

March 13, 1945

C. W. MOTT

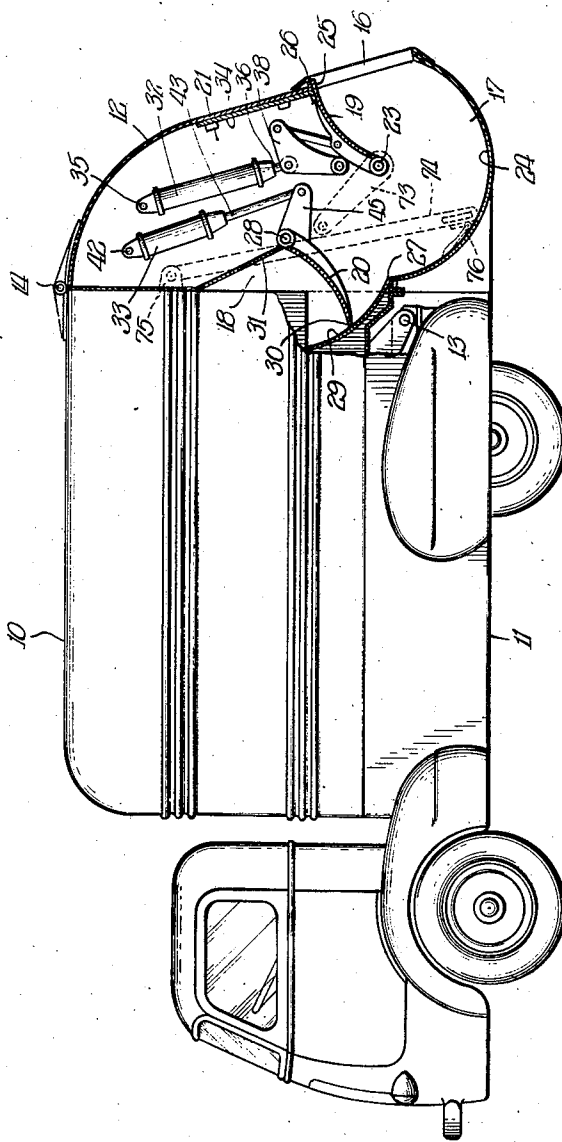
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REFUSE COLLECTOR

