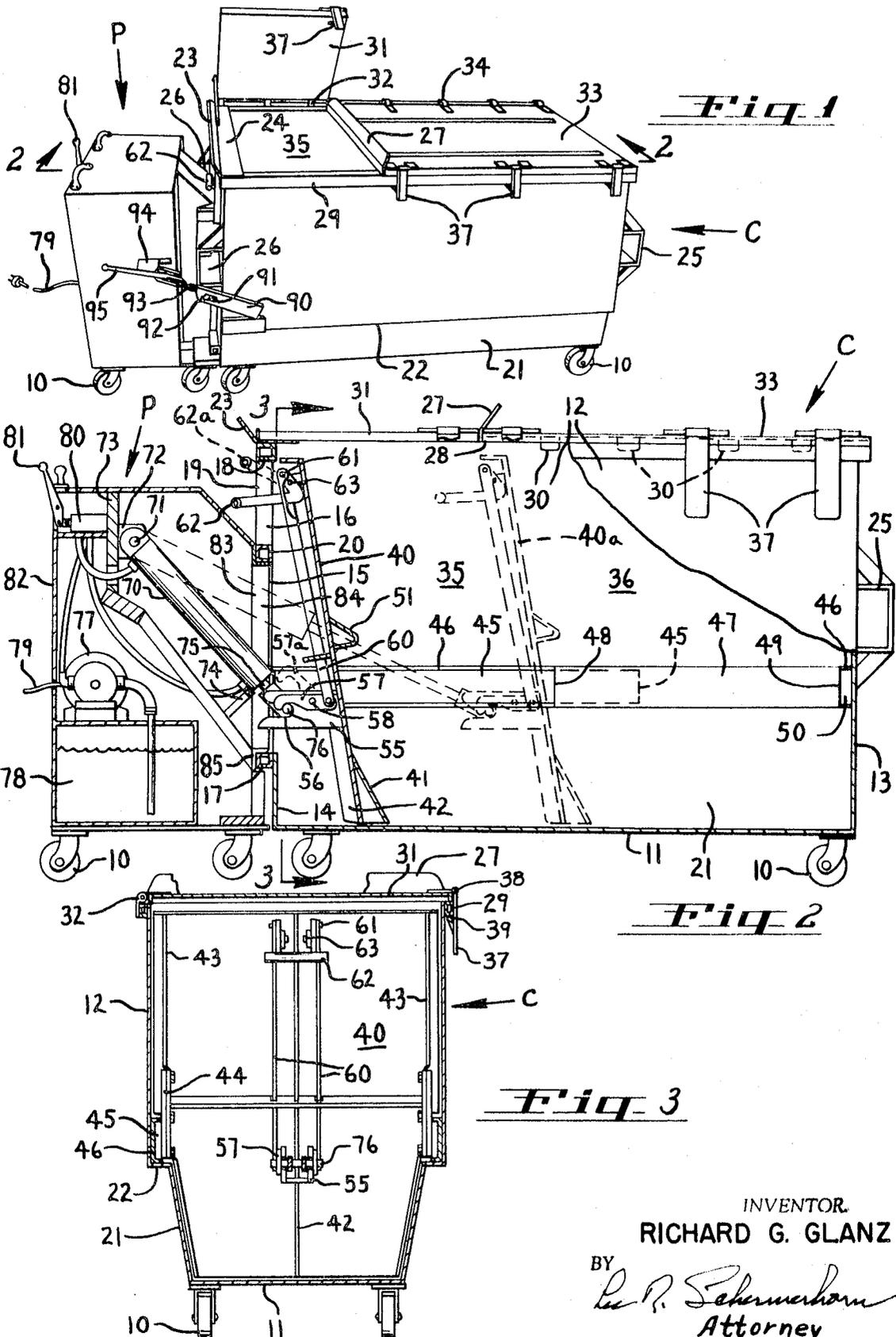
[54] **PORTABLE REFUSE PACKER**
 20 Claims, 5 Drawing Figs.

