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3,007,589

LOAD COMPRESSING AND DUMPING VEHICLE

Filed April 16, 1956

4 Sheets-Sheet 1

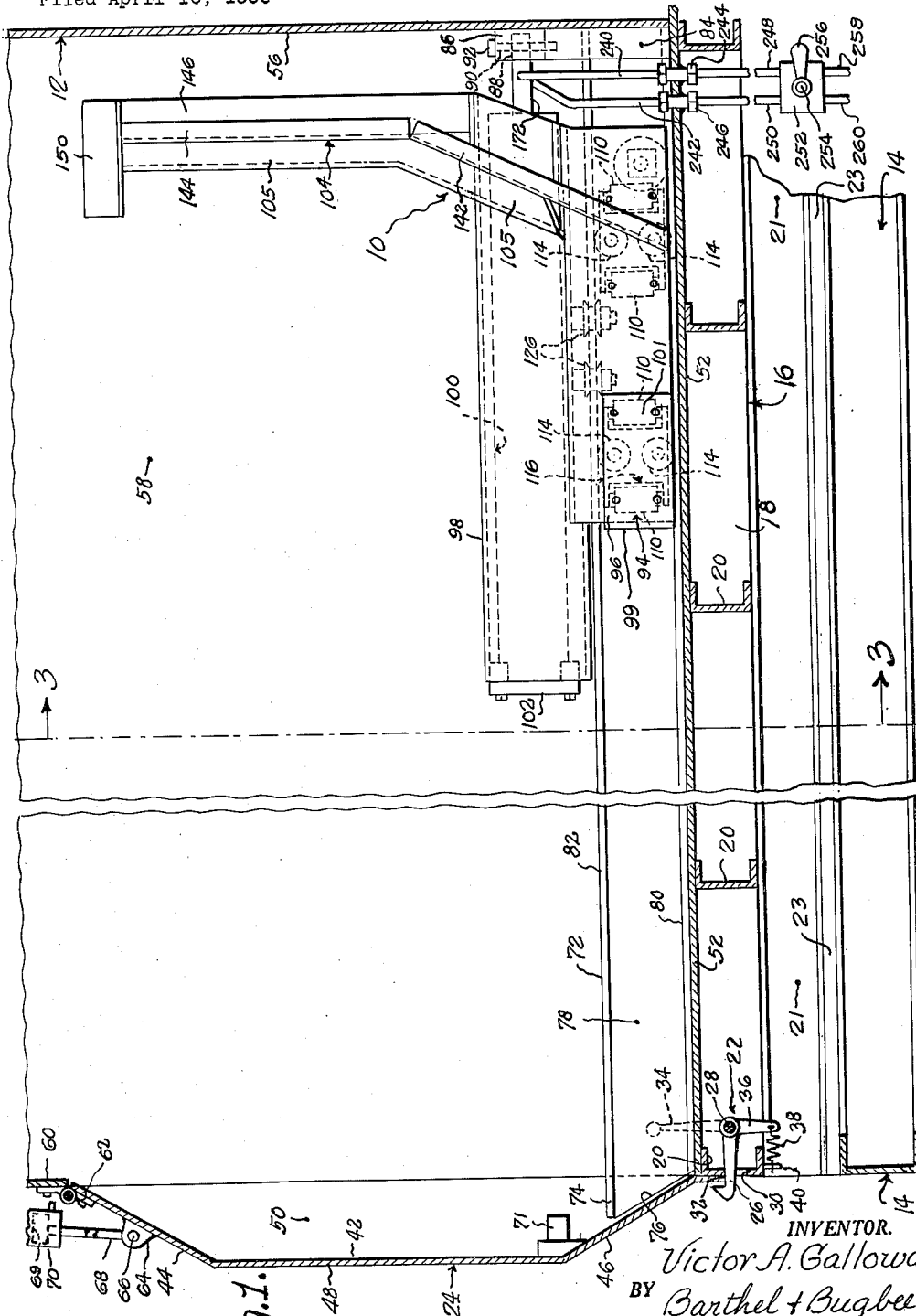


Fig. 1.