Filed Nov. 20, 1943

4 Sheets-Sheet 1

Fig. 1



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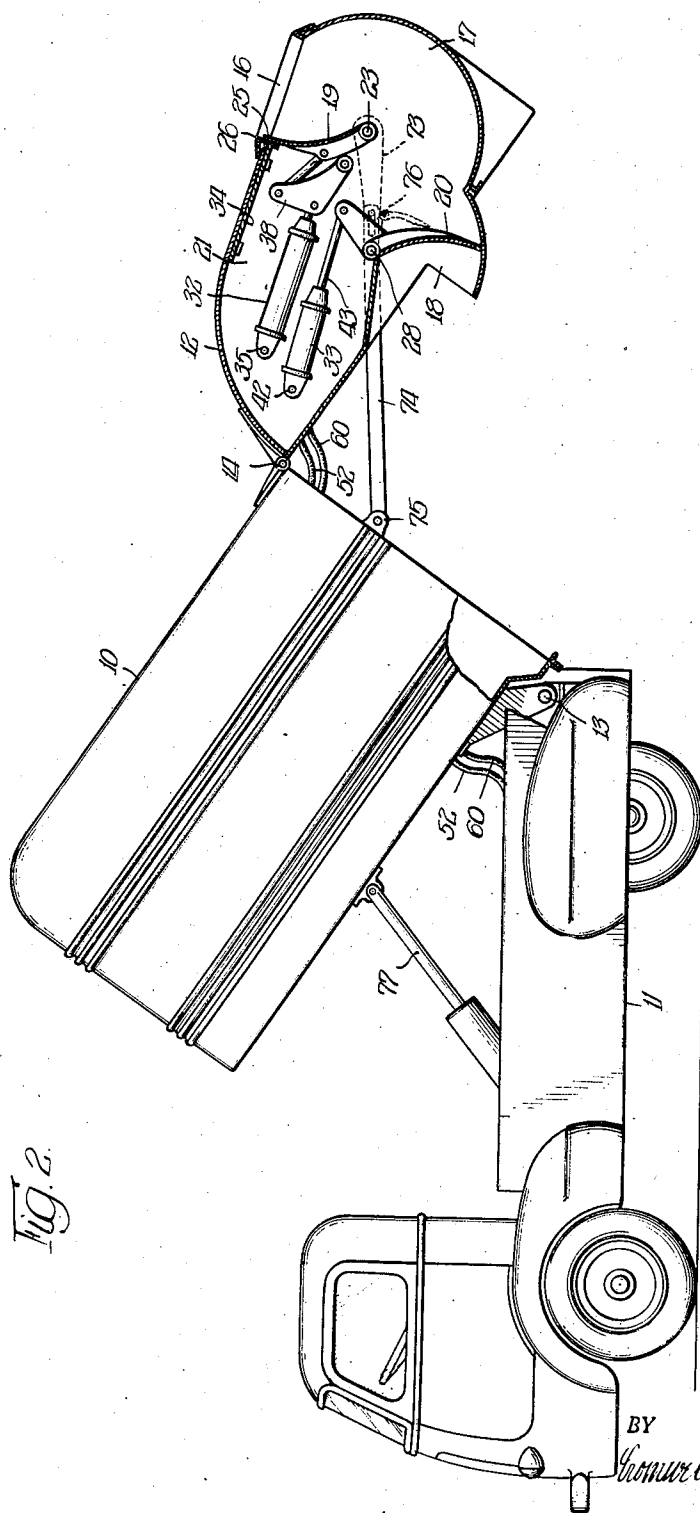
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Filed Nov. 20, 1943

4 Sheets-Sheet 2



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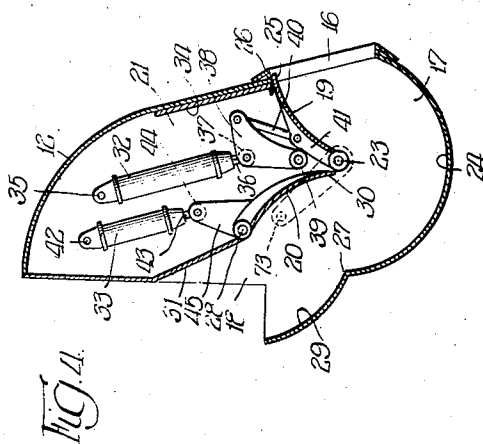
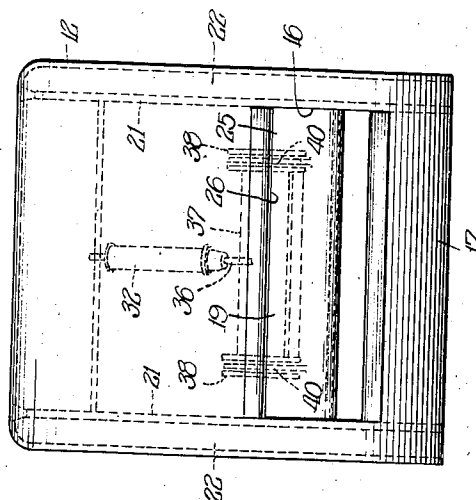
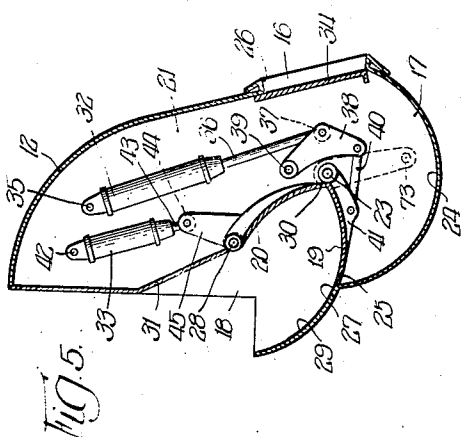
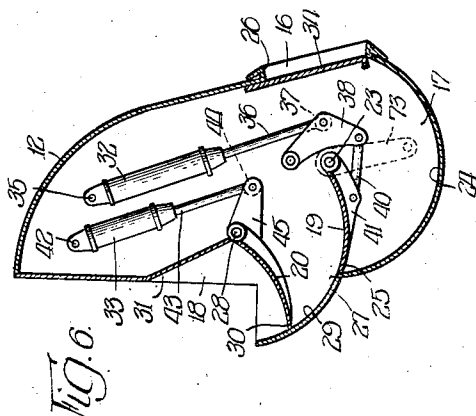
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2,371,540

