

Sept. 12, 1961

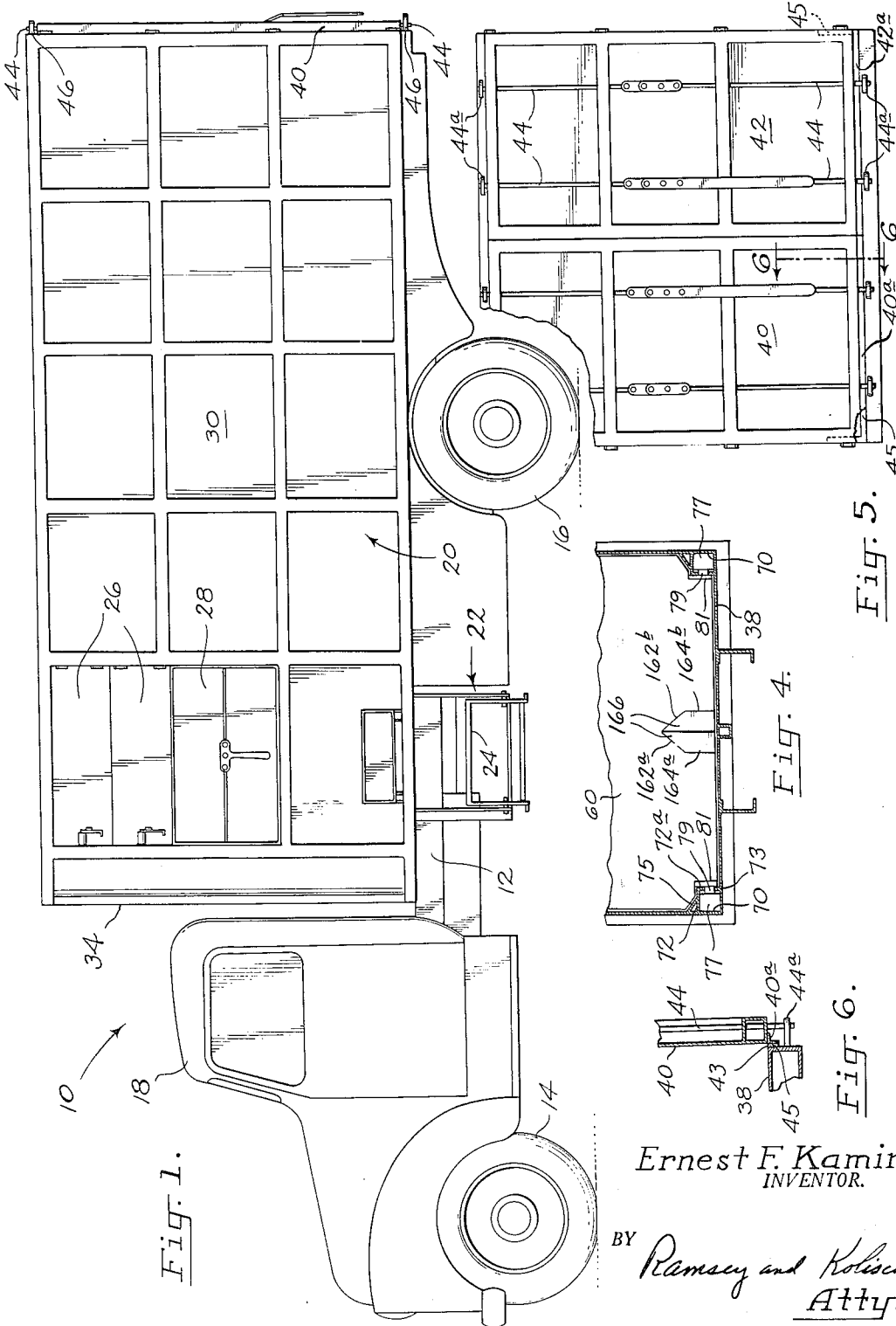
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REFUSE VEHICLE WITH RAM-ACTUATED PACKER BLADE

