

[54] REFUSE COLLECTING VEHICLE

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[52] **U.S. Cl.**.....214/83.3, 214/82

[51] **Int. Cl.** **B65f 3/00**

[58] **Field of Search**214/83.3, 503, 518, 82

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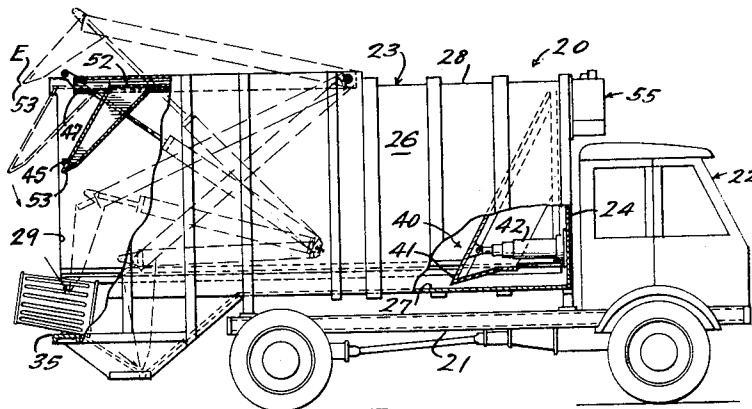
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[57] **ABSTRACT**

This invention relates to a rear end loader type of refuse collecting vehicle. There is no tailgate and the loading hopper, rather than being in the tailgate, is in the rear of the vehicle body. A packing blade moves refuse from the hopper into the forward portion of the body and in one embodiment may be reversed to sweep refuse from the hopper to a point exterior of the vehicle. A longitudinally movable ejector panel is mounted transversely of the body. During the discharging of refuse from the open rear end of the body the packer blade is in an elevated position and the refuse is discharged by the ejector panel between the elevated packer blade and the hopper. In some embodiments an auxiliary floor is provided in the hopper.