REFUSE COLLECTOR

Filed Nov. 20, 1943

4 Sheets-Sheet 3



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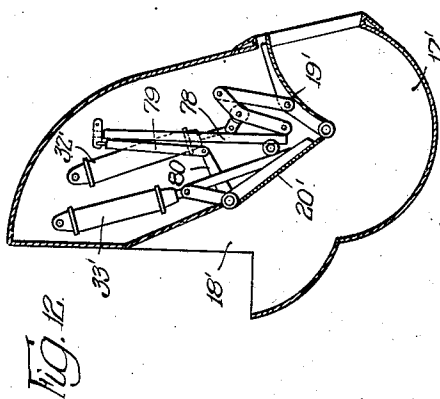
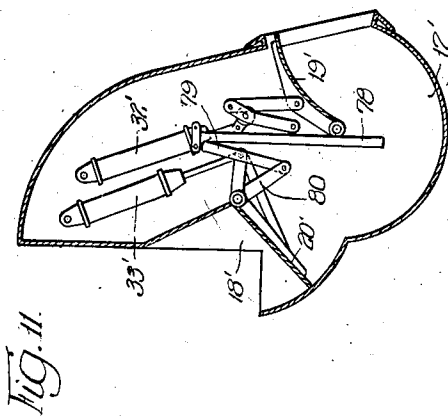
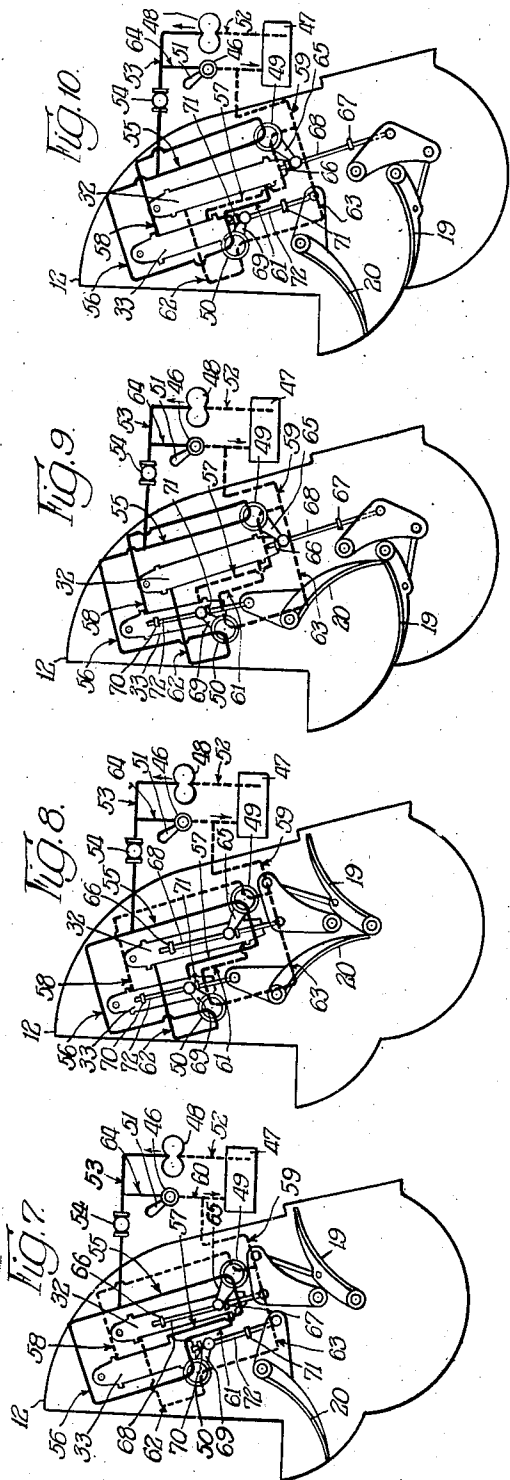
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2,371,540