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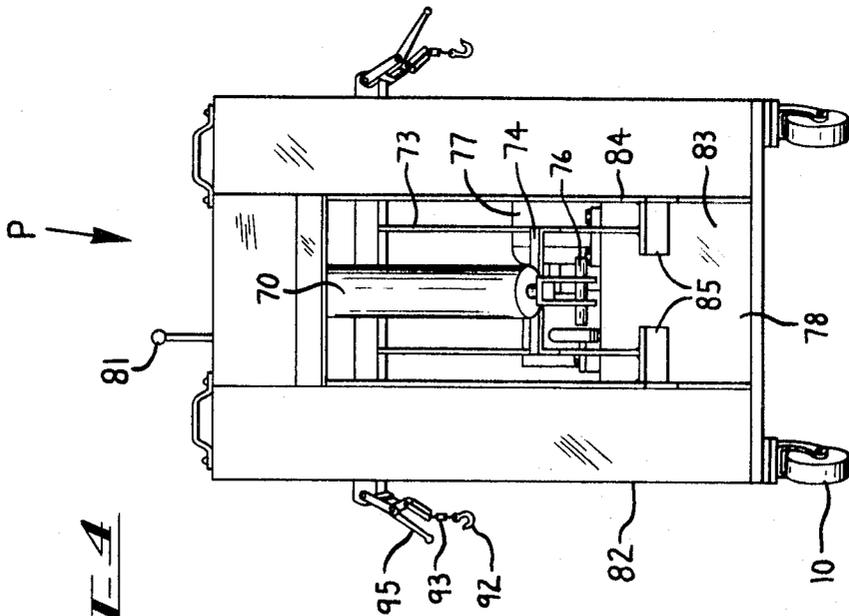
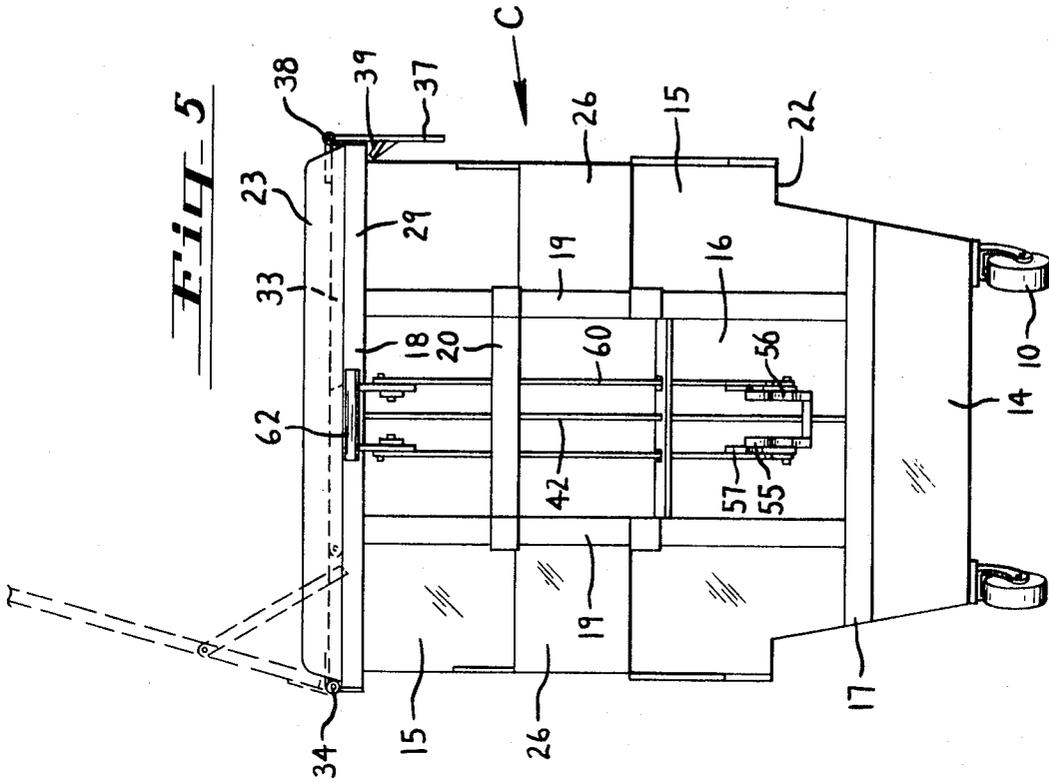
ABSTRACT: A wheeled container having a pair of hinged lids has a packer plate mounted for sliding movement within the container. A wheeled power unit has a hydraulic cylinder with a piston rod arranged for detachable connection with the packer plate in the container. Refuse deposited in the container is crushed and compressed to a small volume by the packer plate and when the container is full the power unit is connected to an empty container. Then the filled container is wheeled to a loading area for garbage trucks and its contents dumped into a truck. Thus, the packer is brought to the refuse instead of following the conventional practice of transporting the refuse to the packer.





