

June 16, 1964

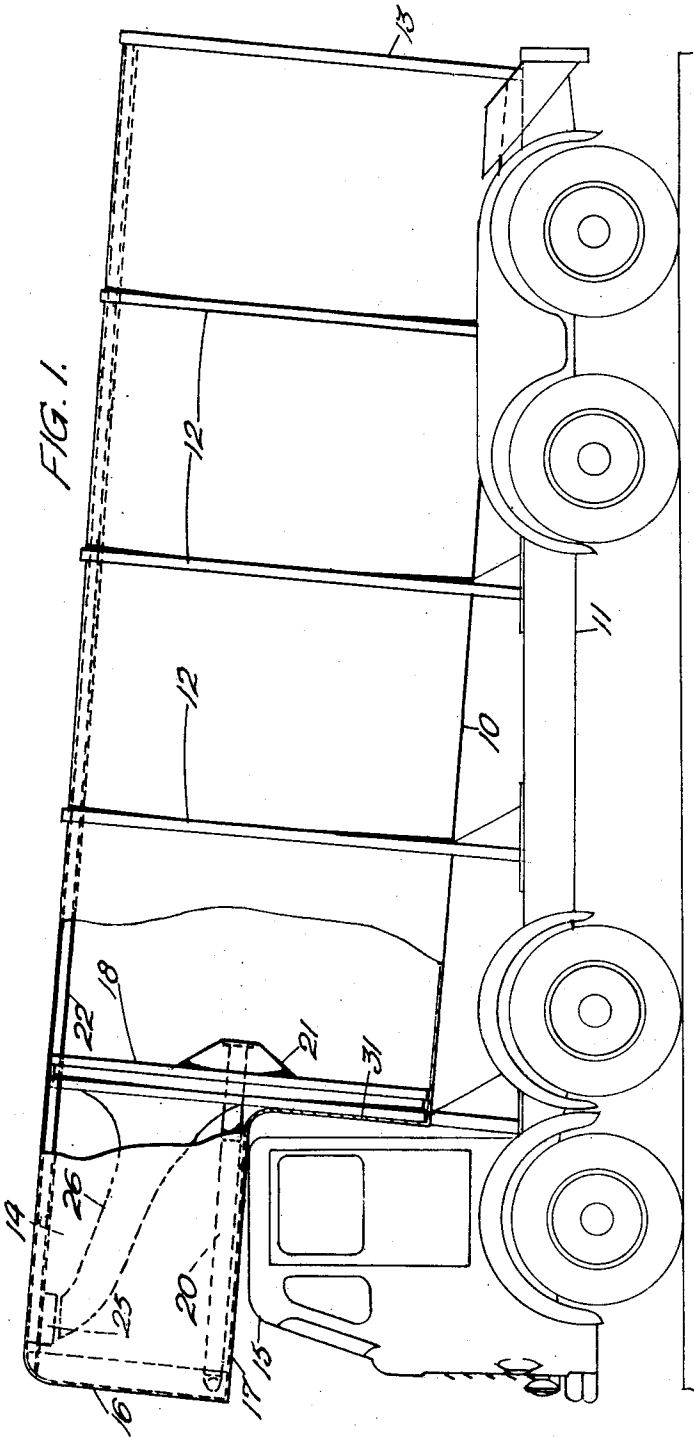
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VEHICLES FOR TRANSPORTING REFUSE

Filed July 17, 1961

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June 16, 1964

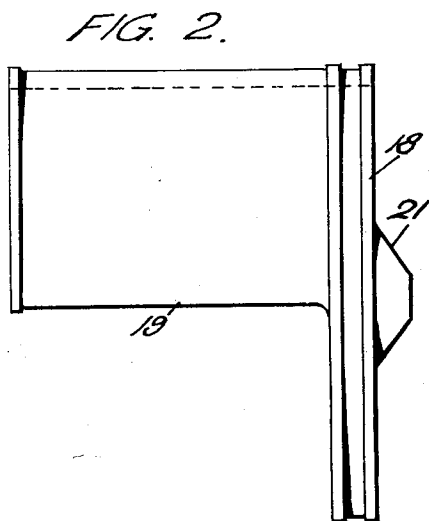
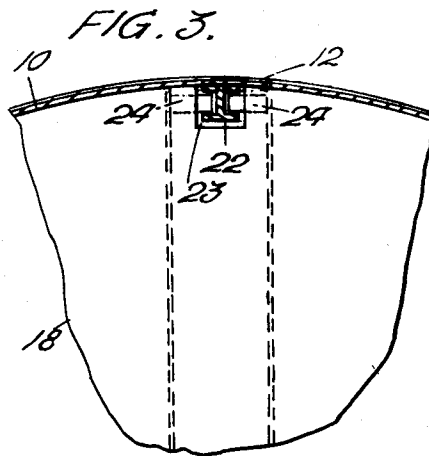
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VEHICLES FOR TRANSPORTING REFUSE

