MATERIAL HANDLING REFUSE VEHICLE OR THE LIKE

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This invention relates to vehicle bodies and particularly to the type of body now used for sanitary garbage collections. It will be partially understood, however, certain elements thereof are equally applicable to self-charging and discharging bodies for trucks used for handling other material collected.

The handling of refuse material in a sanitary, efficient manner requires that the material should be collected at a height easily allowing the dumping of garbage containers by hand into the collection device and yet that the refuse truck body should have adequate volume to accommodate a considerable weight of material before a trip and the final disposal place is necessitated. The volume of refuse and garbage material as collected includes very large percentages of fluids, including air and water, both in empty containers and in the vegetable and other material collected. It is necessary for efficient collecting that most of the air and the greater part of the water be removed at the point of collection and that bulky cardboard boxes and the like be collapsed before the material is added to the body within the vehicle. Various devices have been previously supplied whereby the compressed material after it was added to the vehicle load, but it will be seen that this allowed transfer of much of the water from material freshly collected to that already in the load and attempted to compress the fresh material in large quantities either against the entire contents of the truck or against a barrier placed therebetween which itself pressed at least partially upon the truck load so that compression was never complete. None, so far as the applicant is informed, compressed the material outside and compacted the whole to a solid charge before introduction to the body load, as the present invention.

Previous inventions have provided various mechanical controls for actuating the bodies but such controls have necessitated added employees at multiple control stations, and none have provided instantaneous stop of operation at the command of any employee at any point where his or a fellow-worker's safety was threatened.

The herein disclosed invention provides all of the above desirable features, and at the same time removes many of the mechanical parts, rods, cams, levers and gearing heretofore thought essential. The actual reduction in weight of parts employed is a very real improvement accomplished by this invention.

Reference to the appended drawings and description will show preferred embodiments of my invention.

Fig. 1 is a diagram of an older type of garbage collection vehicle showing schematically some of the parts employed and the position of the hydraulic units controlled by my new system when applied to such vehicles.

Fig. 2 shows the hydraulic system of the truck shown in Fig. 1 with the actuator device applied thereto.

Fig. 3 is a side elevation of the actuator device with a part thereof shown diagrammatically for purposes of description.

Fig. 4 is an end elevation of part of the device shown in Fig. 3 and is taken on line 4—4 of Fig. 3.

Fig. 5 is a cross-section to enlarged scale of the actuator device shown in Fig. 3, a portion thereof being broken away for space reason.

Fig. 6 shows the manual selector for the devices shown in Figs. 3, 4 and 5, with its cover removed.

Fig. 7 shows the electrical system for the devices heretofore mentioned.

Fig. 8 shows the preferred form of vehicle body, the body being broken away at the top thereof for purposes of description.

Fig. 9 shows one end of the improved loading hopper. Fig. 10 is an external elevation of one end of the hopper.

Fig. 11 is a cross-sectional view of the device shown in Fig. 9, taken on line 11—11 of Fig. 9 and shows the compression part of the hopper in closed position.

Referring now to Fig. 1, garbage collection trucks of the type mentioned commonly include a frame 20 wherein is pivot a closed body 30, pivoted on said frame as at 32 and adapted to be lifted on said pivot by hydraulic cylinder 34 for dumping purposes. Body 30 is commonly provided with a tail gate 36 at the main body and tail gate 36 is usually operated by such means as hydraulic cylinders 40 mounted on the vehicle body. Tail gate 36, in this type of vehicle, carries a swinging ram 50 pivoting on trunnions 52 and operated by hydraulic cylinders 54 which act upon levers 56 to swing the ram 50 against material placed within the tail gate.

Rams 50 is commonly provided with a lift door 58 which may be swung upward (see dash lines) to get material within the tail gate and swings inward to a position indicated by dotted line 53 when pressure is exerted by the hydraulic cylinders 54.

In the past, it has been common to provide levers, cams and detents on the side of the tail gate to operate the machinery thereof, but these are here omitted as now unnecessary.

Reference to Fig. 2 will show that in the improved system cylinders 34, 40 and 50 are connected by suitable piping to a single multiple unit control valve V beneath the vehicle body and a simple set of piping directs said valve with the pump P and the sump tank shown. Portions 70 of the hydraulic piping 69 are commonly made flexible to permit motion of the various cylinders on trunnions 72. Trunnions 72 are secured to suitable bearings on the vehicle frame and body after the fashion well known to the art. Valve V is operated through a selector S by the electro-hydraulic control A and the operation of this valve and actuator will be best understood by referring to Figs. 3, 4 and 5 wherein in Fig. 3 particularly shows the multiple valve V, Fig. 4 shows detail of the selector unit S and Fig. 5 of the actuator A. Valve V may be of the piston type and the broken away in Fig. 3 will show that the valve spool or piston 80 having the heads 81 and 82 controls the ports 83 and 84 leading to piping 69 and to the hydraulic cylinders, as shown in Fig. 2. The space between the heads 81 and 82 of the valve is commonly connected to the pressure side of pump P through ports and piping common to all units of the multiple valve, but here omitted to avoid complication. Similarly the end spaces 86 and 87 of the piston cylinder are connected together and through a discharge port and piping such as that indicated at 88 to the sump-tanks.