INVENTOR.
RICHARD G. GLANZ

BY
Lee P. Schermerhorn
Attorney



INVENTOR
RICHARD G. GLANZ

BY
Richard P. Schermerhorn
Attorney

PORTABLE REFUSE PACKER

BACKGROUND OF THE INVENTION

This invention relates to an apparatus for packing refuse for disposal.

When an establishment has a large amount of refuse to be disposed of, it is customary to bring the loose refuse in garbage cans or trash bins to a large stationary packer. The packer is ordinarily located outside of the building in order to compress and pack the refuse into large containers which are hauled away from time to time. An array of garbage cans is necessary for this type of operation, requiring an excessive amount of handling and an excessive amount of space. Such refuse often contains extremely bulky material such as empty cardboard cartons and newspapers.

Liquid is also present in opened bottles and cans. This liquid is spilled in the garbage cans, spilled in transferring the refuse to the stationary packer and spilled in the operation of the packer in packing the refuse in the large containers. This makes it difficult to maintain the premises neat and clean in the areas where refuse is handled.

Objects of the invention are, therefore, to provide an improved apparatus for handling refuse, to provide an apparatus for handling refuse which requires less space than conventional methods and apparatus and which allows the refuse handling areas to be kept neat and clean, to provide an improved refuse container, to provide refuse containers with their own packer plates for compressing bulky refuse into a small space, to provide a detachable power unit for operating the packer plates in a plurality of such containers, to provide portable refuse containers and portable power units of the type described mounted on wheels and of a size that can be moved through doorways and into elevators, to provide a packer system in which there is no spillage in handling opened cans and bottles containing liquid, and to provide a refuse container of the type described equipped with dumping means for use with conventional garbage trucks.

SUMMARY OF THE INVENTION

According to the present invention, wheeled power units and refuse containers are provided of a size to be moved through ordinary doorways and into elevators. One power unit may serve a number of the containers. The containers are equipped with dumping means for use with conventional garbage trucks.

Each container has a packer plate mounted for sliding movement therein. The power unit is equipped with a hydraulic cylinder and piston and a motor driven pump for operating the cylinder. Thus, the power unit may be moved about and operated at any place where an extension cord may be plugged into an electrical outlet. The piston rod in the power unit is introduced through an opening in one end of the container for detachable connection with the packer plate. This opening in the container is spaced a distance above the bottom of the container so that any liquids present in the refuse are not spilled on the floor.

This arrangement permits the handling of refuse to be carried out efficiently and permits the premises to be maintained neat and clean. One or two such containers take the place of a considerable number of garbage cans. A large amount of refuse may be compressed in the relatively small containers at various points of collection in a large building, thereby eliminating the movement of a large bulk of loose refuse to a single stationary packer and the storage of the loose refuse.