7 Claims, 12 Drawing Figures



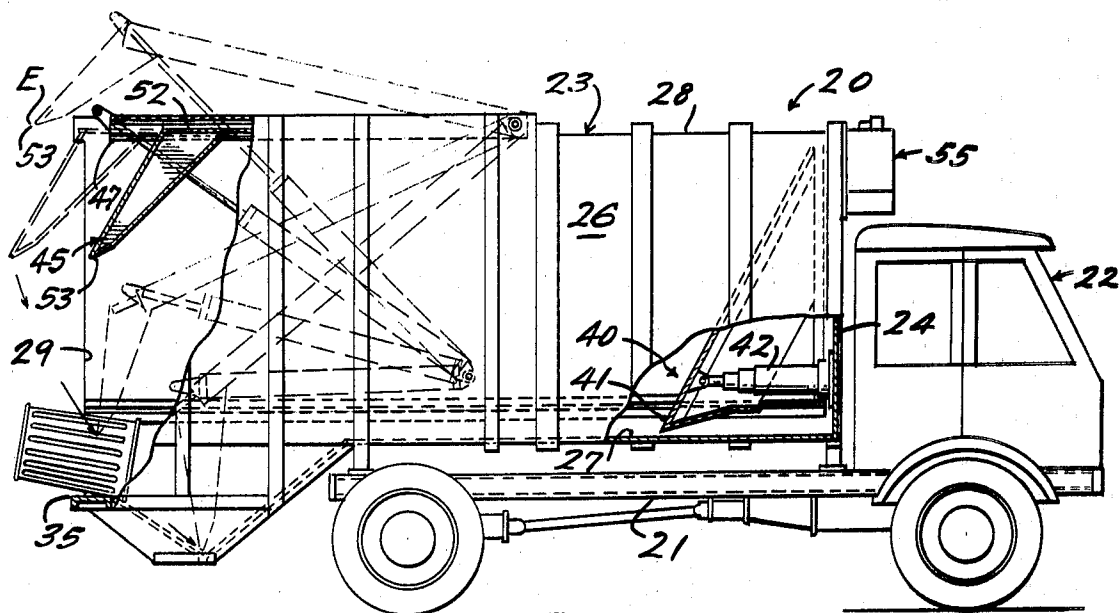


FIG-1-

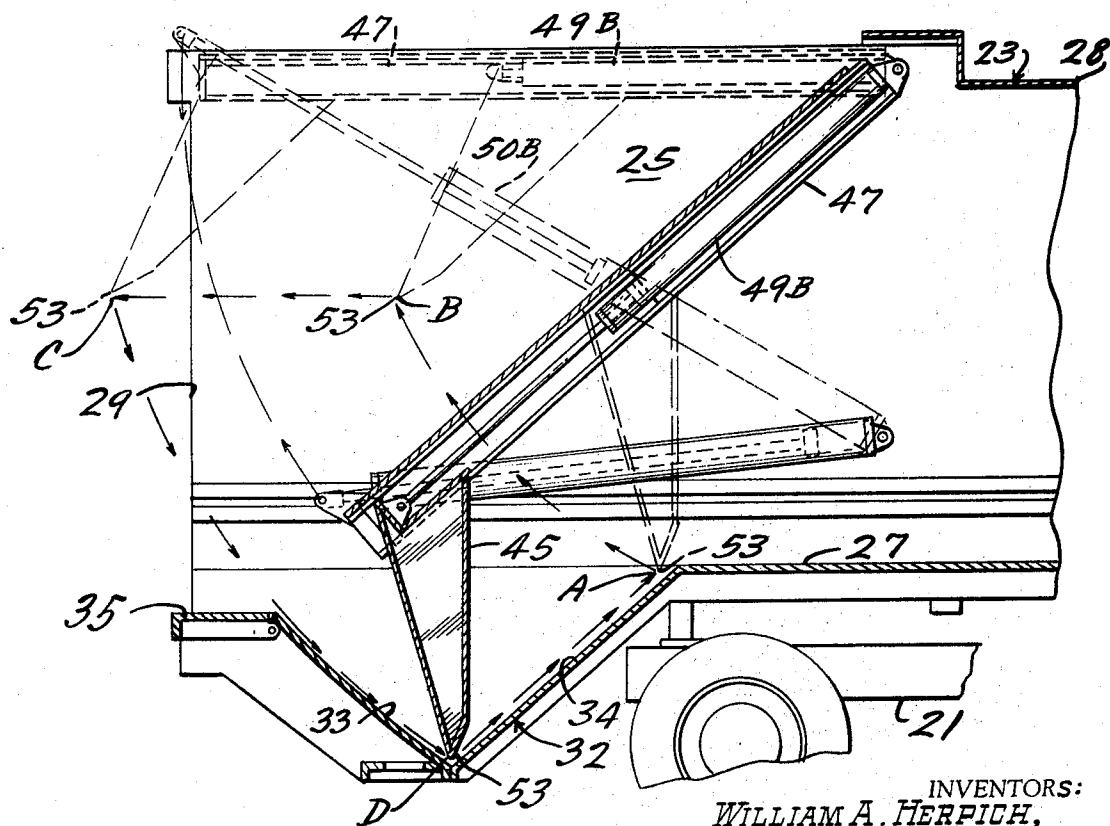


FIG-2-

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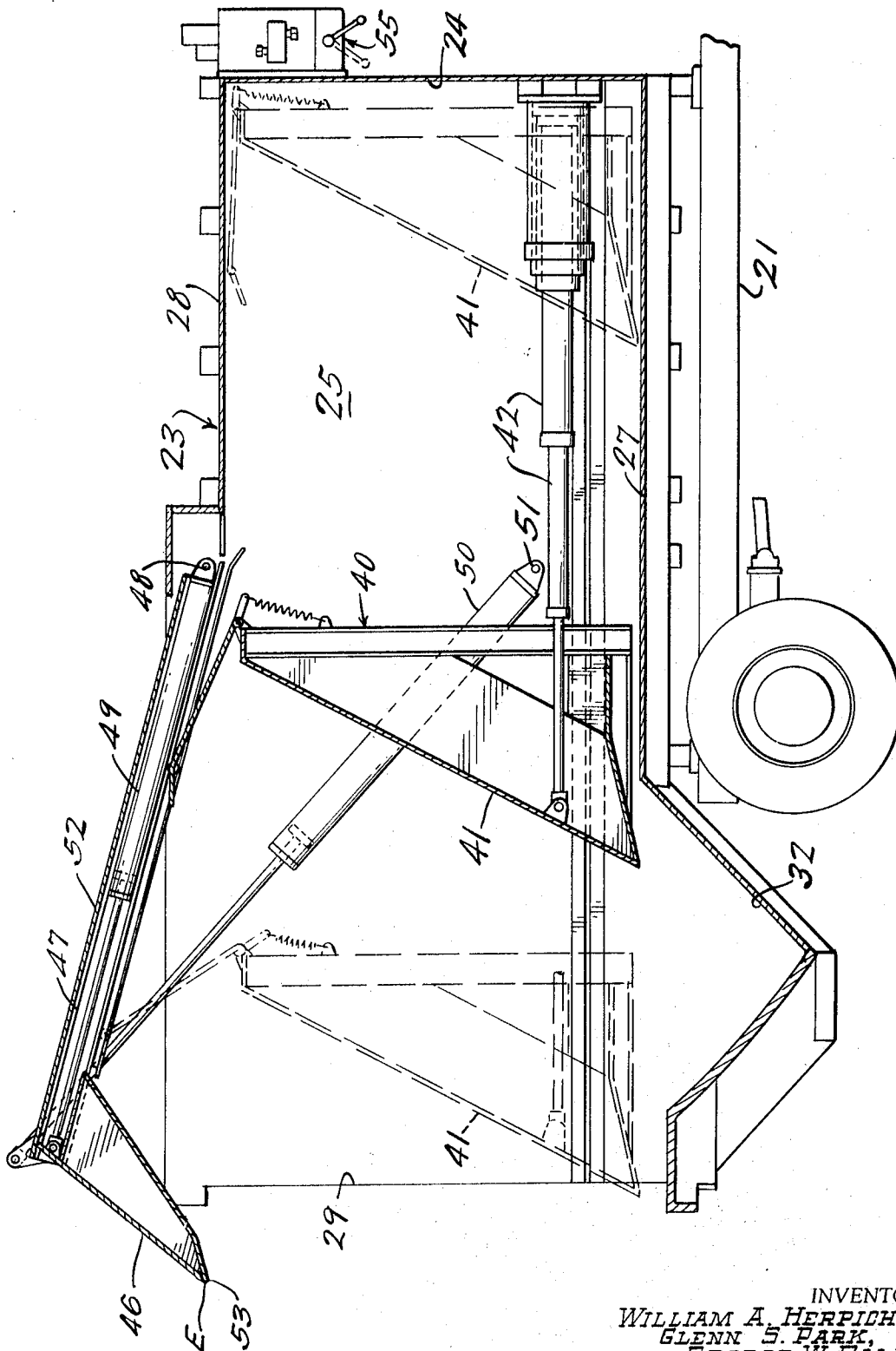


FIG. 3-

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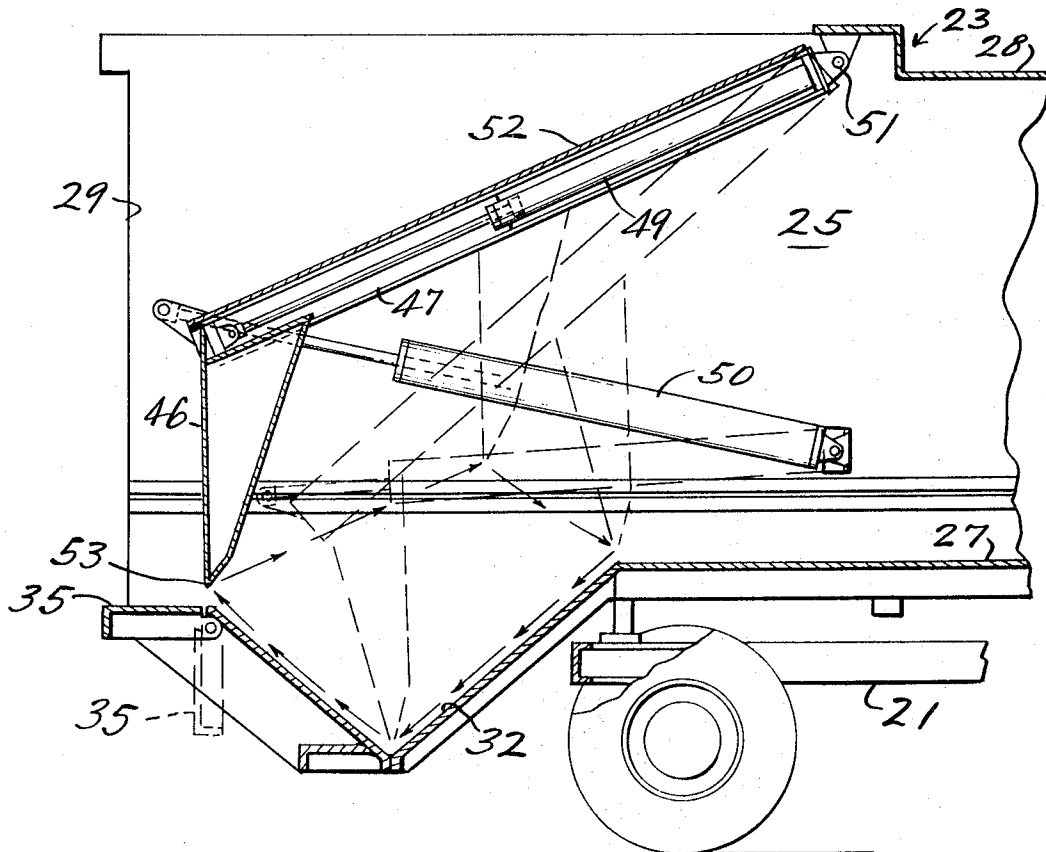