Ports 86, 87, 89 and 80, the central position with its heads 81 and 82 over ports 83 and 84 to which it is urged by springs 89. Thus the normal position of the valve is one obstructing flow to or from the hydraulic cylinders, thus locking those cylinders in the position they may be when this valve is centralized.

It will be understood that each of the units of valve V is similarly constructed and that each independently controls cylinders 40 or 54 or 34.

Actuator A which provides the operating power for the units of multiple valve V is provided with a piston rod 100 which journals upon its end a collar 102 bearing a clutch finger 104. Collar 102 is further provided with an integral lever 106 to which is attached the clevis 108 of control cable 110 extending through the tube 112 to the hand pull 114, sliding at 116 in the casing 120, commonly fixed to the vehicle cab floor beside the driver's seat as shown in Fig. 7. Clutch finger 104 can thus be turned upon piston rod 100 to selectively engage the clutches 105, 107 or 109 as will be seen by inspection of Figs. 3 and 4, thus causing actuator A to work the required valves and hydraulic cylinders for body hoist.
cycling switches 175 may be attached to any of the other cylinders which have been shown. For instance, it may be advisable that in the dumping operation the body be raised three or four times while the vehicle is driven slowly forward and it will be seen that the vehicle driver can easily accomplish this by holding the cycle-switch closed, while he moves the control handle several times.
understood that the opposite end of this hopper duplicates the end shown so far as mechanism is concerned.

For purposes of description, the improved control and hopper system for garbage and the like material collection vehicles have been shown in connection with well known forms of vehicle bodies, but it will be understood that they are equally applicable to the many other different types of both closed and open truck bodies used in garbage and material handling and it will be at once manifest that many of the elements of the invention may be used independently of the whole and in cooperation with other elements supplying similar functions.

What is claimed is:

1. In a self-loading vehicle body having an outside loading hopper with raising means therefor outside of said body, the hopper structure which includes a hopper wall hinged to a second wall of said hopper at one of its edges, spring loaded means opening said walls each away from the other so that material may be placed therebetween and compression means operated by the hopper raising means and squeezing the aforesaid material between said walls to extract fluids therefrom before raising said hopper on said body to load the body.

2. In vehicle bodies of the self-loading and discharging type, a loading hopper, a hydraulic operator for said hopper, a tail gate, a second hydraulic actuator for said tail gate, a tailing body dump, a third hydraulic actuator for said body dump, a multiple control valve, piping connecting said hydraulic actuators with said control valve and with a pressure supply tank and a diaphragm actuator for said valve, a vacuum valve controlling said diaphragm actuator, solenoids operating said vacuum valve, an electrical circuit including a source of power, said solenoids, a cycling switch on said hydraulic hopper, operator, manual control switches at the operator's position, stop switches adjacent the moving parts of said vehicle, including said hopper, said body and said tail gate and a selector clutch between said diaphragm actuator and the units of said multiple valve, said selector providing means whereby the operator may connect said diaphragm actuator to that unit of the multiple control valve controlling the hydraulic operator for said hopper, said tail gate or said body dump, as desired.

3. In a self-loading truck, an enclosed body having a top-loading opening, an elevating loading hopper outside of said body, raising and lowering means for said hopper, compression means within said hopper but outside said body and independent thereof for operating to dehydate and compress material placed therein and actuator means for raising and compressing means.

4. In a self-loading truck provided with an enclosed body, a loading hopper sliding over said body to charging and discharging positions thereon, a charge compressor in said hopper and operable while said hopper is in charging position to compress material placed therein, elevator mechanism attached to said body and said hopper to elevate the hopper thereon to the discharge position and to lower the discharge hopper to the charging position, a hydraulic system providing power for the elements enumerated and electric control means for said hydraulic system whereby the same may be selectively operated automatically and manually.

5. In a self-loading truck provided with an enclosed body, a load hopper moving over said body to charging and discharging positions, a charge compressor in said hopper and operable while said hopper is in charging position to compress material placed therein, elevator mechanism attached to said body and said hopper to elevate the hopper thereon to the discharge position and to lower the discharged hopper to the charging position, a power system providing power for all of the elements enumerated and control means for said system whereby the same may be selectively operated automatically and manually.

6. In a vehicle of the type described, a tilting body hinged to the vehicle frame, hydraulic cylinder actuators including a pressure supply connected to said body and frame to tilt said body on said frame and to return the same to normal relationship thereto, electrical control circuits for said cylinders including solenoid valves controlling said actuators, a current source and circuit including said valves and a plurality of switches in circuit with said valves and arranged on said body and frame, certain of said switches being single one-operation type switches and others being automatic repeat-cycling switches and stop switches also in said circuit, all of said switches being connected to open and close the aforesaid circuit, to energize and deenergize said valves and there-through to operate said actuators and to tilt said body for discharge purposes.

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