Filed Dec. 21, 1959

3 Sheets-Sheet 1



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3 Sheets-Sheet 2

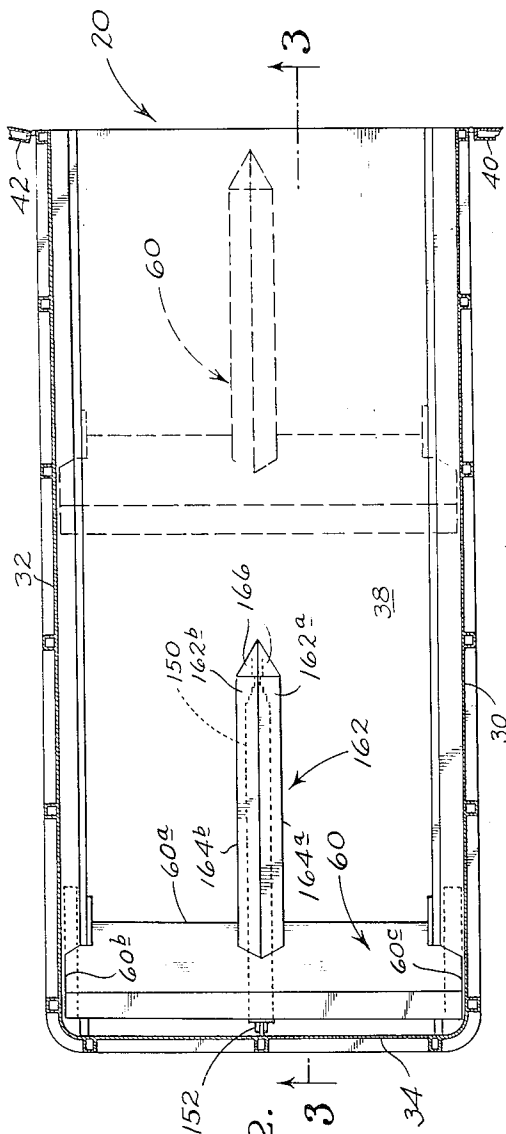


Fig. 2.

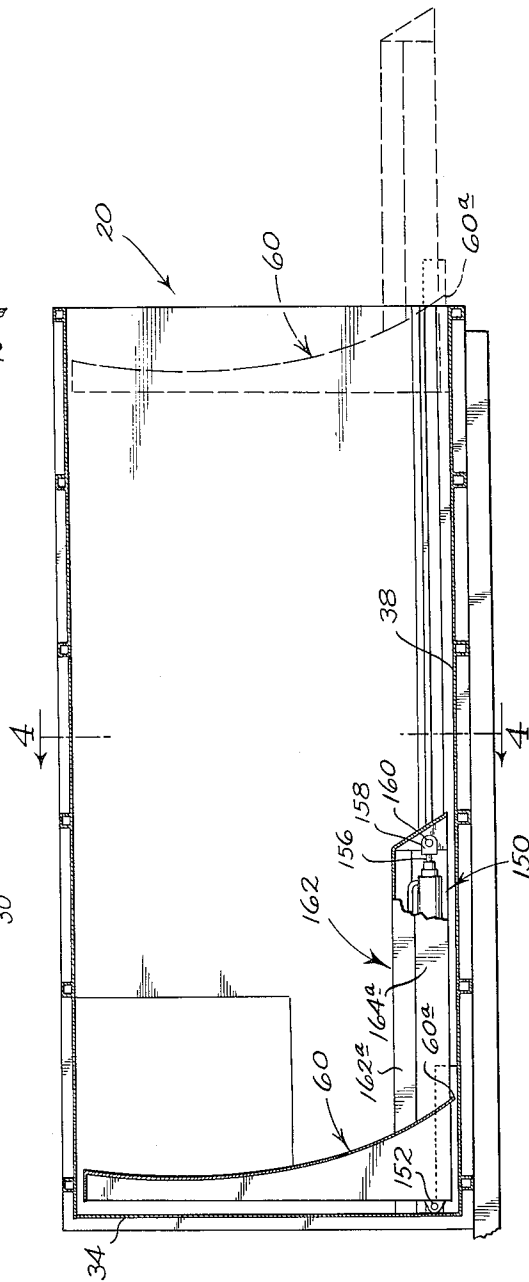


Fig. 3.