REFUSE COLLECTOR

Filed Nov. 20, 1943

4 Sheets-Sheet 4



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UNITED STATES PATENT OFFICE

2,371,540

REFUSE COLLECTOR

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Application November 20, 1943, Serial No. 511,091

6 Claims. (Cl. 214—67)

This invention has to do with large capacity refuse collecting vehicles of the type commonly used on city streets for making house to house collections of garbage, trash and other refuse.

The purpose of the invention is to provide, in a refuse collector of the type described, improved means for loading the refuse into the storage compartment of the collector.

Other more specific objects and advantages of the invention will be apparent to those skilled in the art upon a full understanding of the construction, arrangement and operation of the improved loading means.

One form of the invention is presented herein for the purpose of illustration, but it will of course be appreciated that the invention is capable of being embodied in other structurally modified forms coming equally within the scope of the appended claims.

In the accompanying drawings:

Fig. 1 is a partially sectioned side view of a refuse collector constructed in accordance with the invention;

Fig. 2 is another side view of the collector, showing the same in its dumping position;

Fig. 3 is a rear view of the casing in which the loading device is located;

Figs. 4, 5 and 6 are vertical sections through the loading device, showing the various positions assumed by the material handling plates during each operating cycle;

Figs. 7, 8, 9 and 10 are schematic views of the loading device—which views correspond respectively to Figs. 1, 4, 5 and 6 in the positions of the material handling plates—showing one form of hydraulic control means for automatically operating the plates in the desired sequence; and

Figs. 11 and 12 are vertical sections through a similar loading device equipped with an additional material handling member.

The refuse collector shown in the drawings includes a large capacity storage compartment 10 which is mounted on the chassis 11 of a motor vehicle. A casing 12, which houses the improved loading device, is located at the rear end of the compartment 10. The compartment 10 is hinged at 13 to the chassis 11, and the casing 12 is hinged at 14 to the compartment 10, whereby to permit both the compartment and the casing to be moved into the position shown in Fig. 2 to dump the refuse from the collector.

The rear wall of the casing 12 is provided at a low level with a horizontally elongated opening 16 through which the refuse being collected is adapted to be dumped from portable containers into

the lower portion of the casing. The lower portion below the opening 16 is shaped to provide a horizontal receiving trough 17 of generally semi-cylindrical form. From this trough a transfer passage 18 extends forwardly and upwardly into the compartment 10. A horizontally elongated packing plate 19 operates within the receiving trough 17, while another horizontally elongated packing plate 20 operates within the transfer passage 18.

The ends of the opening 16, trough 17 and passage 18 are separated from the outer side walls of the casing 12 by vertical partitions 21, which partitions provide intervening spaces 22 for the reception of certain parts of the hereinafter described controls.

The plate 19 is rigidly secured to a horizontal shaft 23, which shaft is pivotally mounted above the trough in bearings carried by the partitions 21. The bottom 24 of the trough is curved in an arc about the axis of the shaft 23, and the plate 19 extends radially from the shaft to a point adjacent the bottom trough. The plate 19 is adapted to oscillate back and forth in the trough 17 from a retracted position in which its free edge 25 is located in the vicinity of the upper edge 26 of the opening 16 (see Fig. 1) into an advanced position in which its free edge 25 is located in register with the lower rear edge 27 of the passage 17 (see Fig. 5).

When the loading device is in its normal or refuse receiving position the plate 19 is in its retracted position and the trough 17 is exposed through the opening 16. When the plate 19 is oscillated forwardly into its advanced position after the trough 17 has been filled with refuse, the refuse in the trough is swept forwardly and upwardly from the trough by the plate 19 into the passage 18.