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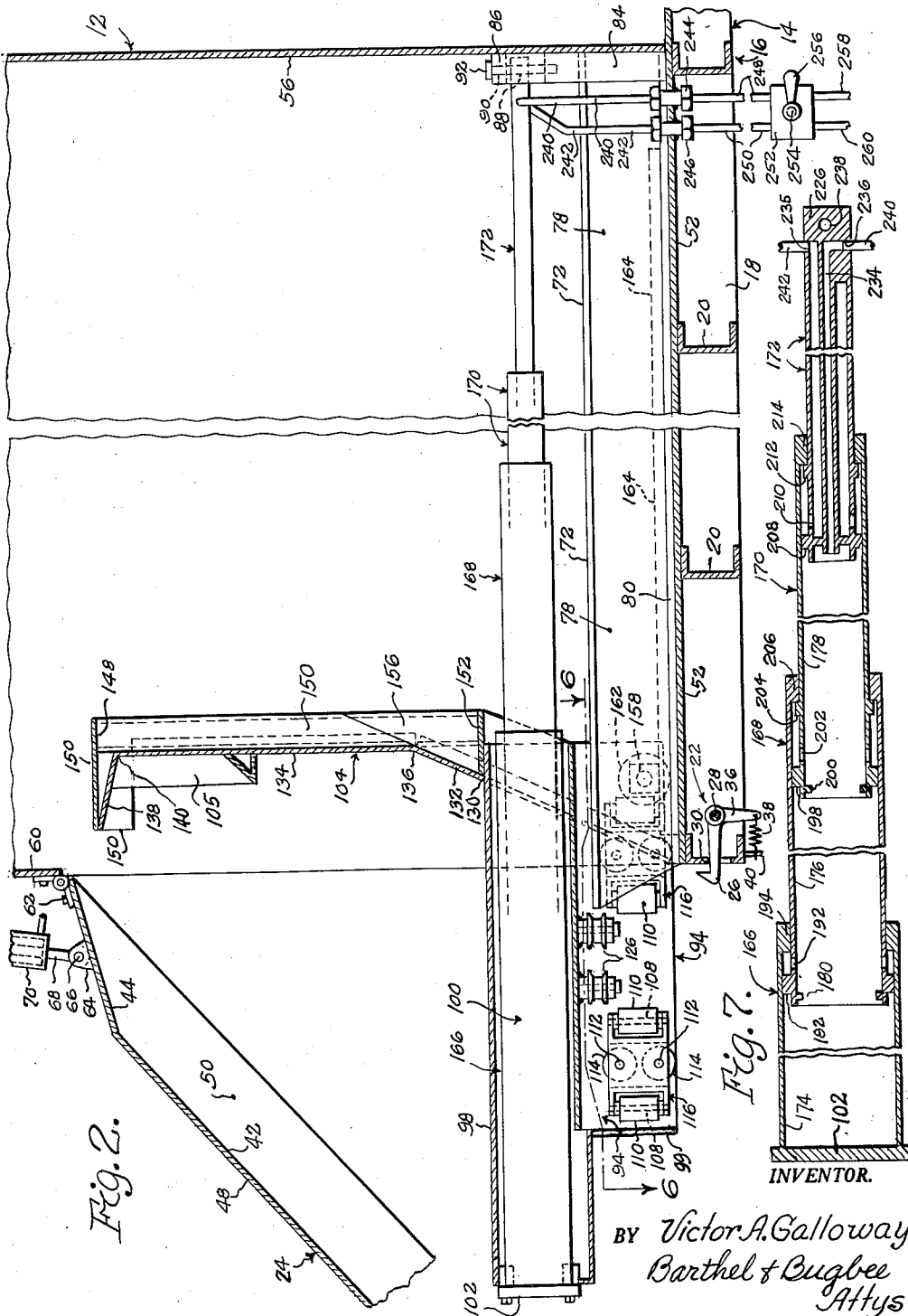
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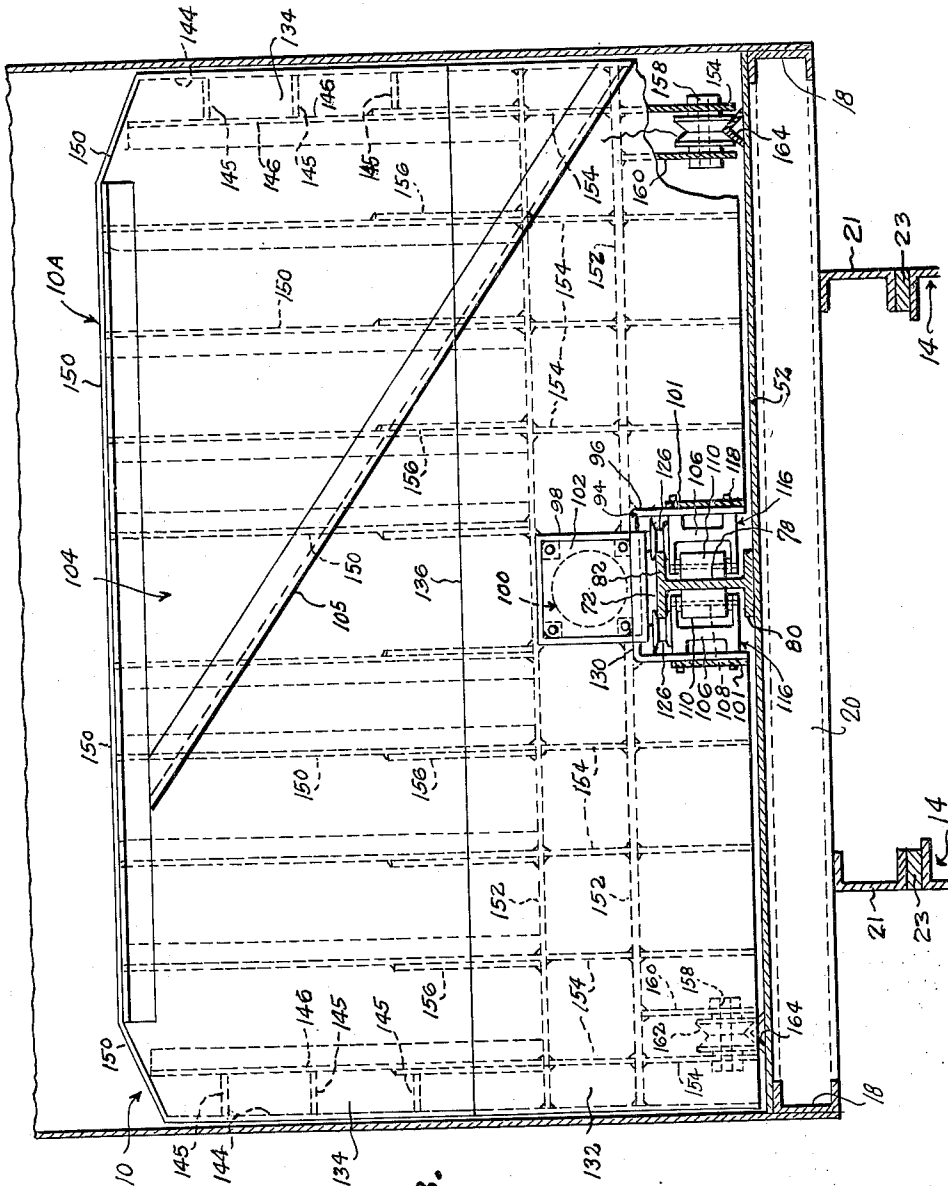


Fig. 3.