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4 Sheets-Sheet 2



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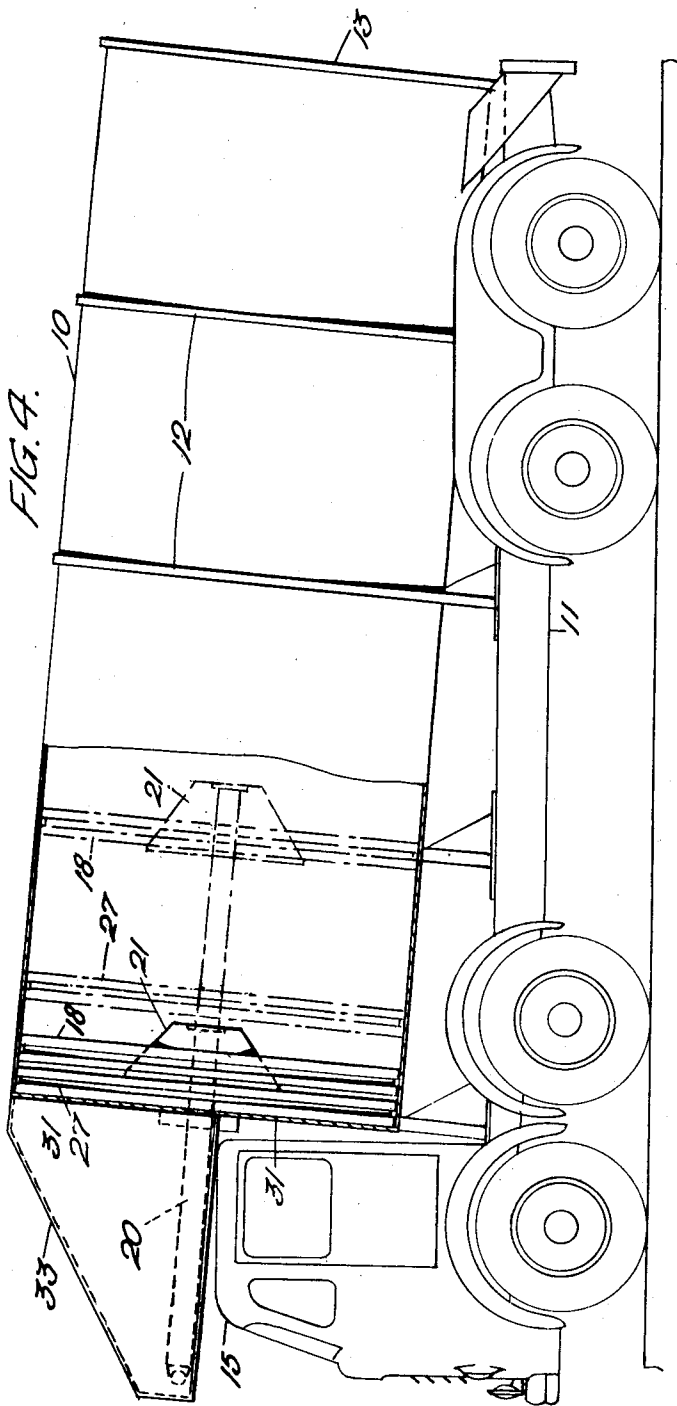
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VEHICLES FOR TRANSPORTING REFUSE