The plate 20 is rigidly secured to a horizontal shaft 28, which shaft is pivotally mounted above the passage 17 in bearings carried by the partitions 21. The bottom 29 of the passage is curved in an arc about the axis of the shaft 28, and the plate 20 extends radially from the shaft to a point adjacent the bottom 29 of the passage. The plate 20 is adapted to oscillate back and forth from a retracted position in which its free edge 30 is located adjacent the shaft 23 at a point a substantial distance rearwardly of the lower rear edge 27 of the passage 17 and an advanced position in which its free edge 30 is located within the passage 18 well forwardly of the lower rear edge 27 of the latter. The upper wall 31 of the passage 18 extends forwardly and upwardly from the shaft

27 in the same general direction as the bottom 29 of the passage.

The plate 19 is curved on the same radius as the bottom 29 of the passage 18. When the plate 19 is in its advanced position it forms a rearward continuation of the bottom 29 of the passage, across which continuation the plate 20 sweeps in oscillating forwardly from its retracted position to its advanced position.

When the loading device is in its normal refuse receiving position the plate 19 is in its retracted position and the plate 20 is in its advanced position, all as shown in Fig. 1. When the loading device is placed in operation the plate 20 moves first, oscillating rearwardly from its advanced position into its retracted position, as shown in Fig. 4. As soon as the plate 20 reaches its retracted position the plate 19 oscillates forwardly into its advanced position, pushing before it all of the refuse in the trough 17, as shown in Fig. 5. As soon as the plate 19 reaches its advanced position the plate 20 comes into action again, oscillating forwardly from its retracted position into its advanced position and pushing before it all of the refuse from the top of the plate 19 into the passage 18. After this has taken place the plate 19 oscillates back into its retracted position again, in readiness for the next loading operation.

Any suitable form of control means may be employed for causing the plates 19 and 20 to move in the above described sequence. In the particular embodiment shown the plates 19 and 20 are operated by hydraulic cylinders 32 and 33. While they can be operated through manual controls by observing the proper sequence, automatic controls are preferable for the purpose.

The opening 16 may be provided, if desired, with a vertically slidable cover 34. The cover 34 may be raised and lowered automatically by the free edge 25 of the plate 19. When the plate 19 is oscillated rearwardly into its retracted position it will raise the cover 34, as shown in Fig. 4, and when it is oscillated forwardly into its advanced position it will lower the cover. If the loading device is to be inactive for any length of time, the control for the device can be manipulated until the plate 19 has oscillated forwardly into its advanced position whereby to allow the cover 34 to close, after which the control means can be shut off, leaving the cover closed.

The cylinders 32 and 33 are located above the plates 19 and 20 in the center of the upper portion of the casing 12. The upper end of the cylinder 32 is pivotally connected to the center of a cross rod 35 which is fixedly mounted in the partitions 21. The lower end of the piston rod 36 in the cylinder 32 is pivotally connected to the center of a relatively short cross rod 37. The rod 37 is movable and is connected at its ends to a pair of levers 38. The levers 38, which are located adjacent the ends of the plate 19, are pivotally connected at corresponding ends to a fixed cross rod 39 and are pivotally connected at their free ends, beyond the rod 37, to links 40 which are in turn pivotally connected to brackets 41 on the back of the plate 19. When the piston rod 36 is in its retracted position in the cylinder 32 it will hold the plate 19 in its retracted position, as shown in Fig. 1. When the piston rod 36 is projected it will swing the plate 19 into its advanced position, as shown in Fig. 5.

The upper end of the cylinder 33 is pivotally connected to the center of another fixed cross rod 42, and the lower end of the piston rod 43 in the cylinder 33 is pivotally connected to the center of

another relatively short movable cross rod 44. The rod 44 is connected at its ends to a pair of brackets 45 on the back of the plate 20. When the piston rod 43 is in its projected position in the cylinder 33 it will hold the plate 20 in its advanced position, as shown in Fig. 1. When the piston rod 43 is retracted it will swing the plate 20 into its retracted position, as shown in Fig. 4.