The invention will be better understood and additional objects and advantages will become apparent from the following description of the preferred embodiment of the invention illustrated in the accompanying drawings. Various changes may be made in the details of construction and arrangement of parts and certain features may be used without others. All such modifications within the scope of the appended claims are included in the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a refuse packer embodying the invention;

FIG. 2 is a view on the line 2—2 in FIG. 1 with parts in elevation;

FIG. 3 is a view on the line 3—3 in FIG. 2;

FIG. 4 is an end elevation view of the power unit; and

FIG. 5 is an end elevation view of the container.

DESCRIPTION OF THE PREFERRED EMBODIMENT

In FIGS. 1 and 2 a power unit P is shown operatively connected to a container C. Both units are mounted on caster wheels 10 for convenient mobility. Preferably, the units are of a size to pass through ordinary doorways either individually or when coupled together as shown.

The container C has a flat bottom wall 11, a pair of opposite vertical upper sidewalls 12 and a flat end wall 13 extending from top to bottom. On its opposite end the container has a flat vertical U-shaped end wall having a bottom portion 14 extending across the width of the container and a pair of opposite side portions 15 extending to the top of the container on opposite sides of an opening 16 which extends from bottom portion 14 to the top of the container. Opening 16 is framed by a horizontal lower beam 17 at the top of wall portion 14, a top horizontal beam 18 and a pair of vertical posts 19. Opening 16 is bridged by a third horizontal beam 20.

A pair of sloping sidewalls 21 extend from bottom wall 11 up to the upper sidewalls 12. The upper edges of sloping sidewalls 21 are offset inwardly at 22 from the lower edges of sidewalls 12. A horizontal channel 25 is mounted on the outside of end wall 13 and two short horizontal channels 26 are mounted on vertical end wall portions 15 on opposite sides of opening 16. These channels are adapted to receive the arms of a container lifting and dumping fork on a conventional front end loader type of garbage truck.

Upper beam 18 is part of a rectangular horizontal frame 29 which surrounds the top of the container. A narrow lid 31 is mounted on hinges 32 on frame 29 on one side of the container and a wide lid 33 is similarly mounted on hinges 34. Lid 31 covers a charging space 35 and lid 33 covers a packing space 36.

The underside of lid 33 is stiffened by a plurality of ribs 30 parallel with end wall 13. The left edge of lid 33 in FIGS. 1 and 2 is equipped with an inclined upstanding deflector plate 27 connected with a stiffening flange 28 on the edge of the lid. On the left side of charging space 35 a deflector plate 23 is mounted on beam 18 with an edge portion 24 overhanging the charging space. Deflector plates 27 and 23 form a hopper to guide refuse into the charging space.

The lids are secured closed by fasteners 37. Each fastener 37 has a vertical plate mounted on a horizontal hinge pin 38 and equipped with a catch 39 which hooks under frame 29. The fasteners are released manually for dumping and when the empty container is returned to upright position, the fasteners return by gravity to latched position as shown in FIGS. 3 and 5.

An inclined packer plate 40 is mounted for sliding movement in charging space 35. The packer plate preferably has a bottom portion 41 inclined at a somewhat greater angle than the rest of the plate. A horizontal stiffening rib 51 is mounted on the front side of plate 40 at intermediate height. The upper edge of plate 40 is spaced a short distance below lid flange 28 and plate portion 24. The backside of the packer plate is equipped with a central vertical stiffening rib 42 and a pair of vertical stiffening ribs 43 adjacent its side edges. Bracket plates 44 on each rib 43 are rigidly connected with the rear end of a forwardly extending horizontal guide plate or arm 45.

Each guide plate 45 slides in and completely fills a horizontal channel 46 seated on offset 22 and connected to sidewall 12. The channels 46 are open in charging space 35 but are closed by a cover plate 47 in packing space 36. Thus, channels

46 and cover plates 47 form enclosed guide tubes for the guide plates 45 in the packing space 36. Cover plate 47 extends rearward to a rear end 48 and forward to a front end 49 in FIG. 2. Front end 49 is spaced a short distance from end wall 13 to provide an opening 50 in packing space 36. Cover plate 47 and guide plate 45 are effective in keeping most refuse out of guide channel 46 but if some refuse should get behind the cover plate 47, the forward movement of guide plate 45 will discharge it through opening 50 to keep the channel clear.