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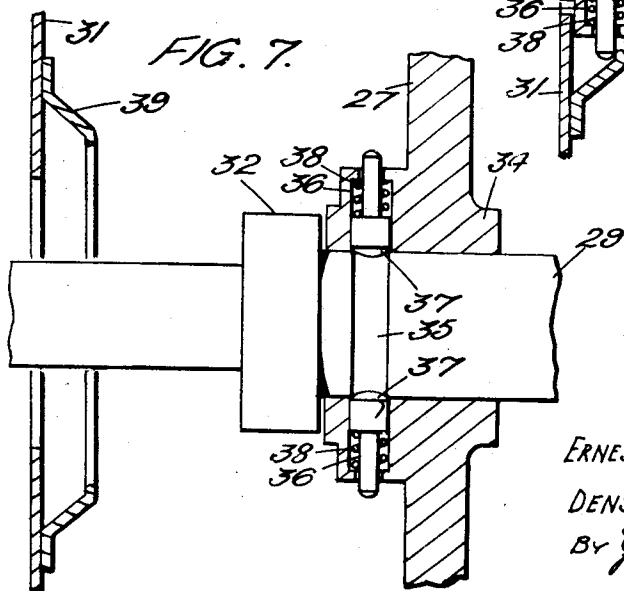
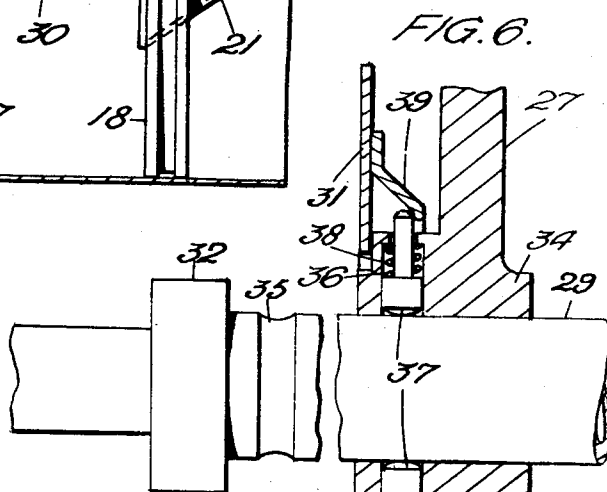
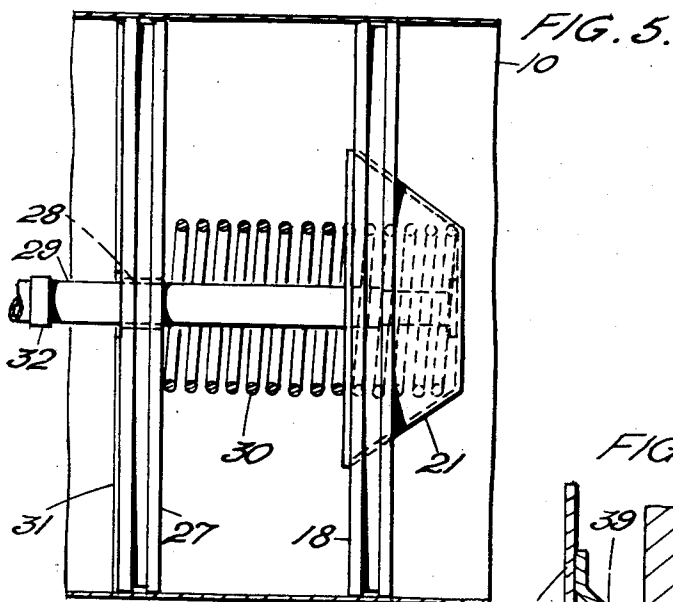
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VEHICLES FOR TRANSPORTING REFUSE

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VEHICLES FOR TRANSPORTING REFUSE

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3 Claims. (Cl. 214-82)

This invention relates to vehicles for transporting refuse or other fragmentary material (hereinafter referred to as refuse) and particularly for use in conjunction with means at a loading station for compressing a charge of the refuse in a compression chamber and then ejecting it into a container on the vehicle. One such arrangement is described in an application Serial No. 40,938, of one of the present inventors, now abandoned, in which the container is permanently mounted on the vehicle and the compression chamber and a compacting element reciprocable therein are permanently mounted at a loading station separate from the vehicle, which compression chamber is provided with a discharge opening at one end thereof so disposed that a loading opening at the end of the container on the vehicle may be brought into register with it, and through which discharge opening a load compacted in the compression chamber may be ejected into the container on the vehicle by said compacting element.