The cylinders 32 and 33 may be so hooked up in a hydraulic system as to permit the cylinders to be operated automatically in proper sequence by merely manipulating a master valve 46. Such a system is illustrated schematically in Figs. 7 to 10 inclusive.

This hydraulic system includes, in addition to the master valve 46, a tank 47 for the oil or other actuating liquid, a continuously operating pressure pump 48, and two four-way valves 49 and 50. The master valve 46 is provided with a readily accessible operating handle 51. The various connecting conduits are represented in Figs. 7 to 10 inclusive by either solid or dotted lines at various stages in the operating cycle, depending on whether the oil in the same happens to be under pressure or not, solid lines indicating pressure and dotted lines indicating an absence of pressure.

Describing the hydraulic system in more detail—a conduit 52 extends from the tank 47 to the pump 48, and another conduit 53 extends from the pump 48 past a check valve 54 to two branch conduits 55 and 56. The branch conduit 55 extends to one of the ports of the four-way valve 49, while the other branch conduit 56 extends to one of the ports of the other four-way valve 50.

From the three remaining ports of the four-way valve 49, conduits 57, 58 and 59 extend respectively (1) to the lower end of the cylinder 33, (2) to the upper end of the cylinder 33, and (3) to a conduit 60 which discharges back into the tank 47. From the three remaining ports of the four-way valve 50, conduits 61, 62 and 63 extend respectively (1) to the lower end of the cylinder 32, (2) to the upper end of the cylinder 32, and (3) to the previously mentioned conduit 59 connecting with the conduit 60. A conduit 64 extends from the conduit 53 to the master valve 46. The previously described conduit 60 extends from the master valve back into the tank 47.

The four-way valve 49 is mounted on the cylinder 32 and is provided with an operating lever 65 which is adapted to be moved through an angle of 90° in first one direction and then the other by stops 66 and 67 mounted on a rod 68. The rod 68 is carried by and moves with the piston rod 36 in the cylinder 32.

When the piston rod 36 reaches its retracted position (see Fig. 7) it turns the valve 49 into a position in which the conduit 55 is placed in communication with the conduit 57 and the conduit 58 is placed in communication with the conduit 59. When the piston rod 36 reaches its projected position (see Fig. 9) it turns the valve 49 into a position in which the conduit 55 is placed in communication with the conduit 58 and the conduit 57 is placed in communication with the conduit 59.

When the valve 49 is first moved into the position shown in Fig. 7, the valve 50 will be in the position shown in Fig. 7, with the conduit 56 in communication with the conduit 61 and the conduit 62 in communication with the conduit 63. The valve 50 will remain in that position until such time as the master valve 51 is moved from its open position into the closed position shown in Fig. 7. When the master valve 51 is closed the

resulting pressure of the oil in the then communicating conduits 55 and 57 will immediately cause the piston rod 43 in the cylinder 33 to be retracted, moving the plate 20 from the advanced position shown in Fig. 7 to the retracted position shown in Fig. 8.

The four-way valve 50 is mounted on the cylinder 33 and is provided with an operating lever 69 which is adapted to be moved through an angle of 90° in first one direction and then the other by stops 70 and 71 mounted on a rod 72. The rod 72 is carried by and moves with the piston rod 43 in the cylinder 33.

When the piston rod 43 in the cylinder 33 reaches its fully retracted position (see Fig. 8) the valve 50 will be automatically turned from the position shown in Fig. 7 into the position shown in Fig. 8. As soon as the valve 50 reaches the position shown in Fig. 8 the pressure of the oil in the then communicating conduits 56 and 62 will immediately cause the piston rod 36 in the cylinder 32 to be projected. When the piston rod 36 reaches the fully projected position shown in Fig. 9 the valve 49 will be automatically moved from the position shown in Fig. 8 into the position shown in Fig. 9. As soon as the valve 49 reaches this position the pressure of the oil in the then communicating conduits 55 and 58 will immediately cause the piston rod 43 in the cylinder 33 to be projected. When the piston rod 43 reaches the fully projected position shown in Fig. 10, the valve 50 will be automatically moved from the position shown in Fig. 9 to the position shown in Fig. 10. As soon as the valve 50 reaches the position shown in Fig. 10 the pressure of the oil in the then communicating conduits 56 and 61 will immediately cause the piston rod 36 in the cylinder 32 to be retracted, completing the operating cycle.