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3 Sheets-Sheet 3

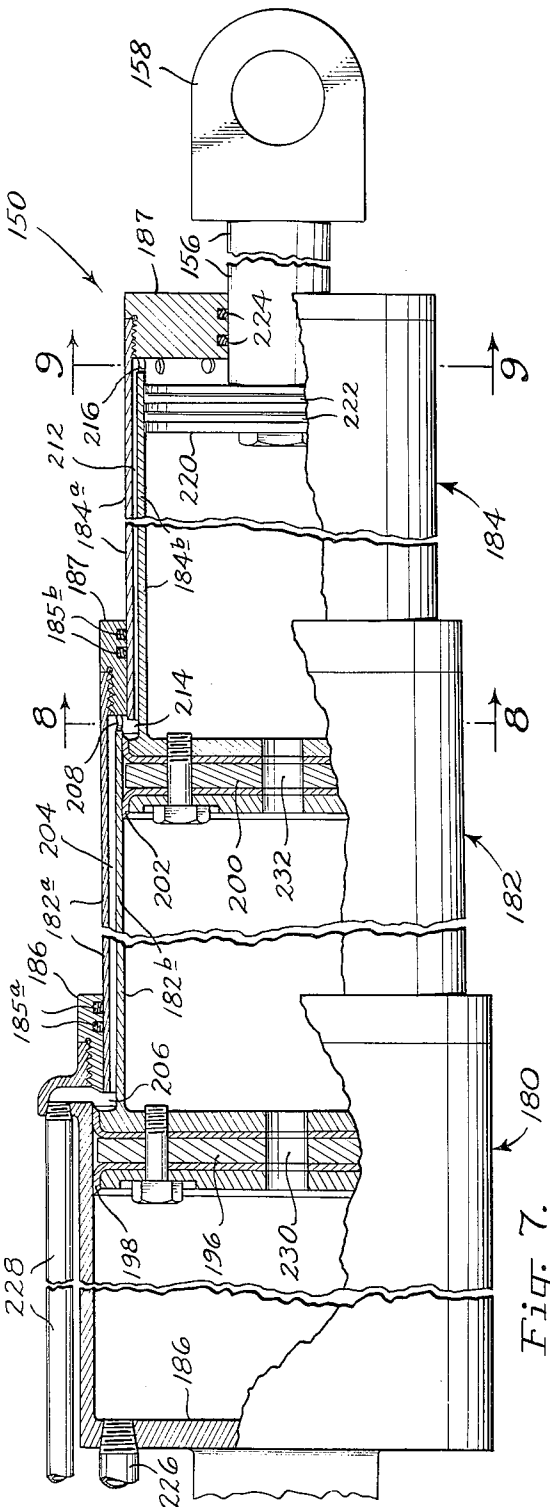


Fig. 7.

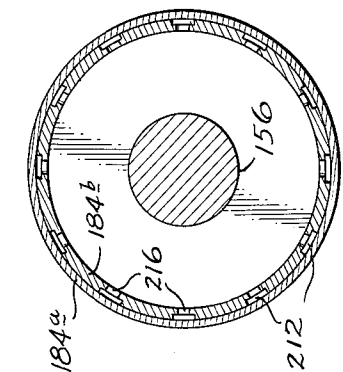


Fig. 9.

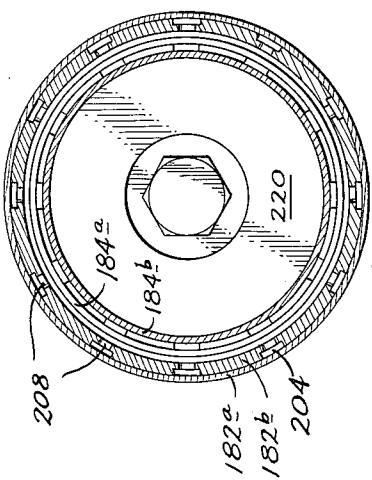


Fig. 8.