FIG-4-

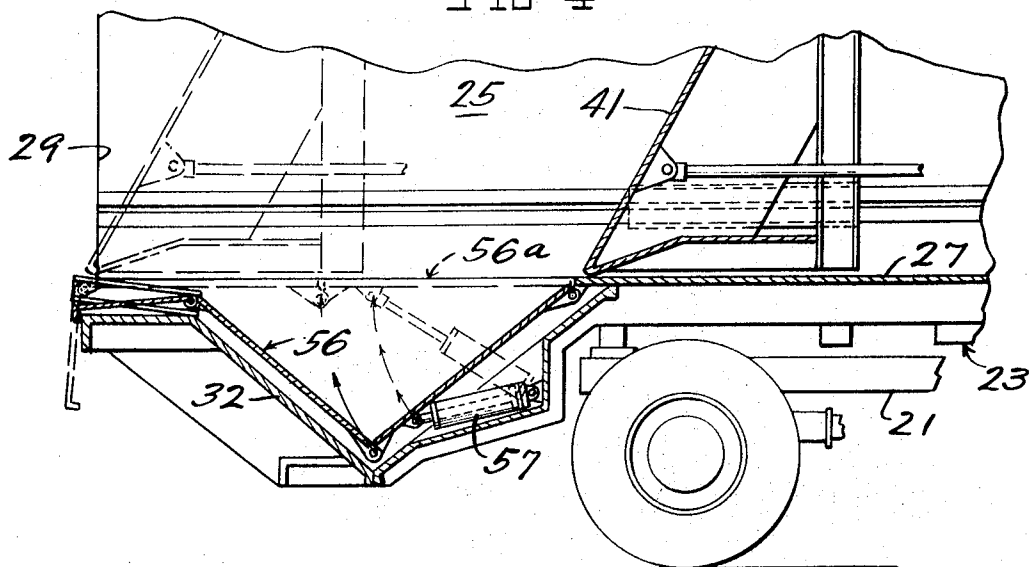


FIG-5-

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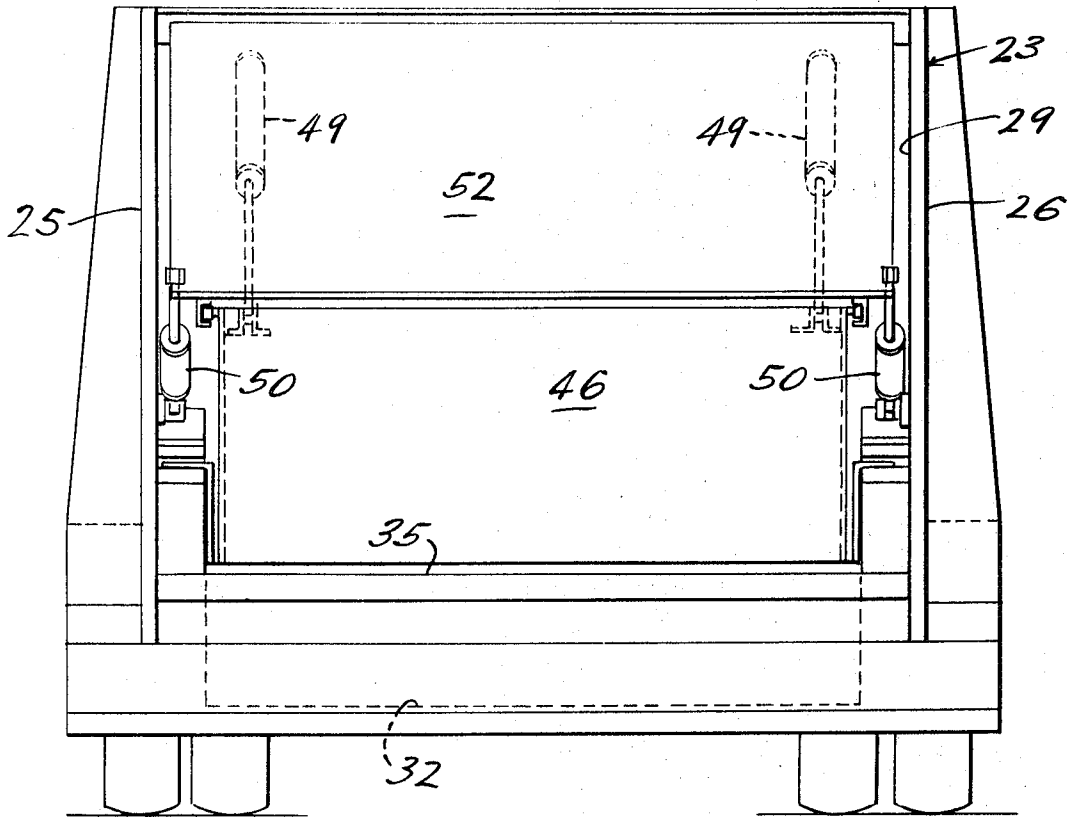