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3,007,589 LOAD COMPRESSING AND DUMPING VEHICLE

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5 Claims. (Cl. 214-82)

This invention relates to trash collecting vehicles, and in particular, to trash packing and expelling devices for such vehicles.

One object of this invention is to provide a trash packing and expelling device for a trash collection vehicle by means of which the trash is not only moved toward one end of the vehicle body successively as it is loaded into the body, thereby economizing on space by compacting the trash, but also expelled from the rearward end of the vehicle by using the same device.

Another object is to provide a trash packing and expelling device of the foregoing character wherein there is provided a packing plate which is mounted upon a carriage reciprocable along a beam by means of a telescoping hydraulic cylinder disposed adjacent the beam, so that oblique thrusts are substantially eliminated and the carriage with its packing plate reciprocates smoothly along the beam, regardless of the opposition presented by the trash which it is compressing.

Another object is to provide a trash packing and expelling device of the foregoing character wherein the beam extends the entire length of the body and the carriage and packer plate are arranged to overhang the beam in their extended positions, thereby expelling the contents of the vehicle body rapidly and efficiently.

Another object is to provide a trash packing and expelling device of the foregoing character wherein the packing plate carriage is reciprocated by a double-acting hydraulic cylinder, thereby eliminating cables and additional cylinders otherwise required for retracting the carriage and packer plate, and thus simplifying the construction as well as saving space and reducing maintenance and repair costs.

Another object is to provide a trash packing and expelling device of the foregoing character wherein the packer plate has an approximately horizontal overhanging portion at the top in order to prevent trash from spilling over the top during compression or expulsion thereof.

Another object is to provide a trash packing and expelling device of the foregoing character wherein the body is provided with an internally-concave end gate against which the trash is compressed, and which is swung upwardly out of the way by power-operated means, such as a hydraulic cylinder, in order to effect expulsion of the trash or other material.

Another object is to provide a trash packing and expelling device of the foregoing character wherein the beam on which the packer plate carriage reciprocates is an I-beam placed close to the floor of the vehicle at a location where it strengthens the body floor construction and transfers stresses directly and most efficiently to the strongest part of the body, namely the body sub-frame, which in turn transfers them to the vehicle chassis to which it is bolted.

Another object is to provide a trash packing and expelling device, as set forth in the object immediately preceding, wherein the packer plate carriage is provided with rollers disposed on both horizontal and vertical axes of rotation so as to engage not only the web of the beam on opposite sides thereof but also to engage the flange or flanges thereof.

Another object is to provide a trash packing and expelling device, as set for in the two objects immediately

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preceding, wherein the body floor near its outer longitudinal edges is provided with packer plate guide rails which are engaged by guide rollers mounted near the outer edges of the packer so as to guide and support the outer ends of the packer plate.

Other objects and advantages of the invention will become apparent during the course of the following description of the accompanying drawings, wherein:

FIGURE 1 is a longitudinal section through the body and chassis of a trash collection vehicle equipped with a packing and expelling device according to one form of the present invention, with the packer plate retracted and the end gate closed;

FIGURE 2 is a view similar to FIGURE 1, but with the packer plate extended to its outermost limit after expelling the trash, and with the end gate open;

FIGURE 3 is a cross-section taken along the line 3-3 in FIGURE 1;

FIGURE 4 is an enlarged central vertical section through the double-acting telescoping hydraulic cylinder used for propelling the packer plate carriage of FIGURES 1 to 3 inclusive, shown in its retracted position;

FIGURE 5 is a cross-section taken along the line 5-5 in FIGURE 4;

FIGURE 6 is a horizontal section through the packer plate carriage taken along the line 6-6 in FIGURE 2; and

FIGURE 7 is a vertical section through the double-acting telescoping hydraulic cylinder of FIGURE 4 on a reduced scale, and in its extended position.

Hitherto, trash packing and expelling devices for trash collecting vehicles have been inefficient and have lacked complete effectiveness or have been faulty for various reasons. Certain vehicles employing cables and winches or hydraulic cylinders for pulling the cables have been faulty because of the stretching of the cables and their breakage when subjected to suddenly-applied excessive loads. Such cable-operated installations have also been complicated and their components have required valuable space on or beneath the vehicle frame which was needed for other purposes or which interfered with the normal use of the vehicle. Another type of device employing an inclined hydraulic cylinder for reciprocating the packer plate was structurally weak because the stationary end of the cylinder and piston unit was secured to the vehicle at a point approximately at the level of the cab roof, thereby setting up severe strains as a result of the leverage resulting from the great distance between that point and the vehicle chassis. This last-mentioned type of vehicle also involved the further fault resulting from the fact that the line of action of the force was oblique to the line of travel of the packer plate, so that both vertical and horizontal components of this oblique force were set up, interfering with the smooth travel of the packer plate and increasing friction and stresses in the mechanism. Still other types of vehicles employing swinging arms carrying the packer plates have provided an inadequate length of stroke for the packer plate and have suffered from inadequate structural strength and ineffective trash expulsion arising from the fact that the packer plate traveled in an arcuate path whereas the floor of the vehicle body was a straight horizontal surface.