A pair of bracket plates 55 having a rearward facing horizontal slot 56 is mounted on the back side of packer plate 40 at approximately the same level as guide plates 45. A pair of hooked latches 57 is pivotally mounted at 58 a short distance forward from the end of slot 56. A pair of links 60 is pivotally connected at its lower end to the front ends of latches 57 and its upper end is pivotally connected at 61 with an L-shaped handle 62. Handle 62 is pivotally mounted at 63 on brackets on packer plate 40. When handle 62 is moved to broken line position as indicated at 62a in FIG. 2, the latches 57 are raised to broken line position at 57a. Lowering handle 62 to its solid line position closes latches 57 to solid line position, the pivot 61 passing over center in relation to pivot 63 to hold the latches closed. These latches are shown closed in FIG. 3 and open in FIG. 5.

Power unit P contains a double acting hydraulic cylinder 70 which is pivotally mounted at its upper end on a pivot 71 in a bracket 72 on a frame member 73. Frame member 73 is equipped with a rest 74 to support the cylinder in inclined position as shown in FIG. 2 with its piston rod 75 inclined downward. The end of piston rod 75 is equipped with a crossbar 76 which is adapted to enter the slot 56 and be engaged by latch 57 when the power unit P is brought up to the end of the container C.

Hydraulic pressure for cylinder 70 is supplied by a pump and motor unit 77 associated with reservoir tank 78. The motor is energized by extension cord 79 and the movements of the piston are controlled by a valve 80 having a valve handle 81.

Packer plate 40 is shown in retracted position in solid lines and in fully advanced position in broken lines in FIG. 2. In retracted position the upper edge of the packer plate comes to rest under plate portion 24 and in advanced position the upper edge of the packer plate passes under flange 28 on lid 33.

The parts just described in power unit P are contained in housing 82 having a front opening 83 surrounded by a forwardly extending lip or flange 84. Flange 84 fits in opening 16 in the container and locates the power unit in proper position against the end of the container with portions of the power unit seated against the beams 17, 19 and 20 of the container. The lower end of frame member 73 extends down to brackets 85 which seat against beam 17.

When flange 84 of the power unit is brought into opening 16 in the container, crossbar 76 on piston rod 75 moves into slots 56 in the brackets 55 and is held in the slots by latch 57. Handle 62 for operating the latch 57 extends through the upper part of opening 16 above the power unit when the packer plate 40 is fully retracted.

The opposite sides of the container C are equipped with brackets 90 each having a hole 91 to receive a hook 92 on a chain 93. Each chain 93 is anchored to a bracket 94 on the side of the power unit and is arranged to be tightened by a suitable tightener such as a conventional overcenter lever action type of chain tightener 95. Chains 93 assume the reaction force from the thrust of piston rod 75 in packing and compressing the refuse in the container. Brackets 94 are mounted on frame member 73 whereby the thrust reaction of the piston rod is transmitted directly from cylinder 70 through frame 73 to the brackets 94 and chains 93.

When the container is empty, both lids 31 and 33 may be opened and a considerable amount of refuse dropped into the container in both spaces 35 and 36 without operating the packer plate 40. When it is desired to operate the packer plate, the lid 33 is secured closed by fasteners 37, motor and

pump unit 77 is started and piston rod 75 is extended in response to manipulation of valve 80. The packer plate then moves to its broken line position at 40a in FIG. 2. The packer plate fits the cross-sectional shape of the container with a small marginal clearance space, compressing the refuse against end wall 13.