FIG-6 -

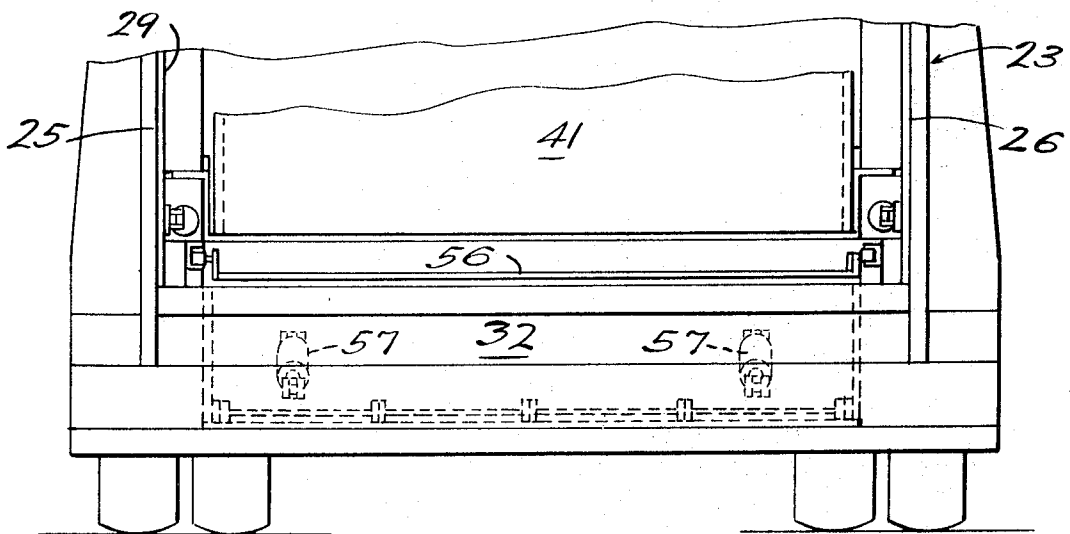


FIG-7 -

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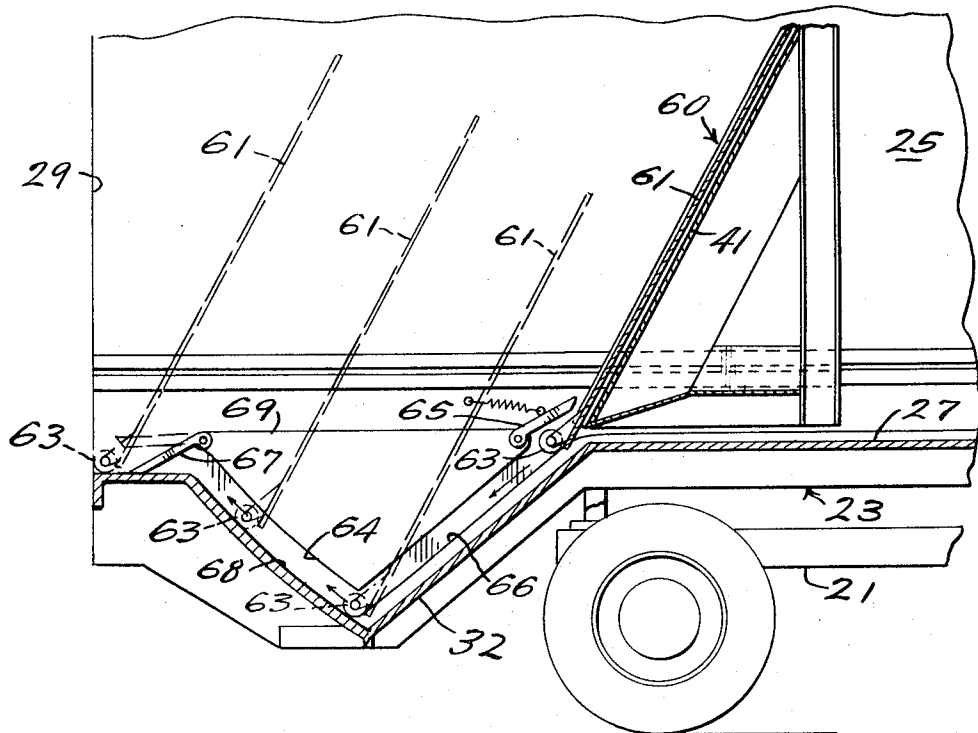