The trash packing and expelling device of the present invention eliminates these difficulties by providing a structurally strong horizontal beam, preferably an I-beam, secured to the vehicle body at the floor level near the chassis frame and carrying a reciprocable carriage upon which the packer plate is mounted, and which is reciprocated by a double-acting telescoping hydraulic cylinder and piston unit mounted close to the beam with its axis parallel thereto, thereby minimizing cross leverages and oblique

thrusters, as well as facilitating the smooth reciprocation of the carriage and packer plate.

The carriage and hydraulic reciprocating mechanism thereof are so mounted on the beam that the packer plate is enabled to travel substantially the entire length of the body, thereby expelling the entire contents of the vehicle body in a rapid and efficient manner. To accomplish this, the carriage and beam are so arranged that the beam slightly overhangs the rearward end of the vehicle body and a portion of the carriage is enabled to run out beyond the end of the beam. The packer plate has a lower inclined portion and an upper overhanging edge portion to facilitate packing and prevent passing of trash over the top thereof, and the end gate is made of a concave shape cooperating with the shape of the packer plate to provide efficient compression and to force the trash slightly upward during the packing operation. The packer plate, in addition to the central carriage and beam, is provided with outlying guide wheels travelling on auxiliary guide tracks near the opposite side edges of the packer plate, thereby supporting and guiding the outer ends of the packer plate during its reciprocation. The trash packing and expelling device of the present invention is quickly and easily mounted upon the chassis of a conventional vehicle equipped with conventional loading mechanism and a conventional body.

Referring to the drawings in detail, FIGURES 1, 2 and 3 show a trash packing and expelling device, generally designated 10, mounted within a box-shaped trash collection vehicle body 12 having a sub-frame 16 which in turn is mounted upon the conventional wheeled chassis 14 of an ordinary motor vehicle (not shown). The body sub-frame 16 has parallel longitudinal channel side members 18 interconnected by channel cross members 20. The latter in turn rest upon parallel longitudinal channel beams 21 bolted to the chassis 14 with wood sills 23 therebetween. Mounted upon the rearmost cross member 20 (FIGURE 1) is a latch unit 22 for releasably latching the end gate 24 of the body 12. The latch unit 22 consists of several latch arms 26 which for the sake of simplicity are shown as mounted on a horizontal shaft 28 and projecting through holes 30 in the rearmost channel member 20. The ends of the latch arms 26 are hooked and engage the lower edge portion 32 of the end gate 24. A hand lever 34 mounted on the shaft 28 enables manual rotation thereof in order to swing the latch arms 26 upward or downward to lock or unlock the end gate 24, the shaft 28 being journaled on the frame side members 18 for this purpose (FIGURE 1). Also mounted on the shaft 28 is a latch-engagement arm 36 which extends downwardly and carries one end of a tension spring 38, the opposite end of which is secured to an anchor bracket 40 depending from the rearmost frame cross member 20. In the latch unit 22 as actually constructed, the shaft 28 carries eccentrics which operate the latch arms 26 with a camming action.

The end gate 24 has a central concavity or recess 42 formed by the upper and lower converging plate portions 44 and 46 of a bent plate 48 and bounded by side plates 50, the lower plate portion 46 being integral with the lower edge portion 32 of the end gate 24. The vehicle body 12 is in the form of a trash-receiving box having a horizontal floor or bottom wall 52, a vertical forward wall 56, and parallel vertical side walls 58 interconnected at their upper rearward corners by a cross plate 60 (FIGURES 1 and 2). The end gate 24, which forms the movable rear wall of the body 12, is pivotally connected to the cross plate 60 by hinges 62 bolted thereto. The end gate 24 on its upper plate 64 carries spaced ears 64 bored to receive a pivot pin 66 to which the lower end of a piston rod 68 is connected. The piston rod 68 carries a piston head 69 reciprocably mounted within a hydraulic cylinder 70, the upper end of which is pivotally connected to a bracket (not shown) mounted on the upper cross plate 60. The hydraulic cylinder 70 is single-acting, so that the ad-

mission of pressure fluid to its lower end moves the piston rod 68 upward so as to swing open the end gate 24 from the closed position of FIGURE 1 to the open position of FIGURE 2. An internal buffer 71 is mounted on the lower plate portion 46 inside the tail gate 24.

Mounted centrally on the floor 52, which, together with the front wall 56 and side walls 58, is of metal, is an elongated I-beam 72 extending substantially the entire length of the truck body 12. The beam 72 has a rearward end portion 74 overhanging the rearmost cross member 20, an inclined rearward end 76, a vertically-disposed web 78, a lower flange 80 secured to the floor 52 and an upper flange 82 parallel thereto. The rearward end 76 is inclined to fit the inclined lower plate 46 of the end gate 24. Secured at its lower end to the floor 52 and straddling the I-beam 72 at its forward end is an upright abutment structure 84 which is secured to the I-beam 56 and at its upper end carries a head 86 with a socket 88 and a hole 90 receiving an anchor bolt 92.