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1

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REFUSE VEHICLE WITH RAM-ACTUATED PACKER BLADE

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7 Claims. (Cl. 214—82)

This invention relates to refuse-collection vehicles, and more particularly to refuse-collection vehicles equipped with a packer blade movable longitudinally of an elongated, hollow, refuse-collecting body and operable to compact refuse during its collection thereby to increase the load-carrying capacity of the vehicle.

A general object of the invention is to provide an improved construction for such a vehicle that accommodates movement of the blade substantially along the entire length of the hollow body, whereby the blade may be fully retracted to the forward end of the body during the collection of refuse, and fully extended to the rear end of the body during dumping and cleaning.

Another general object is to provide such a construction wherein the interior of the refuse-collecting body is substantially uncluttered with mechanism for actuating the blade.

A still further general object is to provide a refuse-collecting vehicle which is easy to clean and to make sanitary.

Another general object is to provide a vehicle which includes a novel ram mechanism for extending the blade, and that can undergo extension to length substantially in excess of double its contracted length, and that is also double-acting so that the blade can be moved by the ram mechanism both during a compacting and during a return stroke.

In a specific embodiment of the invention contemplated, the refuse-collecting vehicle comprises a hollow body with a smooth and substantially nonperforate floor. Within this body is a packer blade, with ends adjacent the body's sides. The blade in a retracted position is located substantially directly adjacent the forward or cab end of the body, and can be moved from this position to an extended position wherein the bottom of the blade is to the rear of the rear end of the floor. Thus, the blade can be used effectively to remove substantially all refuse from the vehicle. Powering the blade between its extended and retracted positions is a telescopic, double-acting fluid ram, comprising plural shell assemblies nested one within the other. The ram is constructed to undergo elongation to a length substantially in excess of twice its minimum length. The ram is mounted in the vehicle with a portion of the ram extending toward the rear of the blade, which results in more complete retraction of the blade. That part of the ram which extends toward the rear of the blade is shielded by cover means joined to the blade and movable therewith.

Specific advantages attained by the construction outlined generally above are: (1) the elimination of any cables or complicated lever mechanism for producing full extension of the blade, (2) a construction where the blade can be moved from a position directly adjacent the forward end of the body to a position substantially beyond a position midway between the body's ends with rear doors of the body closed, (3) a construction wherein the base of the blade may be made fully to clear the rear end of the body floor without substantial overhang of power-transmitting structure at the rear end of the vehicle, (4) a construction wherein the floor may be left smooth and nonperforate, which expedites cleaning, and (5) a construction where runways for guiding the blade may be positioned above floor level, thus to prevent leakages from the body of fluids.

Another part of the invention is the provision of novel

2

means sealing the doors at the rear end of the refuse-collecting body in a closed position. In the organization of a completely extensible blade which is movable over the rear end of the body floor, proper construction of the sealing means is important if the sealing means is not to hinder extension of the blade.

Other features and advantages are attained by the invention, the same being described here-below in conjunction with the accompanying drawings, wherein;

FIG. 1 is a side elevation of a refuse-collecting vehicle of the nondumping type, equipped at its rear end with a hollow, refuse-collecting body of the type contemplated by this invention;

FIG. 2 is a plan view of the hollow refuse-collecting body illustrated in FIG. 1;

FIG. 3 is a section view along the line 3—3 in FIG. 2, showing in elevation details of the interior of the hollow body;

FIG. 4 is a section view along the line 4—4 in FIG. 3, illustrating body portions of the packer blade in the construction, and means for guiding the blade in its movement to and fro in the body;

FIG. 5 is a view of the rear end of the refuse-collecting body;

FIG. 6 is a section view along the line 6—6 in FIG. 5;

FIG. 7 is a view, slightly enlarged, illustrating the double-acting, telescopic ram mechanism used in the construction;

FIG. 8 is a section view along the line 8—8 in FIG. 7; and

FIG. 9 is a section view along the line 9—9 in FIG. 7.