FIG. 8-

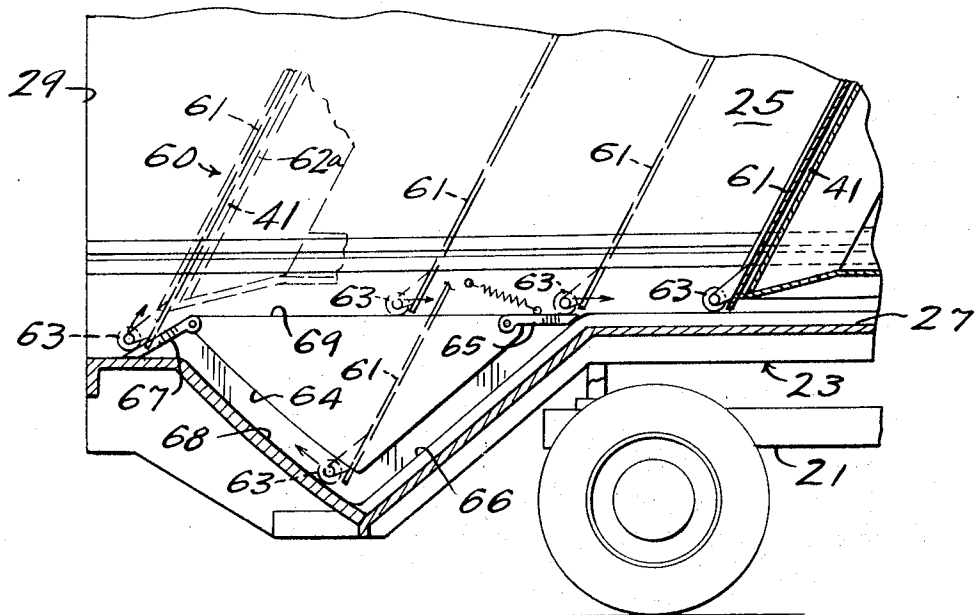
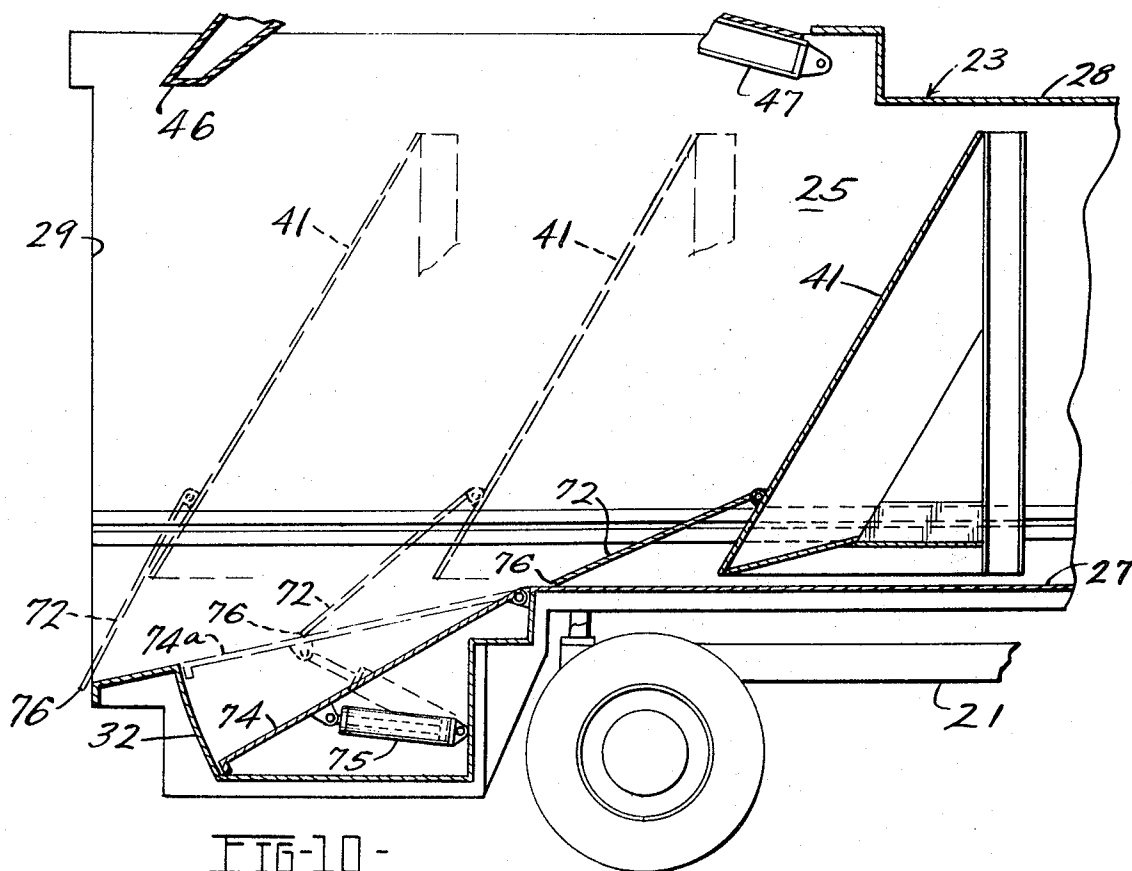
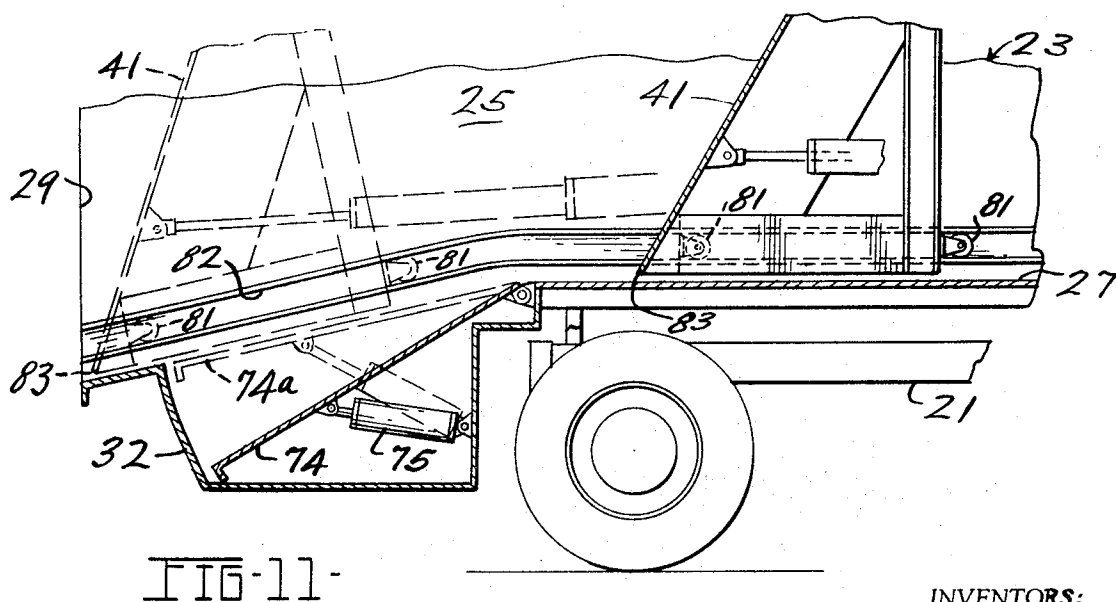