Reciprocably mounted upon the I-beam 72 is a packer plate carriage, generally designated 94, having a casing 96 of approximately inverted U-shaped form carrying an elongated box-shaped hydraulic motor housing or shield 98 secured to the upper part thereof, as by welding. The front end of the casing 96 (FIGURE 6) is closed by a pair of angle plates 99 (omitted from FIGURE 3) having their sides 101 bolted to the sides of the casing 96 and their fronts 103 shaped to fit closely to the opposite sides of the I-beam 56 so as to guard the interior of the casing 96 against the entrance of trash. The hydraulic motor housing 98 receives a multiple-cylinder telescoping reciprocating hydraulic motor, generally designated 100, having a cylinder head 102 and secured to and mounted between the cylinder head 102, which serves as an end plate bolted to the hydraulic cylinder housing 98, and the upright 84. Mounted upon and straddling the carriage 94 and cylinder housing 98 is a packer plate or load-moving member, generally designated 104, to the front of which is secured an inclined elongated trash deflector 105 of triangular cross-section.

The carriage 94 (FIGURES 2 and 6) includes inwardly-facing approximately H-shaped rotary guide units or roller mounts 106 (FIGURE 3) carrying spaced parallel vertical axles 108 upon which horizontally-spaced rollers 110 are rotatably mounted near the opposite ends of the roller mounts 106. Between the horizontally-spaced axles 108, each roller mount 106 is provided with upper and lower parallel horizontal axles 112 upon which are mounted upper and lower rollers 114. The roller mount 106 with its various rollers 110 and 114 constitutes a guide roller unit, generally designated 116 (FIGURE 6). Each guide roller unit 116 is bolted or otherwise secured as at 118 to the side walls 120 of the housing 96 on opposite sides of the interior thereof. Each side of the carriage 94 is provided with two such guide roller units 116 arranged at opposite ends of the housing 96 in longitudinally-spaced relationship. Each side of the carriage 94 is additionally provided with a pair of longitudinally-spaced brackets 122 (FIGURE 6) welded or otherwise secured to the inner surfaces of the side walls 120 and bored vertically to receive parallel pivot shafts or studs 124 on which grooved rollers 126 are rotatably mounted. The carriage 94 and its component parts, as described above, are so arranged that the grooved rollers 126 engage the opposite edges of the upper flange 82 of the beam 72, whereas the vertical rollers 110 engage the opposite sides of the web 78 thereof and the horizontal rollers 114 engage the inner surfaces of the upper and lower flanges 82 and 80 respectively, as described below in connection with the operation of the invention.

The packer plate 104 is notched out at 130 (FIGURE 3) in its inclined lower plate portion 132 with an opening corresponding to the combined cross-sectional outline of the carriage casing 96 and hydraulic motor housing 98. The lower plate portion 132 continues in an inter-

mediate vertical portion 134 at a bending line or line of junction 136 and the intermediate portion 134 in turn joins an integral upwardly and rearwardly-inclined top portion 138 at a bending line 140. The lateral edges of the packer plate portions 132 and 136 are bent at right angles into flanges 142 and 144 respectively (FIGURE 1) which in turn are connected by welded gussets 145 to the outer vertical members 146 of the packer plate 104. The vertical members 146 are arranged substantially parallel to one another and their upper ends 148 carry a horizontal top plate 150 extending between them (FIGURE 2) and welded to them and to the rearward edge of the inclined top portion 138. The packer plate 104 is provided with a cellular structure (FIGURE 3) interconnecting the side members 146 for lightness and structural strength, and including horizontal and vertical members 152 and 154 respectively welded or otherwise secured to one another, strengthened by additional vertical members 156. Each of the outermost vertical members 146 at their lower ends rotatably supports an axle 158, the opposite end of which is rotatably supported in an auxiliary vertical member 160 spaced toward the center of the pusher plate 104. A grooved guide roller 162 is mounted on each axle 158 and runs back and forth along an auxiliary guide rail 164 which is welded or otherwise secured to the floor 52. The guide rails 164 are disposed parallel to the beam 72 which they supplement by providing additional support and guidance for the opposite ends of the pusher plate 104.

The telescoping double-acting reciprocating hydraulic motor 100 (FIGURES 4 and 7) which in the retracted position of the packer plate 104 (FIGURE 1) is contained almost wholly within the hydraulic motor housing 98, includes an outer cylinder 166, an intermediate cylinder 168, an inner cylinder 170, and a plunger 172, all formed in telescoping relationship. The cylinders 166, 168 and 170 have cylinder bores 174, 176 and 178 respectively into which the next successive cylinder extends. The intermediate cylinder 168 at its inner or rearward end carries on its inner side an annular stop 180 (FIGURE 4) and on its outer side an annular piston head 182 which slidably engages the outer cylinder bore 174. The intermediate cylinder 168 is internally grooved to receive a snap ring 184 by which the annular stop 180 is held in position, and is externally grooved to receive snap rings 186 by which the annular piston head 182 is held in position. The outer cylinder 166 has a cylinder head 102 welded or otherwise secured to the end thereof and in turn having an X-shaped member 190 secured thereto for the purpose of providing a stop to limit the reciprocation of the cylinders 168 and 170 and the plunger 172 while providing fluid passageways therebetween, as shown by the arrows at the left-hand end of FIGURE 4. A port 192 opens into the space behind the outer annular piston head 182 and the latter is limited in its extension stroke by an annular end member 194 secured to the outer cylinder 166 by snap rings 196, the outer cylinder 166 being internally grooved for that purpose.