With this arrangement material is loaded into the compression chamber through an opening remote from the discharge opening and compressed by the reciprocable compacting element moving towards a door closing the discharge opening. The container on the vehicle is maneuvered into a position so as to register with the discharge end of the compression chamber and said door is opened, whereupon the compacting element is moved so as to force the compacted material from the compression chamber through its discharge opening into the first container, this being facilitated by the fact that the cross-sectional area of the compression chamber is less than that of the container on the vehicle. Also as described in British specification No. 3158/60 the compressed refuse may be discharged through the opening at the rear of the container on the vehicle by a piston which is moved rearwardly from the forward position by a hydraulic ram or by a cable mechanism. Such an arrangement may be employed in the present construction or any other suitable mechanism may be employed for moving the piston. The hydraulic ram may thus be of the single acting type.

This arrangement enables the container on the vehicle to be completely sealed by the closing of the one opening. Thus in the case of domestic refuse there can be no escape of objectionable odors.

In these previous arrangements and in the present construction the compression chamber at the loading station and container on the vehicle are preferably cylindrical.

In order that the piston may take up as little space in the container as possible it must have a comparatively small axial thickness, but then there is a tendency for the piston to tilt whilst being moved and an object of the present invention is to overcome that drawback.

According to this invention a vehicle for transporting refuse comprises a container having an opening at the rear end thereof with which is associated closure means, a piston movable along the container and of a similar contour to that of the container and means for imparting movement to said piston, which piston is provided with a supplementary portion which is either fixed to the piston and extending axially therefrom and engaging a guiding surface or the like on the container, or which supplementary

portion of the piston comprises a separate guide member slidable along the container and having a hole through which extends a piston rod fixed to the piston proper and for imparting movement to the piston and means for retaining said supplementary portion at the end of the container remote from the discharge end and means on a part moving with the piston for imparting movement to the supplementary portion when the main piston has moved a predetermined extent towards the discharge end, and which piston rod or a part secured thereto is a close fit in said hole. With either of these arrangements the comparatively narrow piston proper is prevented from tilting due to such causes as the refuse being most dense in the lower part of the container or the refuse jamming a part of the piston.

In the first of the two alternative arrangements the supplementary part may be fixed to that side of the piston proper nearer the front of the vehicle and may form a continuation of the upper part of the surface thereof and which continuation is movable into a forward extension of the upper part of the container above the driver's cab.

In one embodiment of the second of the two alternative arrangements first referred to in which the supplementary portion of the piston comprises a separate guide member having a hole through which the piston rod of the piston extends, the said retaining means may comprise a spring disposed between the guide member and piston proper so as to hold the guide member against the end of the container until the main piston has been moved a predetermined extent during the discharge stroke whereupon the supplementary part moves with the main part of the piston.

In this arrangement when the compressed charge of refuse is forced into the container from the rear end thereof, the piston and guide member and spring travel towards the forward end of the container and the spring is compressed; but when the main piston is moved by the piston rod (which may comprise the movable element of a ram) in a direction to expel the compressed load, the guide member at first remains stationary, being maintained at the forward end of the container by the spring. However, when the piston becomes separated from the guide member by a sufficient space to afford adequate restraint to tilting, the guide member is arranged to move rearwardly with the piston. For this purpose the piston rod which is connected to the main piston may be provided with a stop located on the forward side of the supplementary piston in such a position that it does not engage the guide member until it and the piston proper are at a required distance apart during the expulsion of the compacted refuse. The abutment may be in the form of a collar. The hole in the guide member may be larger in diameter than that of the piston rod and the collar may be shaped to form a jamming fit in the hole.

The following is a description of a number of different arrangements for preventing a discharging piston from tilting in a container on a vehicle when discharging material from the container reference being made to the accompanying drawings in which:

FIGURE 1 is a part section and part elevation of a vehicle having a two part piston;

FIGURE 2 is a side elevation of an alternative two part piston;

FIGURE 3 is a cross section of the upper part of the container on the vehicle and showing the guide means for the piston;

FIGURE 4 is a view similar to FIGURE 1 showing an alternative means for preventing tilt of the piston embodying a supplementary relatively movable piston part;

FIGURE 5 is a diagrammatic side elevation of the means for maintaining the supplementary piston part

against the end wall of the container during the first part of the movement of the main piston part;

FIGURE 6 is a diagrammatic view of alternative means for holding the supplementary piston part against the end wall of the container; and

FIGURE 7 is a view similar to FIGURE 6 but showing the supplementary piston part away from said end wall.