Referring now to the drawings, and more particularly to FIG. 1, 10 indicates generally a refuse-collecting vehicle comprising a vehicle frame 12, lateral support wheels 14, 16 at the front and rear ends of the vehicle, respectively, a vehicle cab 18, and an elongated, hollow, refuse-collecting body or box 20 mounted on frame 12 rearwardly of cab 18.

On one side of the hollow body and adjacent the forward end of the body, i.e. the end of the body nearest cab 18, there is a step ladder assembly 22 including a step 24 that may be swung down when it is desired to climb up along side of the body. Doors 26 and an openable panel 28 above step ladder assembly 22 may be swung aside to provide access to the inside of body 20.

Considering the construction of body 20, and referring now to FIGS. 1, 2, 3, 5 and 6, the body comprises side walls 30, 32, a forward end wall 34, and a smooth, substantially nonperforate floor 38. At the rear end of the body and floor are a pair of swinging doors 40, 42 (only partially shown in FIG. 2) that may be swung from the open position of FIG. 2 to the closed position illustrated in FIGS. 1 and 5. Locking rods 44 and brackets 44a are provided for locking the doors closed. The doors 40, 42 have bottom or base portions 40a, 42a (see FIGS. 5 and 6) that extend below the level of the top of the rear end 43 of the floor.

The rear end of the floor is exposed by opening the doors, as shown in FIG. 2. With the doors closed, bottom portions 40a, 42a move snugly up against rear end 43. A pair of elongated sealing strips, one for each door and indicated at 45, are secured to bottom portions of the doors and provide a fluid-tight seal with the doors in a closed position. The sealing strips have turned-up ends at the location of the side walls, as shown in FIG. 5, which seal base portions of the side walls to the doors. The sealing strips function to prevent fluid from leaking out the rear end of body 20. Important is the fact that the sealing strips are below the top of the floor, and thus out of the way of refuse compacted against the doors with the doors closed. The sealing strips are joined to the doors and move away from the floor with opening of

the doors, which makes cleaning the vehicle easier and increases the life of the sealing strips.

Referring now more specifically to FIGS. 2 and 3, mounted within the interior of body 20 and movable in a path extending longitudinally of the vehicle is a packer blade, indicated at 60. The packer blade is movable from a retracted position, shown by the solid outline in the figures, wherein the blade is closely adjacent forward wall 34, to an extended position, shown by the dashed outline in FIG. 3. In its extended position, the blade is adjacent the rear end of body 20, and the bottom edge 60a of the blade is located to the rear and beyond the rear end of the floor.

Blade 60 has ends 60b, 60c that move snugly adjacent side walls 30, 32, and bottom edge 60a is snugly adjacent the top of the floor. Thus, the packer blade is operable to collect substantially all refuse thrown to the rear of the blade, and move such refuse rearwardly, on extension of the blade. By constructing the vehicle so that the bottom edge 60a of the blade is movable entirely to the rear of floor 38, at dumping time substantially all refuse may be removed mechanically and without resorting to manual effort.

Means are provided in the construction for guiding the blade and maintaining the blade upright and set squarely across the interior of body 20. In the embodiment illustrated, and now referring to FIGS. 2, 3 and 4, adjacent the bottom of each side wall is an elongated tunnel 70, defined by an upper plate 72 extending horizontally along the wall and having a downturned edge 72a, and an elongated vertical flange 73 aligned vertically with edge 72a. A deflector plate 75 may also be included over the top of plate 72, which inclines inwardly and downwardly from a side wall and has the effect of fending refuse from off the top of upper plate 72.

Each tunnel 70 slidably receives an elongated guide block 77. Each guide block is rigidly fixed to an end of the packer blade by screws 79 connecting the block to a plate 81, that is an integral part of the blade. The shanks of screws 79 when packer blade 60 is moved to and fro travel in the runway defined by the bottom of down-turned edge 72a and the top of flange 73.