When valve 80 is reversed to retract the packer plate 40 back to its solid line position in FIG. 2, more refuse may be dropped into charging space 35. Lid 31 may remain open until the container is so full that the forward movement of the packer plate tends to force refuse upward out of the charging space. During its forward movement, the packer plate is stabilized for easy sliding movement by the long forwardly extending guide plates 45. These guide plates fill the tubes formed by cover plates 47 on channels 46 except for a small running clearance, causing the refuse to be substantially excluded from these tubes. The compressing action of packer plate 40 enables the container C to hold the contents of a considerable number of garbage cans filled with loose refuse, depending on the type of refuse. Channel 25 reinforces end wall 13, and offsets 22 and channels 46 provide reinforcement to prevent bulging of the sidewalls.

The spacing of the upper edge of packer plate 40 a short distance below lid flange 28 causes large paper boxes and the like to be bent around this flange rather than being sheared off. The spacing of the upper edge of the packer plate below both flange 28 and plate portion 24 operates as a safety feature, preventing injury to an operator's fingers in these regions. Overhanging plate portion 24 serves as a guard plate.

The parts are proportioned so that the forward ends of guide arms 45 are retained behind cover plates 47 when packer plate 40 is fully retracted and at the same time the rear ends 48 of cover plates 47 will allow sufficient forward movement of the packer plate to move the forward ends of guide arms 45 to the openings 50 at the forward limit of movement.

As packing space 36 becomes filled, the slope of packer plate 40 causes the refuse to be more tightly packed at the bottom of the container, producing a tendency for the refuse to move forward along bottom wall 11, upward along end wall 13 and backward along the underside of lid 33. If this backward movement were unrestrained, the top layer of refuse would fall back into charging space 35 each time the packer plate is retracted. Such fallback is effectively prevented by ribs 30 and flange 28. These projections into the packing space act as stops to lock the top layer of refuse in the packing space against backward movement and keep the charging space open to receive more refuse.

The bottom layer does not exhibit a tendency to spring back into the charging space when the packer plate retracts. Rib 51 on the packer plate restrains upward movement of material along the front surface of the packer plate as the plate moves forward, preventing material from being pushed upward out of the charging opening. This combination of features causes the container to hold a maximum amount of compressible material for the most efficient handling of many different types of refuse.

When the container has been filled, lid 31 is latched closed and the power unit P is removed by merely disconnecting the hooks 92 from brackets 90 and opening the latch 57 by means of handle 62. The power unit is then backed away from the container and moved to another empty or partially filled container at the same collecting station or at a different collecting station. The filled containers may be wheeled through doorways and onto elevators, if necessary, for travel to the garbage truck loading area. The bottom of the container forms a closed sump to retain any liquids up to the level of crossbeam 17 at the lower edge of opening 16.

Lifting forks on other devices on the garbage trucks invert the container C and dump its contents into the truck. The containers may be equipped with fittings for dumping by rear end loader trucks or other apparatus, if desired. The lids 31 and 33 having been unlatched, swing open by gravity when the container is inverted and latch themselves closed again when the

container is turned upright. The sloping lower sidewalls 21 prevent wedging of the compressed refuse in the bottom of the container, allowing all the refuse to fall out freely by gravity when the container is inverted, including any liquid collected in the bottom sump portion.

Since the packer plate arms 45 completely fill the guide channels 46, the free gravity discharge of the refuse is not impeded by these channels even at their rear ends where they are not closed by cover plates 47. In this connection it will also be observed that the entire thickness of the channels is contained within the width of sidewall offsets 22 so that the channels do not present obstructions to the free falling of the refuse material.

The present refuse packer eliminates garbage cans and makes it unnecessary to move or store unsanitary loose refuse. The power unit P and container C are moved to the point of collection as, for example, the basement outlet of a trash chute in a building. The filled containers are lidded and hold any liquids present, keeping the premises neat and clean. Where there are a plurality of collection points, a single power unit may be moved from one collection point to another, packing refuse from time to time so that large volumes of refuse do not accumulate in loose condition.