FIG. 9-

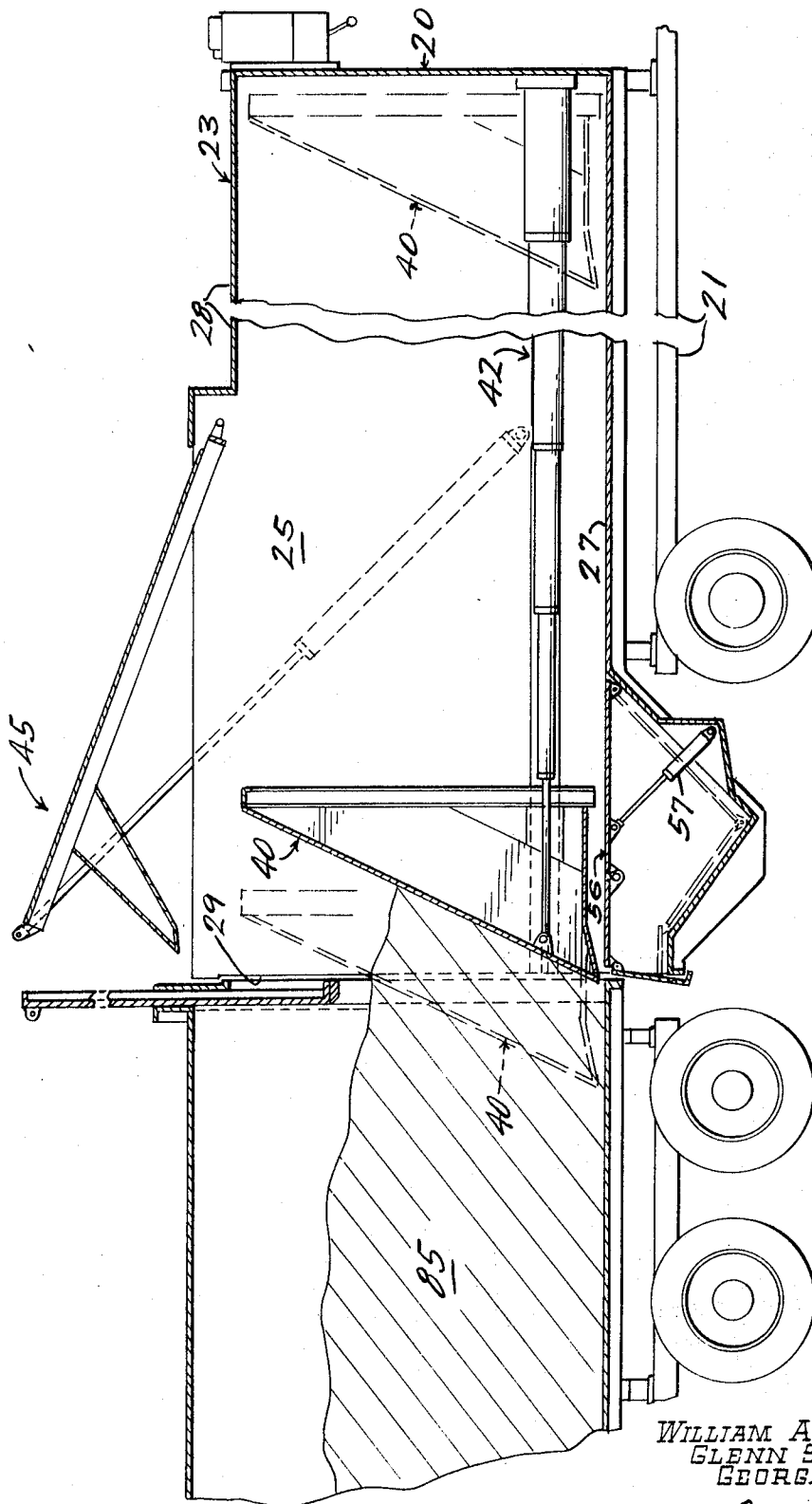
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REFUSE COLLECTING VEHICLE

BACKGROUND OF THE INVENTION

The present invention relates to a refuse collecting vehicle of the type customarily employed on city streets for the collection of trash, garbage and other refuse. More particularly, this invention relates to an improved rear end loader type of refuse collecting vehicle.

Many prior art rear end loaders, for example the vehicle shown in Palmer et al. U.S. Pat. No. 3,402,837, include an elongated body having an ejector panel which was moved rearwardly to discharge refuse from the body of the vehicle. However, most of the prior art rear end loader vehicles included a tailgate which defined a lower hopper portion. The tailgate was moved to an elevated position before the ejector panel was activated to discharge refuse from the rear of the body. Often, prior art vehicles also included packing blade mechanism in the tailgate to move the refuse from the tailgate hopper into the vehicle body.

It has been found that it is difficult to maintain the proper seals on prior art tailgate type rear end loaders. When the seals are not maintained, waste material is often discharged upon city streets. In addition, many of the prior art vehicles included massive tailgate structures which when elevated created a safety hazard to the vehicle operator. It was not uncommon for an operator to walk beneath such an elevated tailgate when, for example, there was a malfunction during the discharging operation.

SUMMARY OF THE INVENTION

The present invention relates to a rear end loader type of refuse collecting vehicle in which the tailgate structure normally present in a rear end loader type of vehicle is eliminated. A refuse collecting vehicle according to the present invention includes an elongated body having opposed sidewalls, a body floor, and an integral hopper defined in the body floor adjacent the rear end of the body. Ejector means are provided for discharging refuse through the open rear end of the body. Packing means are provided for moving refuse from the hopper forwardly into the elongated body. The packing means includes a packing blade which is movable between an upper discharge position and a lower packing position. The ejector means is effective to discharge refuse between the elevated packing blade and the hopper. The hopper may be provided with an auxiliary floor which is moved to an elevated or upper position during the discharge of refuse from the open rear end of the body.

It is the principal object of the instant invention to provide an improved rear end loader type of refuse collecting vehicle.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a refuse collecting vehicle, according to the present invention, with parts broken away to show portions of the ejection means and showing the packer blade in various positions by the use of dashed lines;

FIG. 2 is a partially diagrammatic vertical sectional view showing one embodiment of packing means according to the present invention;

FIG. 3 is a partially diagrammatic, enlarged vertical sectional view of a vehicle body and showing in particular the position of the packing means and the ejection means during the discharge of refuse from the open rear end of the vehicle;

FIG. 4 is a partially diagrammatic vertical sectional view showing the packing means being used to discharge the contents of the hopper through the open rear end of the vehicle;

FIG. 5 is a partially diagrammatic, vertical sectional view showing another embodiment of the present invention, including an auxiliary floor positioned within the hopper;

FIG. 6 is a rear view of the vehicle shown in FIG. 1 with the packing mechanism in a transportation position;

FIG. 7 is a view similar to FIG. 6 showing a rear view of the FIG. 5 embodiment;

FIG. 8 is a partially diagrammatic vertical sectional view showing another embodiment in which an auxiliary panel is mounted on the ejector panel;

FIG. 9 is a partially diagrammatic vertical sectional view similar to FIG. 8 showing the position of the auxiliary panel as the ejection panel moves forwardly after it has discharged refuse from the rear open end of the body;

FIG. 10 is a partially diagrammatic vertical sectional view of another embodiment and showing in particular an auxiliary panel which is pivotally mounted on the ejection panel;

FIG. 11 is a partially diagrammatic vertical sectional view showing another embodiment including guide tracks which deflect downwardly adjacent the hopper; and

FIG. 12 is a partially diagrammatic vertical sectional view showing a vehicle according to the present invention discharging its contents into a transfer trailer which is used to transport refuse to a remote dumping area.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

A refuse collecting vehicle, according to the present invention, is generally indicated in FIG. 1 by the reference number 20. The vehicle 20 includes a conventional truck chassis 21 which mounts a driver's cab 22 and an elongated body 23. The body 23 includes a front wall 24, opposed sidewalls 25 and 26, a floor 27, a partial roof 28, and an open rear end 29.