To prevent the operating cycle from being continuously repeated, the master valve 46 is moved from its then closed position into an open position, allowing the oil under pressure in the conduit 64 to be short-circuited back to the tank through the conduit 60. To start the operating cycle it is merely necessary to move the master valve 46 into the closed position shown in Fig. 7.

The master valve 46 can be operated by hand at the desired time to stop the operation of the cylinders 32 and 33 at the end of the cycle, or it can, if desired, be arranged in the path of movement of any suitable control member (not shown) connected either with the piston rod 36 or with some part moving in coordination therewith, whereby when the piston rod 36 returns finally to its retracted position at the completion of the cycle the master valve 46 will be automatically moved into its open or inactive position.

When the storage compartment 10 is filled with refuse and ready for dumping the collector is driven to a suitable location and the casing 12 swung up into the out-of-the-way position shown in Fig. 2. This may be done, if desired, by using the cylinder 32. Arms 73 are secured to the ends of the oscillating shaft 23 in the spaces 22 at the sides of the casing 12, and long depending links 74 are pivotally connected at their upper ends to brackets 75 at the rear ends of the sides of the compartment 10. The links 74 are normally housed in the spaces 22. When the casing 12 is to be raised into the position shown in Fig. 2 the master valve 46 is closed momentarily until the arms 73 have moved into the lowered position shown in Fig. 5, whereupon the free lower ends of the links 74 are hooked up to the ends of the

arms 73 by means of latches 76. As soon as this has been accomplished the master valve 46 is again closed and kept closed until the arms 73 have moved into the position shown in Fig. 1. This movement will force the links 74 into the straight line position shown in Fig. 2, with the casing 12 raised clear of the rear end of the compartment. After this has been done the compartment can be tilted up into the position shown in Fig. 2 by means of a hydraulic hoist 77 operating between the compartment and the chassis.

In the modification shown in Figs. 11 and 12 a gate-like member 78 is arranged within the trough 17' in a vertical position lengthwise of the latter, for preventing the refuse from working up into a possibly obstructing position behind the packing plate 20'. The member 78 is adapted to move up and down, in synchronism with the forward and backward movement of the plate 20'. When the packing plate 19' is in its elevated refuse receiving position and the packing plate 20' is in its forward refuse holding position, as shown in Fig. 11, the member 78 is in its lowered position, in which position it will prevent the refuse from working upwardly into the space at the back of the plate 20'. When the plate 20' is moved rearwardly, as shown in Fig. 12, to receive a new charge from the plate 19', the member 78 is moved upwardly into an out-of-the-way position. This movement of the member 78 is accomplished by mounting the member in vertical guides and connecting it by a link 79 with an arm 80 on the back of the plate 20'.

I claim:

1. In a refuse collector, a storage compartment for receiving a number of charges of refuse, a stationary receiving trough into which refuse is adapted to be dumped prior to being transferred to the storage compartment, said trough having capacity for a single charge of refuse, a transfer passage between the trough and the compartment, and two pivotally mounted refuse handling members which are oscillatable back and forth in arcs between retracted and advanced positions, one of said members being located in the trough and upon each charging operation being advanced downwardly and forwardly to sweep all of the refuse in the bottom of the trough from the surface of the latter into a relatively elevated position, in which elevated position said charge of refuse is temporarily supported on the surface of the first mentioned member, and the other of said members being located above the trough and upon each charging operation being advanced to sweep said refuse from the surface of the first mentioned member into the transfer passage.