Attention is directed to the fact that the runways at the sides of the body are located above the top level of the floor. Thus, fluid material in garbage is blocked from flowing into the tunnels. Flanges 73 have the effect of damming water used in cleaning the floor area bounded by the flanges 73. The floor between the flanges is nonperforate, and thus all cleaning water may be directed out the rear of the hollow body, with the doors at the rear end open.

Guide blocks 77 have substantial length, and function to inhibit not only turning of the blade about vertical axes but also twisting of the blade about horizontal axes, when the blade is fully extended (to the position shown by the dashed outline in FIG. 3). The guide blocks also resist twisting tendencies of the blade when the blade encounters refuse during a compaction stroke.

A fluid-operated ram means 150 mounted above floor 38 is provided for moving the packer blade in the vehicle under power. By placing the ram mechanism above the floor, the necessity for making any slots or perforations in the floor to accommodate connections with the blade is eliminated. The ram mechanism may be connected directly to the packer blade without the inclusion of any linkages or cables that would tend to clutter up the interior of body 20.

Specifically, ram means 150 extends longitudinally above the floor and is interposed between forward end wall 34 and blade 60. The ram means takes the form of an elongated, double-acting, telescopic ram. The ram is pivotally connected at one end to the vehicle body by pivot connection 152 (see FIGS. 2 and 3), and a rod portion 156 at the other end of the ram is pivotally connected to the blade through clevis 158, pin 160 and an

elongated hood or cover structure 162. The latter extends to the rear of the packer blade in covering relation over that portion of the ram mechanism that extends rearwardly of the blade.

Cover structure 162 comprises top walls 162a, 162b that flare from each other progressing downwardly toward the floor, and that connect at their bottom edges with side walls 164a, 164b. The lead or nose end of the cover structure is formed by end plates 166 that converge at a sharp angle. The entire cover structure is rigid with the packer blade, and thus moves along the refuse-collecting body with movement of the packer blade.

A portion of the ram mechanism extends rearwardly of the blade, in order that the above-floor mounting of the ram not have the effect of reducing the retractability of the blade. It will be noted that using the construction, the blade in a retracted position is closely adjacent forward end wall 34, in optimum position for receiving refuse. With portions of the ram mechanism and cover structure 162 extending toward the rear of the blade, a relatively small compaction stroke for the blade with doors 40, 42 closed would result, were not provision made for extension of the ram to a length in substantial excess of double its contracted length. In the construction contemplated wherein a telescopic, double-acting ram is used having plural cylinder shell assemblies telescopically nested one within another, the packer blade may be moved a distance considerably more than half the body length with the doors closed approximately to the position illustrated by the dashed outline for the blade in FIG. 2, without cover structure 162 engaging the closed doors. The ram contemplated also enables overhang at the rear of the vehicle to be kept at a minimum, with the blade in its fully extended position.

Referring now in particular to FIGS. 7, 8 and 9, the double-acting ram mechanism in the embodiment illustrated comprises three cylinder shell assemblies, indicated at 180, 182 and 184. These are disposed with the smallest of the shell assemblies 184 nested within assembly 182, and this assembly in turn nested within the large shell assembly 180. The outer surface of shell assembly 182 is sealed to assembly 180 by means of seals 185a mounted in a retainer ring 186. In a similar manner, the outer surface of assembly 184 is sealed to assembly 182 by seals 185b mounted in a retainer ring 187. Closing the left end in FIG. 7 of the largest assembly 180 is an end wall 186. Closing the right end of the smallest assembly 184 is an end wall 187.

Shell assembly 182 is provided at the end which is supported within assembly 180 with a piston portion 196. On operation of the ram, piston portion 196 reciprocates between end wall 190 and retainer ring 186 of assembly 180. Seals 198 are provided piston portion 196 sealing its periphery to the inner wall of assembly 180. Similarly, provided the end of assembly 184 disposed within assembly 182 is a piston portion 200, and seals 202 seal the periphery of the piston portion to the inner surface of assembly 182.