The floor 27 has a generally flat front portion 31. The refuse collecting vehicle 20 does not have a tailgate which includes a loading hopper. Rather, a loading hopper 32 is defined in the rear of the elongated body 23. Referring to FIG. 2, the loading hopper 32, in the present embodiment, includes inclined bottom sections 33 and 34. A loading step 35 is located adjacent the inclined bottom section 33 and the inclined bottom section 34 abuts the main floor 27 of the body 23. The loading hopper 32 is an integral part of the elongated body 23.

As shown in FIG. 1, the opposed sidewalls 25 and 26 extend downwardly in the area of the loading hopper 32 and also serve as sidewalls for the loading hopper 32.

Ejector means, generally indicated by the reference number 40, are provided within the body 23 for discharging refuse through the open rear end 29 of the vehicle 20. In the present embodiment the ejector means 40 includes a longitudinally movable ejector panel 41 which extends transversely across the body 23 from side to side and top to bottom. The ejector panel 41 is mounted in the body 23 for movement from one end to the other. The bottom of the ejector panel 41 normally moves over horizontal wooden rails (not shown) which are mounted on the floor 27. The ejector panel 41 is moved back and forth in the body 23 by a telescoping hydraulic cylinder set 42 which is operatively connected between the front wall 24 of the body 23 and the ejector panel 41.

The refuse collecting vehicle 20 also includes packing means, generally indicated by the reference number 45, for moving refuse from the hopper 32 into the front portion of the body 23. In the present embodiment, the packing means 45 includes a transversely extending packing blade 46 which is mounted for movement along the longitudinal centerline of a pair of opposed guide channels 47. Each of the guide channels 47 is pivotally mounted adjacent the roof 28 and a respective sidewall 25-26 by a mounting assembly 48. In the present embodiment, the packing means 45 includes a first pair of cylinders 49 and a second pair of cylinders 50. Each of the cylinders 49 is operatively connected between the mounting assembly 48 and the transversely extending packing blade 46. The first pair of cylinders 49 is effective to move the packing blade 46 along the longitudinal centerline of the channels 47. The second pair of cylinders 50 is operatively connected between the distal ends of the guide channels 47 and a lower mounting assembly 51 located below the mounting assembly 48 and slightly above the floor 27. A cover plate 52 is welded or otherwise connected to the upper surfaces of the channels 47 and serves as an extension of the partial roof 28 when the packing means 45 is in the solid line position shown in FIG. 1.

The packing blade 46 which extends transversely across the vehicle 20 includes a lowermost horizontal edge 53.

Operation of the packing means 45 is best described by referring to various positions of the lowermost edge 53 of the packing blade 46. These positions have been designated A, B, C, D, and E in FIGS. 1 and 2. Of course, various other motions of the packing blade 46 are possible when other embodiments of packing means are utilized in connection with a vehicle 20, according to the present invention. Referring to FIG. 2, when the lowermost edge 53 of the packing blade 46 is located at position A, both the first pair of cylinders 49 and the second pair of cylinders 50 are in retracted positions (not shown). When the packing blade 46 is in this position, refuse may be loaded into the loading hopper 32 behind the packing blade 46. During a packing cycle, the lowermost edge 53 of the packing blade 46 is moved to position B by extending the second pair of cylinders 50 while maintaining the first pair of cylinders 49 in their retracted positions as indicated by 50B and 49B respectively. The lowermost edge 53 is moved to position C by extending the first set of cylinders 49 while at the same time keeping the second set of cylinders 50 in its partially extended position. This moves the lowermost edge 53 along a rearward generally horizontal path. The lowermost edge 53 is moved from the position 53C to the lowermost packing position 53D by retracting the second pair of cylinders 50 thus swinging the channels 47 and the packing blade 46 downwardly. The last stage of movement between the point 53D and 53A is affected by retracting the upper first pair of cylinders 49. This produces a "hoe" like movement which packs the refuse into the body 23.

When the packing blade 46 is in the packing cycle, designated A-D, it is said to be in its lower packing position. Referring to FIG. 1 and more particularly FIG. 3, during the discharge of refuse from the vehicle 20 the packing blade 46 is moved to an upper discharge position shown in FIG. 3 at E. This is done by extending the first and second pairs of cylinders 49 and 50. Of course, other types of packer means may be utilized and still be within the scope of the present invention.

In the present embodiment, during the discharge of refuse from the elongated body 23, the packing blade 46 is moved to the upper discharge position E and the ejector panel 41 is moved rearwardly by extending the hydraulic cylinder set 42. Referring to FIG. 3, after the ejector panel 41 has been moved to its rearward position, it is still necessary to clear the loading hopper 42 of refuse. In the present embodiment, this is accomplished by reversing the packer blade cycle as shown in FIG. 4.

An important feature of the present invention is that when the ejector panel 41 moves rearwardly to discharge refuse from the open end 29 of the elongated body 23, the ejector panel 41 moves between the elevated packing blade 46 and the loading hopper 32.

Control means for discharging refuse from the body 23 are generally indicated by the reference number 55. The control means 55 includes circuitry for reversing the travel of the packer blade 46 to clear the hopper 32 as shown in FIG. 4.

FIG. 5 illustrates another embodiment of the present invention. In this embodiment, rather than reversing the travel of the packing blade 46 to clear the hopper 32, an auxiliary hopper floor 56 is pivotally connected to the main vehicle floor 27. The auxiliary hopper floor 56 is positioned within the hopper 32 and is movable between a lower position (indicated by the solid lines in FIG. 5) and an upper discharge position (indicated by the dashed line position 56a). A pair of hopper cylinders 57 are provided to move the auxiliary floor 56 between its lower position and its upper discharge position. When discharging refuse from the elongated body 23 of the vehicle 20, the cylinders 57 are extended, moving the auxiliary floor to its upper discharge position 56a. As the ejector panel 41 moves rearwardly adjacent the upper surface of the auxiliary floor 56, it sweeps all of the refuse, including the hopper refuse, outwardly through the open rear end 29 of the vehicle 20. Subsequently, the cylinders 57 are retracted and the auxiliary hopper floor 56 assumes its lower position.