In a similar manner, the inner cylinder 178 is provided with an annular cylinder head 198 reciprocable in the cylinder bore 176 in the intermediate cylinder 168, an internal annular stop 200 and a port 202, the cylinder head 198 being limited in its extension stroke by a longitudinally-grooved annular stop member 204 secured in a similar manner by snap rings to the outer surface of the inner cylinder 170. The annular stop member 204 engages the annular end member 206 secured to the inner side of the intermediate cylinder 168 in a manner similar to that described above for the outer annular end member 194. Finally, the plunger 172 is similarly provided with an annular piston head 208 reciprocable in the bore 178 in the inner cylinder 170 and also with a similar port 210, and a similar longitudinally-grooved annular stop member 212 which is engageable with the annular end member 214. The latter is secured within the

bore 178 by snap rings in a manner similar to the end members 194 and 206. The piston heads 182, 198 and 208 and the end members 194, 206 and 214 are circumferentially grooved to receive packing rings 216 and 218 respectively to prevent leakage of hydraulic fluid.

The plunger 172 is of hollow construction and consists of an outer tube 220 and an inner tube 222 secured to one another at one end by a ring or annular end member 224 welded therebetween. At their opposite ends, the tubes 220 and 222 are held in radially-spaced relationship by a hub 226 of cylindrical form having an external rabbet 228 into which the end of the outer tube 220 is welded, and an inner rabbet or counterbore 230 into which the end of the inner tube 222 is welded or otherwise secured. The hub 226 has L-shaped passageways 232 and 234 respectively terminating at their outer ends in threaded ports 235 and 236 and opening into the space between the tubes 220, 222 and the interior of the tube 222 respectively (FIGURE 4). The opposite end of the inner tube 222 is open and opens into the space to the left of the annular member 224. The hub 226 is provided with a hole 238 for receiving the anchor bolt or pin 92 when the hub 226 is seated in the socket 88 (FIGURE 1).

In order to supply pressure fluid to the telescoping double-acting hydraulic cylinder 100, pipes 240 and 242 are threaded at one end into the threaded ports 234 and 236 respectively and at their opposite ends are threaded into couplings 244 and 246 seated in openings in the floor 52 and welded thereto. From the couplings 244 and 246, pipes 248 and 250 run to a conventional four-way valve 252 having a valve rod 254 which for the sake of simplicity is shown carrying a hand lever 256. Connected to the control valve 252 are pipes 258 and 260 respectively leading to a conventional hydraulic pump (not shown) which supplies the pressure fluid needed for actuating the hydraulic cylinder 100, the pump being power-driven in any suitable manner beyond the scope of the present invention.

As actually constructed the four-way valve 252 is reversibly actuated by a conventional electro-hydraulic circuit (not shown) including a solenoid which is energized by an electric circuit containing a pressure-responsive electric limit switch, the operating cylinder of which is connected to the hydraulic circuit of the hydraulic motor 100 so as to be shifted when the pressure in the hydraulic motor 100 reaches a predetermined maximum amount.

In the operation of the invention, let it be assumed that the trash collection vehicle is making its rounds and has halted at a location where trash is to be loaded and packed. Let it also be assumed that the parts are in the positions shown in FIGURE 1 with the end gate 24 closed and latched and with the packer plate carriage 94 and packer plate 104 moved forward to their retracted position shown in FIGURE 1. The trash is then loaded into the forward portion of the trash collection body 12 to the left of the packer plate 104 by any suitable conventional loading means, such as that shown in the Galloway Patent No. 2,522,441 issued September 12, 1950 for Vehicle Loading Equipment.

When the trash has been loaded, and the loading device returned to its proper position, the operator shifts the control valve 252 to supply pressure fluid from the hydraulic pump to the threaded port 236 and to discharge fluid from the threaded port 235. Pressure fluid then passes through the passageway 234 and the inner tube 222 into the space at the left-hand end thereof, acting against the cylinder head or end plate 102 to cause the latter to move to the left, carrying with it the hydraulic cylinder housing 98, the packer plate carriage 94, and the packer plate 104. As the outer cylinder 166 moves to the left in this manner, the fluid filling the annular space between the outer annular piston head 182 and the outer annular end member 194 is expelled through the

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ports 192, 202 and 210 into the space between the outer and inner tubes 220 and 222 (FIGURE 4), whence it passes out through the passageway 232 and threaded portion 235, returning to the pump through the suction side of the control valve 252.

When the outer cylinder 166 reaches the end of its extension stroke to the left (FIGURES 4 and 7), its annular end member 194 engages the annular piston head 182 on the intermediate cylinder 168 and pulls the latter along with it, the fluid between the cylinders 168 and 170 being expelled past the stop 204 through the ports 202 and 210 into the space between the outer and inner tubes 220 and 222 and thence back to the suction side of the pump by way of the passageway 232 and the control valve 252, as described above.

The intermediate cylinder 168 continues to be pulled along by the outer cylinder 166 until the pusher plate 104 is halted by the compression of the trash, or until its end member 206 engages the longitudinally-grooved annular stop 204. This then causes the inner cylinder 170 to which it is connected to be pulled along with the outer and intermediate cylinders 166 and 168. During all of this time, of course, hydraulic pressure continues to be supplied to the port 236 and passageway 234 in the hub 226 of the plunger 72 by the hydraulic pump.

The motion of the packer plate 104 to the left compresses the trash or other loaded material against the now closed end gate 24 (FIGURE 1), and the packer plate 104 comes to a halt either when the end plate 102 engages a buffer 71 or is halted by the inability of the packer plate 104 to further compress the trash. In either case, the consequent building up of pressure within the hydraulic cylinder 100 and its connected parts of the hydraulic circuit cause actuation of the above-mentioned pressure-responsive reversing switch to reverse the control valve 252 and thereby to reverse the flow of pressure fluid to the hydraulic cylinder 100 in response to the attainment of a predetermined pressure therein.