Referring to the arrangement shown in FIGURES 1 to 3, a cylindrical container 10 is supported in an inclined manner on the chassis 11 of the vehicle and is retained in position by suitable straps 12. The container is provided with a discharge door 13 at its rear end. The forward and higher end of the container is provided with a half cylindrical extension 14 which is disposed over the driver's cab 15. The forward end of the extension may be closed by an end wall 16 beyond the end wall 31 of the container proper whereas the bottom is closed by a flat wall 17. Slidable within the fully cylindrical part of the container is a piston 18. This piston on the forward side thereof with respect to the travel of the vehicle is provided with an extension or supplementary part which comprises an arcuate shoe 25 (shown in FIGURE 1) supported upon the main piston part 18 by means of a bracket 26. The shoe 25 is slotted to provide a guide passage by which it is guided along an I-section guide rail 22 fixed to the inner surface of the upper part of the container.

Movement is imparted to the piston 18 along the container by a telescopic ram 20, the relatively movable parts of which are secured between the front wall 15 of said container extension and the bottom of a conical depression 21 in the crown of the piston at a location above the centre of the crown.

As will be seen, the main piston part 18 is of comparatively small axial length and is prevented from tilting by reason of the supplementary part 25, 26.

Instead of the main piston part 18 being associated with the supplementary part 25, 26 according to FIGURE 1, it may be provided with a half-cylindrical supplementary part 19 (shown in FIGURE 2) which at the forward end of the stroke of the piston is accommodated and slides within the half-cylindrical extension 14 of the container.

In order to ensure that the supplementary part 19 of the piston is retained in a position in which it will enter the half-cylindrical extension 14 of the container at the forward end of the stroke, there is again provided an I-section guide rail 22 which is fixed to the inner surface of the upper part of the container and extends along the full length thereof.

The guide rail 22 is arranged to extend through a slot 23 in the main part of the piston and also through guide passage 23A in part 19. Blocks 24 extend from the sides of the slot 23 and passage 23A into the space between the flanges of the I-section guide rail 22. Anti-friction rollers may be mounted in the blocks to engage the web portion of the guide rail 22.

Referring now to the arrangement shown in FIGURES 4 and 5, instead of the supplementary part of the piston comprising an extension secured to the main part 18 thereof, it comprises a second comparatively narrow width piston part 27 having a hole 28 at the centre thereof in which a part 29 of the telescopic ram is a close fit.

As in the previous construction, the end of one part of the ram is fixed in the bottom of a conical recess 21 in the main part 18 of the piston. Disposed between the bottom of this recess and the supplementary piston 27 is a compression spring 30. At the forward end of the stroke of the main piston 18 as shown in FIGURE 4 the two parts of the piston are disposed close together and the spring 30 is compressed between them. The two piston parts are in this position after a compressed load has been introduced into the container through the closure wall at its rear end by means of equipment at a loading station.

When the vehicle reaches the destination where the material is to be discharged, the rear door is opened, the hydraulic ram 20 is energised by the hydraulic gear on the vehicle, and the main piston part 18 commences to move towards the rear end of the container. During this first part of the movement, the spring 30 retains the supplementary piston 27 against the front wall 31 of the cylindrical container. After a predetermined travel of the main piston 18 a collar 32 on the moving part of the ram engages the front face of the supplementary part 27 of the piston, whereupon it will move together with the main part 18. At this time the two parts are at such a distance apart, for example seven feet, that there will be little tendency for the main piston part 18 to tilt, due for example to the greater density of the material in the bottom of the container.

The collar 32 may be of such a size as to be a jamming fit in the hole 28 in the supplementary piston 27.

As in the previous construction, the telescopic ram 20 may be housed in an extension 33 of the container above the driver's cab and in this instance it can be of any desired shape.