Another embodiment of the present invention is shown in FIGS. 8 and 9. In this embodiment, auxiliary panel means, generally indicated by the reference number 60 are mounted on the front face of the packing blade of the ejector panel 41. The auxiliary panel means 60 includes a generally rectangular auxiliary panel 61 which is mounted on the front face of the ejector panel 41. The auxiliary panel 61 has guide rollers 63 mounted on the lower portion of opposed side edges. Guide tracks 64 are provided adjacent the sidewalls of the hopper 32. Referring to FIG. 8, during the discharge of refuse from the vehicle 20, as the ejector panel 41 moves rearwardly the auxiliary panel means 60 moves downwardly into the hopper 32 to clear the hopper of refuse. The auxiliary panel 61 is guided through the hopper by the rollers 63 which are guided along the guide tracks 64. A spring biased latch 65, which is normally in the upward position shown in FIG. 8, causes the guide rollers 63 to enter an inclined leg 66 of each guide track 64. Another latch 67 is located at the upper end of an adjacent inclined leg 68 of each guide track 64. After the hopper 32 is cleared and the ejector panel 41 has moved to its extreme rearward position, as indicated by the designation 62a in FIGS. 8 and 9, the ejector panel 41 is moved to its forward position by retracting the hydraulic cylinder set 42. The latch 67 is in its down position and guides the rollers 63 along an upper horizontal leg 69 of each guide track 64. As the rollers 63 engage the spring biased latches 65, they urge the latches 65 into a downward position as shown in FIG. 9. This closes the entrance to the inclined legs 66 of the guide tracks 64 and prevents the auxiliary panel 61 from moving downwardly.

Another embodiment of the invention is shown in FIG. 10. In this embodiment, an auxiliary panel 72 is pivotally connected to the front face of the ejector panel 41 by a pivot connection 73. The pivot connection 73 extends horizontally or parallel to the floor 27. An auxiliary hopper floor 74 which is movable between an upper discharge position and a lower position, is positioned in the loading hopper 32. Hopper cylinders 75 are operatively connected to the auxiliary hopper floor 74 to move the auxiliary floor 74 between its upper discharge position (indicated by the dashed line position 74a) and its lower position.

During discharge of refuse from the elongated body 23, the auxiliary hopper floor 74 is moved to the upper discharge position 74a. The ejector panel 41 is then moved rearwardly. A lowermost edge 76 of the auxiliary panel 72 engages the uppermost surface of the auxiliary hopper floor 74 to clear refuse from the floor 74.

Another embodiment of the invention is shown in FIG. 11. In this embodiment, a pair of longitudinally extending and opposed guide tracks 80 are positioned on the opposed sidewalls 25 and 26 of the elongated body 23. A pair of opposed guide rollers 81 (see FIG. 11) are mounted on the packing blade 46 and are positioned within the guide tracks 80. The guide tracks 80 deflect downwardly adjacent the hopper 32 forming inclined guide track segments 82. During the discharge operation, the auxiliary hopper floor 74 is moved upwardly to the upper discharge position 74a and the ejector panel 41 moves rearwardly guided by the guide tracks 80. A lowermost edge 83 of the ejector panel 46 is closely adjacent the floor 27. After the rollers 81 enter the inclined guide track segments 82, the lowermost edge 83 of the ejector panel 46 moves downwardly closely adjacent the auxiliary hopper floor 74, thus clearing the floor 74 of refuse.

FIG. 12 shows one embodiment of a refuse collecting vehicle 20, according to the present invention, being used in connection with a transfer trailer 85. The transfer trailer 85 is of a type commonly employed to transfer refuse from a pickup point to a remote location, for example, to a remote land fill location. This is becoming more and more common in present day refuse handling operations and it has been found that the refuse collecting vehicle 20, according to the present invention, is readily adaptable to this type of transfer operation.

What we claim is:

1. In a refuse collecting vehicle having an elongated body with an open rear end, said body including opposed side walls,

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a top, a body floor and a hopper extending below the level of said body floor adjacent said rear end, said hopper being an integral part of said body and inseparable therefrom, an ejector plate in said body and extending substantially from said top to said floor and across between said side walls for discharging refuse through said open rear end, a packer blade extending transversely across said body and having an upper end and a lower end that is adapted to be moved along the bottom of said hopper for sweeping refuse from said hopper into said body, means for moving said packer blade between a lower packing path with said lower end extending into said hopper and an upper return path with said packer blade and said lower end elevated to a level above the top of said ejector plate a distance such that refuse may be discharged from said body by said ejector plate through the open space between said body floor and said lower end, means for moving said packer blade generally forwardly along said lower packing path for sweeping refuse from said hopper into said body and generally backwardly along said upper return path for moving said packer blade rearwardly over refuse in said hopper, and power means for moving said ejector plate through said body to said open end for discharging refuse therefrom through such open space.

2. A refuse collecting vehicle according to claim 1, and control means for reversing the travel of said packer blade along said packing path whereby said packer blade is effective to

remove refuse from said hopper during such reverse travel.

3. A refuse collecting vehicle according to claim 1, including an auxiliary floor positioned within said hopper, said auxiliary floor being movable between a lower position and an upper discharge position.

4. A refuse collecting vehicle according to claim 3, including cylinder means for moving said auxiliary floor between such lower position and such upper discharge position.

5. A refuse collecting vehicle according to claim 4, wherein said ejector panel moves adjacent the upper surface of said auxiliary floor when discharging refuse from such open rear end of said elongated body.

6. A refuse collecting vehicle according to claim 1 in which said means for moving said packer blade between said lower packing path and said upper return path includes means for moving said packer blade to and from an intermediate return path with said lower end of said packer blade at a level above refuse in said hopper and lower than the level of the top of said ejector plate when in said intermediate return path.

7. A refuse collecting vehicle according to claim 1 including an auxiliary floor pivotally mounted within said hopper on a pivot line adjacent the front side of said hopper, and means for moving said auxiliary floor between a lower position and an upper discharge position spanning said hopper.

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