Having now described my invention and in what manner the same may be used, what I claim as new and desire to protect by Letters Patent is:

1. A refuse packer comprising an open top container having lid means to close said open top, a packer plate mounted for horizontal sliding movement in said container for compressing refuse against one end of the container, said packer plate being permanently attached within said container and serving as an end wall closure for the other end of said container, a power unit having a cylinder and piston, means for detachably connecting said piston with said packer plate for reciprocating said plate in the container, and means for detachably connecting said power unit bodily to the container.

2. A packer as defined in claim 1, both said container and said power unit being mounted on wheels for portability.

3. A packer as defined in claim 1 including a motor driven hydraulic pump in said power unit for operating said cylinder and piston.

4. A packer as defined in claim 1 including means on said container for engagement by a container dumping mechanism on a garbage truck for dumping the contents of the container into the truck.

5. A packer as defined in claim 4, said engagement means comprising horizontal channels on the ends of the container arranged to receive the arms of a lifting fork on the truck.

6. A packer as defined in claim 1 including a pair of horizontal arms mounted on opposite sides of said packer plate, and a pair of channels on opposite sides of said container supporting said arms in said sliding movement of the packer plate.

7. A packer as defined in claim 6, said container having vertical upper sidewalls and sloping lower sidewalls offset inwardly from said upper sidewalls, said channels being disposed in said offsets.

8. A packer as defined in claim 6 including cover plates on said channels forming tubular guides for said arms.

9. A packer as defined in claim 8, said arms completely

filling said channels and said tubular guides.

10. A packer as defined in claim 8, said cover plates terminating at a distance from the ends of the channels at said one end of the container leaving openings for the discharge of any refuse in the uncovered channels.

11. A packer as defined in claim 1, the volume in said container traversed by said packer plate forming a charging space and the remaining volume at said one end of the container forming a packing space, said lid means comprising a lid over said charging space and a separate lid over said packing space.

12. A packer as defined in claim 11, including fasteners for said lids which are self-latching when the container is erected from an inverted dumping position.

13. A packer as defined in claim 11 including ribs on the underside of said packing space lid parallel with said packer plate.

14. A packer as defined in claim 1, said packer plate being inclined backward and having a horizontal rib at intermediate height on its front face.

15. A packer as defined in claim 1, the opposite end of said container having an opening behind said packer plate, said means for connecting said piston with said packer plate comprising a piston rod on said piston extending through said opening and a latch device on the back of the packer plate arranged for connection with said piston rod.

16. A packer as defined in claim 15, said opening being spaced a distance above the bottom of said container and the bottom portion of the container forming a sump to retain any liquids in the refuse.

17. A packer as defined in claim 15 including a pivotal support in said power unit for one end of said cylinder and a rest for the other end of said cylinder arranged to hold said piston rod in position for engagement with said latch device when said power unit is positioned for connection to the container.

18. A packer as defined in claim 17 including a cross bar on said piston rod, a plate on the back of said packer plate having a rearward facing slot to receive said crossbar, and a latch member arranged to hold said cross bar in said slot.

19. A packer as defined in claim 15 including a handle accessible in said opening for operating said latch device.

20. A refuse packer comprising an open top portable container having lid means to close said open top, a packer plate mounted for horizontal sliding movement in said container and being permanently attached within said container, a latch device on the back side of said packer plate, an opening in one end of said container behind said packer plate and at a distance above the bottom of the container; a portable power unit arranged for detachable connection to said one end of said container, a hydraulic cylinder pivotally mounted at one end in said power unit, a piston rod in said cylinder arranged for detachable connection with said latch device to reciprocate said packer plate in said container, a rest in said power unit for the other end of said cylinder arranged to hold said piston rod in position for engagement with said latch device when said power unit is positioned for said connection to the container, a motor driven pump in said power unit for operating said cylinder, and a valve in said power unit connected with said pump and cylinder for controlling reciprocation of said packer plate.

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