Referring to the arrangement shown in FIGURES 6 and 7 instead of a spring being arranged between the main and auxiliary piston parts 18 and 27, the latter part is provided with a boss 34 through which the ram part 29 extends.

As in the previous arrangement, the ram part is provided with a collar 32 and in addition it is provided with a circumferential groove 35. The boss 34 on the supplementary piston part 27 projects forwardly thereof and is provided in the forward part with a number of stepped bores 36, the narrow portion of each bore being arranged outermost. There is arranged in each bore a stepped plunger 37, the smaller diameter portion of which extends out through the smaller end of the bore, and a compression spring 38 is arranged between the step in the bore and in the shoulder formed between the two parts of the plunger.

The end wall 31 of the container has secured to it a dished retaining ring 39 and when the two parts of the piston are at the forward end of the container the small ends of the plungers are disposed between the retaining ring 39 and the end wall 31. The plungers remain in this position so long as the outer parts of each plunger engages the main cylindrical surface of the ram part away from the circumferential groove 35.

When, however, the ram moves the main part 18 of the piston towards the discharge end of the container, the circumferential groove is brought opposite the plungers and the springs 38 press them into the groove, withdrawing their outer ends from engagement with the retaining ring 39. Thereupon the collar 32 on the ram part engages the boss and the piston 27 moves with the main piston part 18.

On the return journey the plungers are snapped past the retaining ring 39 and the piston is then arrested by reason of the engagement with the end of the container wall, whereupon the plungers are forced out of the circumferential groove by continued movement of the ram and are retained by the ring 39.

In the case where loading of the charge into the container is not effected by means of a compressor at a loading station, the container may be provided with a charging opening at the top thereof which is to the rear of the piston arrangement when it is at the forward limit of its travel.

We claim:

1. A vehicle for transporting refuse comprising a container of substantially circular cross section having an opening and associated closure means at the rear end thereof, a main piston part movable along the container and of a similar contour thereto, substantially the whole peripheral surface of the main piston part being in sliding contact with the whole circumference of the inner

5

surface of the container, said main piston part being provided with a slot, said main piston part having a supplementary portion disposed on the side thereof which is nearer the front of the vehicle to provide an increased bearing surface in a fore-and-aft direction as well as to prevent tilting thereof, said supplementary portion comprising a bracket affixed to said main piston part and a shoe carried by said bracket, said shoe being provided with a guide passage, a guide rail mounted on said container and extending through both said slot and said guide passage, a hydraulic ram acting on said main piston part near the center thereof adapted to impart movement thereto, the axis of said ram being substantially coincident with the axis of the container, said container and said ram being so inclined to the horizontal and said container being of such a diameter that said coincident axes extend over the driver's position, and a longitudinal extension of the upper part of the container above the driver's position arranged to accommodate, at least in part, the hydraulic ram and the members moving with said main piston part on the side thereof nearer the front of the vehicle when said main piston part lies at the front end of the container.

2. A vehicle according to claim 1, wherein said guide rail has an I-shaped cross section and wherein bearing means are arranged between the respective sides of said slot and the web surfaces of said I-shaped guide rail.

3. A vehicle for transporting refuse comprising a container of substantially circular cross section having an opening and associated closure means at the rear end thereof, a main piston part movable along the container and of a similar contour thereto, substantially the whole peripheral surface of the main piston part being in slid-

6

ing contact with the whole circumference of the inner surface of the container, said main piston part being provided with a slot, said main piston part having a supplementary portion disposed on the side thereof which is nearer the front of the vehicle to provide an increased bearing surface in a fore-and-aft direction as well as to prevent tilting thereof, said supplementary portion comprising a half-cylindrical body rigidly connected to the upper half of said main piston part, said half-cylindrical body having a guide passage therein, a guide rail mounted on said container and extending through both said slot and said guide passage, a hydraulic ram acting on said main piston part near the center thereof adapted to impart movement thereto, the axis of said ram being substantially coincident with the axis of the container, said container and said ram being so inclined to the horizontal and said container being of such a diameter that said coincident axes extend over the driver's position, and a longitudinal extension of the upper part of the container above the driver's position arranged to accommodate, at least in part, the hydraulic ram and the members moving with said main piston part on the side thereof nearer the front of the vehicle when said main piston part lies at the front end of the container.

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