The reversal of the hydraulic circuit thereupon causes pressure fluid to be supplied to the port 235 and discharged from the port 236 in the hub 226 of the plunger 172. Under these circumstances, the pressure fluid passes through the passageway 232 and the space between the inner and outer tube 222 and 220 of the plunger 172, thence through the port 210 (FIGURE 4) into the space between the outer tube 210 of the plunger 172 and the inner cylinder 170 where it acts against the annular end member 214, forcing the inner cylinder 170 to the right upon its retraction stroke.

The inner cylinder 170 continues to move to the right until its port 202 is uncovered by the annular piston head 208 on the plunger 172, whereupon pressure fluid then flows into the space between the intermediate and inner cylinders 168 and 170 and acts against the annular member 206 to retract the intermediate cylinder 168 to the right. When the intermediate cylinder 168 has moved to the right upon its retraction stroke a sufficient distance for its port 192 to pass to the right beyond the annular piston head 198 on the inner cylinder 170, pressure fluid then enters the space between the outer cylinder 166 and the intermediate cylinder 168. This pressure fluid then acts against the annular end member 194 to cause the outer cylinder 166 to move to the right upon its retraction stroke, thereby continuing to move until the cross member 190 on the end of the cylinder head 102 engages the left-hand ends of the now-retracted intermediate and inner cylinders 168 and 170 respectively. The parts now occupy the retracted positions shown in FIGURE 4.

The loading of the vehicle body 12 continues to be carried out in the foregoing manner, either at the location at which the vehicle was first halted, or at subsequent halts thereof, with subsequent operation of the packer plate 104 in the manner described above, until the space to the left of the packer plate 104, namely be-

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tween it and the end gate 24, has become filled with compressed trash or other material. Loading is then completed, and the vehicle proceeds to the dumping ground to empty the load of compressed trash in the body 12.

To expel the load of compressed trash at the dumping ground, the operator releases the latch or latches 26 by swinging the hand lever 34 to the left (FIGURE 1), and holds it open while supplying pressure fluid to the lower end of the hydraulic cylinder 70. This action moves the piston 69 and piston rod 68 upward, swinging the end gate 24 from its closed position of FIGURE 1 to the open position of FIGURE 2.

The operator now shifts the control valve 252 to direct pressure fluid from the hydraulic pump to the port 236 in the hub 226 of the plunger 172. This action causes the outer cylinder 166 and intermediate cylinder 168 to be moved to the left upon their extension strokes in the manner previously described, thereby causing the carriage 94 and pusher plate 104 to move to the left, expelling the load of trash or other loaded material. The extension strokes of the outer and intermediate cylinders 166 and 168 also cause the inner cylinder 170 to execute its extension stroke as described above.

The outer cylinder 166, intermediate cylinder 168 and inner cylinder 170 continue to move to the left (FIGURE 7) on their extension stroke until the annular end member 214 on the inner cylinder 170 engages the grooved annular stop 212 on the plunger 172, halting the entire assembly of the cylinders 166, 168 and 170 constituting the telescoping hydraulic cylinder 100 in the positions shown in FIGURE 7. Further movement is not possible upon the extension stroke because of the fact that the plunger 172 is anchored to the upright abutment structure 84 by the anchor pin or bolt 92.

Meanwhile, as the telescoping hydraulic cylinder 100 has been operating in the above-described manner upon its extension stroke by reason of pressure fluid supplied to the port 236 and fluid discharged through the port 235, the carriage 94 travels to the left along the beam 72, guided by its various rollers 110, 114 and 126 (FIGURES 2 and 6). The carriage 94 continues to move to the left until the leading guide roller units 116 leave the beam 72, as shown in FIGURE 2, while the trailing guide roller units 116 remain on the tracks formed by the beam 72. Thus, the packer plate 104 moves almost to the rearward end of the body 12 during the trash-expulsion stroke thereof, completely expelling the trash or other loaded material.

The packer plate 104 and its carriage 94 are retracted by reversing the flow of pressure fluid to the telescoping hydraulic cylinder 100 in the manner described above, whereupon the grooved rollers 126 (FIGURE 2) re-engage the edges of the upper flanges 82 of the beam 72 and the outermost guide roller unit 116 re-engages the beam 72. The carriage 94 and packer plate 104 carried thereby continue to move to the right upon their retraction strokes until the retracted position shown in FIGURE 1 is reached, and the carriage 94 halts in the manner described above.

During the compression or expulsion stroke of the packer plate 104, the lower inclined plate portion 142 of the packer plate 104 pushes the trash upward against the end gate 24 and into the concavity 42 thereof so as to prevent concentration of the trash wholly in the lower part of the vehicle body 12 and thus insure complete filling of the vehicle body 12. During such motion of the packer plate 104, the upper end portion or top portion 138 prevents the trash from spilling over the top of the packer plate 104 into the space between it and the front wall 56 of the trash collection body 12. During reciprocation of the packer plate carriage 94 and packer plate 104, the auxiliary grooved rollers 162 and the auxiliary tracks 164 (FIGURE 3) assist the central beam 72 in supporting the opposite ends of the packer plate 104. Moreover, the

fact that the telescoping hydraulic cylinder 100 is located immediately adjacent and as close as possible to the beam 72, with its axis of reciprocation parallel to the axis of the beam 172, substantially eliminates oblique thrusts and the strains caused by cross thrusts resulting from packer plate operating cylinders being disposed obliquely to their respective guide rails. The telescoping hydraulic cylinders 100, furthermore, enable the packer plate 104 to be moved through the entire length of the interior of the trash collection body 12, from the greatly extended position shown in FIGURE 7 to the completely retracted and compact position shown in FIGURE 4, without the use of cables and pulleys for retracting the packer plate 104, with their attendant disadvantages as set forth above. The trash deflector 105 serves to transfer material dumped in on one side of the vehicle body toward the other side thereof, as the packer plate 104 is reciprocated.