Shell assembly 182 comprises a pair of cylinder portions 182a, 182b, concentrically arranged and secured together as by welding. The inner of these cylinder portions 182b is provided with flutes 204 extending axially therealong. These flutes open at their left set of ends in FIG. 7 to an angular groove 206 defined by the end of outer cylinder portion 182a and the end of piston portion 196. The right set of ends of the flutes communicate with a series of ports 208 extending radially through inner cylinder portion 182b. The passages provided by the flutes, groove 206, and bores 208 constitute fluid passage means for the delivery of fluid under pressure or for the exhaust of fluid from the right end of shell assembly 182.

Similarly, assembly 184 comprises an inner cylinder portion 184b and an outer cylinder portion 184a concen-

trically arranged and welded together. Inner cylinder portion 184b is provided with flutes 212 extending axially therealong. These connect at their left set of ends in FIG. 7 with an angular groove 214 defined by the left end of outer cylinder portion 184a and the right end of piston portion 200. The right set of ends of the flutes connect with a series of ports 216 extending radially through cylinder portion 184b. Flutes 212, groove 214 and ports 216 constitute another fluid passage means for the delivery and exhaust of fluid to and from the right side of shell assembly 184.

Mounted for reciprocation within shell assembly 184 is a piston 220 provided with seals 222. The piston is connected to rod 156 of the ram mechanism. Rod 156 extends through an accommodating bore provided wall 187, and is sealed within the bore by seals 224.

Completing a description of the ram mechanism, a conduit 226 connects with the left end of shell assembly 180, and is used for the supply and exhaust of fluid from the space on the left side of piston portion 196. Connecting with the right end of the shell assembly is a second conduit 228 which is for the supply and exhaust of fluid from the space on the right side of piston portion 196. Bores 230, 232 extending through piston portions 196 and 200, respectively, connect the interiors of assemblies 182 and 180 and the interiors of assemblies 184 and 182, respectively.

The ram construction described is double-acting, and thus can be used both for producing a compaction stroke and a return stroke in the packer blade. Explaining the operation of the ram, to extend the ram fluid is admitted under pressure through conduit 226, fluid exhaust takes place through conduit 228. As pressure fluid is admitted to conduit 226, assembly 182 starts movement to the right relative to assembly of 180, piston portion 196 having the largest pressure face of the various pistons involved. When movement of piston portion 196 and assembly 182 to the right is completed, fluid passes through bore 230 into the interior of assembly 182, and piston portion 200 starts movement toward the right. This is accompanied with discharge of fluid through bores 208, flutes 204 and conduit 228. At the end of the stroke for piston portion 200, fluid passes through bore 232 into the interior of assembly 184, and piston 220 moves to the right related to assembly 184, with exhaust taking place through flutes 212, flutes 204 and conduit 228. To contract the ram, fluid is admitted through conduit 228 to the right sides of the various pistons, and exhaust of fluid from the various assemblies is through bores 232, 230 and conduit 226.

Considering the operation of the refuse-collection vehicle as a whole, the packer blade normally when not in use is positioned adjacently forward end wall 34, which enables refuse to be dumped directly to the rear of the blade by an operator making collection calls. To compact the refuse, ram mechanism 150 is extended with the rear doors 40, 42 closed so that blade 60 moves to the intermediate position shown in FIG. 2, with the forward end of cover 162 slightly in front of the rear doors. As a load builds up in the vehicle, rearward movement of the blade stops prior to reaching the intermediate position of FIG. 2, because of resistance set up by refuse collecting in the vehicle body. After a full load is collected, the load is completely dumped from the vehicle by opening the doors and fully extending the packer blade, to the position indicated by the dashed outline in FIG. 3.

During use, any fluid collecting on the floor of body 20 is prevented from seeping out the rear end of body 20 by sealing strips 45. Leakage through the floor does not take place, since the floor is flat and imperforate.