What I claim is:

1. A load compressing and dumping vehicle comprising, in combination with a wheeled chassis structure, an elongated body structure mounted longitudinally upon said chassis structure, said body structure being provided with front and side and bottom walls and a movable rear end gate having a rearwardly-extending recess inside the lower portion thereof, an elongated substantially I-section guide beam mounted longitudinally upon one of said structures approximately in the center thereof and extending lengthwise thereof near said bottom wall beyond the rearward end of said bottom wall into said recess, a carriage reciprocally mounted upon said guide beam, a load-moving member mounted on said carriage transversely of said beam and extending between said side walls and said bottom wall, a reciprocable fluid pressure motor including a series of telescoping piston and cylinder motor elements disposed adjacent and parallel to said beam, and a fixed abutment mounted upon one of said structures near said front wall, the foremost motor element being connected to said abutment and the rearmost motor element being operatively connected to said load-moving member, said carriage rearwardly overhanging the rearward end of said beam at the maximum extension of said motor rearwardly whereby to effect substantially complete expulsion of the load from said body through the opening provided by the movable rear end gate thereof.

2. A load compressing and dumping vehicle comprising, in combination with a wheeled chassis structure, an elongated body structure mounted longitudinally upon said chassis structure, said body structure being provided with front and side and bottom walls and a movable rear wall, an elongated guide beam mounted longitudinally upon one of said structures and extending lengthwise thereof near said bottom wall, a carriage reciprocally mounted upon said guide beam, a load-moving member mounted on said carriage transversely of said beam and extending between said side walls and said bottom wall, a reciprocable fluid pressure motor including a series of telescoping piston and cylinder motor elements disposed adjacent and parallel to said beam, and a fixed abutment mounted upon one of said structures near said front wall, the foremost motor element being connected to said abutment and the rearmost motor element being operatively connected to said load-moving member, said carriage rearwardly overhanging the rearward end of said beam at the maximum extension of said motor rearwardly whereby to effect substantially complete expulsion of the load from said body through the opening provided by the movable rear wall thereof, said carriage having forwardly-disposed and rearwardly-disposed rotary guide units guidingly engageable with said beam, the rearwardly-disposed guide units running off the rearward end of the guide beam in the rearmost position of said carriage.

3. A load compressing and dumping vehicle comprising, in combination with a wheeled chassis structure, an elongated body structure mounted longitudinally upon said chassis structure, said body structure being provided

with front and side and bottom walls and a movable rear wall, an elongated substantially I-section guide beam mounted longitudinally upon one of said structures approximately in the center thereof and extending lengthwise thereof near said bottom wall, a carriage reciprocally mounted upon said guide beam, a load-moving member mounted on said carriage transversely of said beam and extending between said side walls and said bottom wall, a reciprocable fluid pressure motor including a series of telescoping piston and cylinder motor elements disposed adjacent and parallel to said beam, and a fixed abutment mounted upon one of said structures near said front wall, the foremost motor element being connected to said abutment and the rearmost motor element being operatively connected to said load-moving member, said guide beam having a vertically-disposed web with a flange projecting laterally outward in opposite directions from said web at the upper edge thereof, said carriage having rotary guide members guidingly engaging said web and flange.

4. A load compressing and dumping vehicle comprising, in combination with a wheeled chassis structure, an elongated body structure mounted longitudinally upon said chassis structure, said body structure being provided with front and side and bottom walls and a movable rear wall, an elongated guide beam mounted longitudinally upon one of said structures and extending lengthwise thereof near said bottom wall, a carriage reciprocally mounted upon said guide beam, a load-moving member mounted on said carriage transversely of said beam and extending between said side walls and said bottom wall, a reciprocable fluid pressure motor including a series of telescoping piston and cylinder motor elements disposed adjacent and parallel to said beam, and a fixed abutment mounted upon one of said structures near said front wall, the foremost motor element being connected to said abutment and the rearmost motor element being operatively connected to said load-moving member, said movable rear wall having a concave inner surface forming a recess therein over the major part of the area thereof, and said load-moving member having an upwardly-inclined lower portion adapted to urge load material upward into said recess in response to reciprocation thereof, said load-moving member having a rearwardly-projecting approximately horizontal upper edge wall portion thereon in rearwardly-overhanging relationship therewith whereby to prevent spilling of load material over the top thereof.

5. A load compressing and dumping vehicle comprising, in combination with a wheeled chassis structure, an elongated body structure mounted longitudinally upon said chassis structure, said body structure being provided with front and side and bottom walls and a movable rear wall, an elongated guide beam mounted longitudinally upon one of said structures and extending lengthwise thereof near said bottom wall, a carriage reciprocally mounted upon said guide beam, a load-moving member mounted on said carriage transversely of said beam and extending between said side walls and said bottom wall, a reciprocable fluid pressure motor including a series of telescoping piston and cylinder motor elements disposed adjacent and parallel to said beam, a fixed abutment mounted upon one of said structures near said front wall, the foremost motor element being connected to said abutment and the rearmost motor element being operatively connected to said load-moving member, said guide beam being disposed substantially along the center line of said body, and a substantially horizontal hollow fluid pressure motor housing open at its forward end and mounted on said carriage adjacent and above said beam in spaced parallel relationship therewith and projecting rearwardly away from said load-moving member, said rearmost motor element being mounted within and secured to said motor housing.

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