It is claimed and desired to secure by Letters Patent:

1. In a refuse-collection vehicle comprising an elongated substantially rectangular hollow body with forward and rear ends and including a floor and side walls, and a packer blade extending transversely of and substan-

tially straight across said body with ends adjacent said side walls and a bottom edge adjacent said floor, said blade being movable in a path longitudinally of said body between a retracted position adjacent the forward end and an extended position adjacent the rear end of said body, the improvement comprising means adjacent each end of the blade near its bottom edge for guiding the blade in its path, fluid-operated ram means substantially parallel to said floor and extensible substantially the entire length of said body disposed above and close to the floor of said body operatively connected between the forward end of said body and said blade and extending rearwardly of the bottom edge of the blade for moving the blade in its path, and elongated cover means extending longitudinally of said body joined to said blade for movement with the blade, said cover means extending rearwardly from said blade and being disposed in shielding relation over said ram means.

2. In a refuse-collection vehicle, an elongated substantially rectangular hollow body for collecting refuse with forward and rear ends and having an expansive, substantially nonperforate floor and side walls along either side, a packer blade extending transversely of and substantially straight across said body with ends adjacent said side walls and a bottom edge adjacent the said floor, said blade being movable in a path longitudinally of said body between a retracted position adjacent its forward end and an extended position adjacent its rear end, a runway adjacent each side wall spaced above the top of the floor, means joined to each end of the blade and adjacent its bottom edge extending into the runway adjacent the end for guiding the blade in its path, extensible fluid-operated ram means substantially parallel to said floor for moving the blade disposed above and adjacent the floor, said ram means being operatively connected between the forward end of said body and said blade and extending rearwardly of the bottom edge of said blade, and elongated cover means extending longitudinally of said body joined to said blade for movement with the blade and extending rearwardly of said blade, said cover means being disposed in shielding relation over said ram means.

3. In a refuse-collection vehicle having an elongated hollow body and a packer blade disposed within said body movable in a path to and fro along the length thereof, an extensible double-acting fluid ram mechanism for moving the blade in its path, said ram mechanism comprising at least a pair of cylinder shell assemblies telescopically disposed one within the other, said one shell assembly having a first piston part integral therewith disposed within said other shell assembly, said other shell assembly including fluid passage means for introducing fluid under pressure to opposite ends of the shell assembly and against opposite ends of said first piston part, said one shell assembly having a second piston part mounted therein and fluid passage means for introducing fluid under pressure to opposite ends of the shell assembly and against opposite ends of said second piston part, and a member connected to said second piston part protruding out of said one shell assembly and extensible therefrom on actuation of the ram mechanism.

4. In a refuse-collection vehicle, an elongated hollow body with forward and rear ends including a floor and door means at the rear end of said body, said door means having a base portion extending below the top of the rear end of said floor and being adjustable between a closed position closing off the rear end of said body and an open position wherein the rear end is open and the top of the rear end of said floor is exposed, a packer blade mounted within said body and having a bottom edge adjacent said floor, mechanism for moving the packer blade from a position adjacent the forward end of the body to a position adjacent the rear end and with said bottom edge disposed rearwardly of the rear end of said floor, and elongated sealing means interposed between said base portion of the door means and the rear end of said floor disposed

7

below the top of said floor, said sealing means being constructed to inhibit leakage of fluid between the door means and the rear end of said floor with the door means in its closed position.

5. The construction of claim 4 wherein said sealing means is joined to the door means and is moved away from the rear end of said floor when the door means is adjusted to its open position.

6. In a refuse-collection vehicle, the combination of an elongated hollow body having a floor, side walls and forward and rear ends, door means at the rear end of said body for opening and closing said rear end and including a base portion that extends below the top of the floor at the rear end of said body, a packer blade disposed within said body movable in a path along the length of said body between a retracted position adjacent the forward end and an extended position adjacent the rear end of said body, elongated fluid ram mechanism interposed between the forward end of said body and said packer blade for moving it in its path, said ram mechanism be-

8

ing mounted directly above the floor and having a portion that projects rearwardly of said blade, cover means joined to the blade in shielding relation over said projecting portion of the ram mechanism and movable with the blade to a position beyond the rear of said floor with said blade in a retracted position, and sealing means disposed below the path of said cover means and the top of said floor interposed between said base portion of said door means and the rear end of said floor with the door means closing the rear end of said body.

7. The construction of claim 6 wherein said sealing means is joined to the door means and moved away from the rear end of said floor on opening of the door means.

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20