2. In a refuse collector, a storage compartment for receiving a number of charges of refuse, a stationary receiving trough into which refuse is adapted to be dumped prior to being transferred to the storage compartment, said trough having capacity for a single charge of refuse, a transfer passage between the trough and the compartment, and two pivotally mounted refuse handling members which are oscillatable back and forth in arcs between retracted and advanced positions, one of said members being located in the trough and upon each charging operation being advanced downwardly and forwardly to sweep all of the refuse in the bottom of the trough from the surface of the latter into a relatively elevated position, in which elevated position said charge of refuse is temporarily supported on the surface of the first mentioned member, and the

other of said members being located above the trough and upon each charging operation being advanced to sweep said refuse from the surface of the first mentioned member into the transfer passage, and means for automatically oscillating the refuse handling members back and forth during each charging operation in the following sequence: first retracting the first mentioned member, then advancing the second mentioned member, and finally retracting the second mentioned member.

3. In a refuse collector, a storage compartment for receiving a number of charges of refuse, a stationary receiving trough into which refuse is adapted to be dumped prior to being transferred to the storage compartment, said trough having capacity for a single charge of refuse and being provided with a receiving opening at the rear of the same, a transfer passage between the trough and the compartment, and two pivotally mounted refuse handling members which are oscillatable back and forth in arcs between retracted and advanced positions, one of said members being located in the trough and upon each charging operation being advanced downwardly and forwardly to sweep all of the refuse in the bottom of the trough from the surface of the latter into a relatively elevated position, in which elevated position said charge of refuse is temporarily supported on the surface of the first mentioned member, and the other of said members being located above the trough and upon each charging operation being advanced to sweep said refuse from the surface of the first mentioned member into the transfer passage, and a vertically movable closure for said receiving opening.

4. In a refuse collector, a storage compartment for receiving a number of charges of refuse, a stationary receiving trough into which refuse is adapted to be dumped prior to being transferred to the storage compartment, said trough having capacity for a single charge of refuse and being provided with a receiving opening at the rear of the same, a transfer passage between the trough and the compartment, and two pivotally mounted refuse handling members which are oscillatable back and forth between retracted and advanced positions, one of said members being located in the trough and upon each charging operation being advanced to sweep all of the refuse in the bottom of the trough from the surface of the latter into a relatively elevated position, in which elevated position said charge of refuse is temporarily supported on the surface of the first mentioned member, and the other of said members being located above the trough and upon each charging operation being advanced to sweep said refuse from the surface of the first mentioned member into the transfer passage, and a vertically movable closure for said receiving

opening, said closure being movable into its closed position prior to the trough being swept by the first mentioned refuse handling member.

5. In a refuse collector, a storage compartment for receiving a number of charges of refuse, a stationary receiving trough into which refuse is adapted to be dumped prior to being transferred to the storage compartment, said trough having capacity for a single charge of refuse and being provided with a receiving opening at the rear of the same, a transfer passage between the trough and the compartment, and two pivotally mounted refuse handling members which are oscillatable back and forth between retracted and advanced positions, one of said members being located in the trough and upon each charging operation being advanced to sweep all of the refuse in the bottom of the trough from the surface of the latter into a relatively elevated position, in which elevated position said charge of refuse is temporarily supported on the surface of the first mentioned member, and the other of said members being located above the trough and upon each charging operation being advanced to sweep said refuse from the surface of the first mentioned member into the transfer passage, and a vertically movable closure for said receiving opening, said closure being operated by the first mentioned refuse handling member and being moved into its closed position prior to the trough being swept by said member.

6. In a refuse collector, a storage compartment for receiving a number of charges of refuse, a stationary receiving trough into which refuse is adapted to be dumped prior to being transferred to the storage compartment, said trough having capacity for a single charge of refuse and being provided with a receiving opening at the rear of the same, a transfer passage between the trough and the compartment, and two pivotally mounted refuse handling members which are oscillatable back and forth in arcs between retracted and advanced positions, one of said members being located in the trough in a downwardly facing position above the receiving opening and upon each charging operation being advanced downwardly and forwardly to sweep all of the refuse in the bottom of the trough from the surface of the latter into a relatively elevated position, in which elevated position said charge of refuse is temporarily supported on the then upwardly facing surface of the first mentioned member, and the other of said members being located above the trough in a position closing the transfer passage and upon each charging operation being first retracted rearwardly before the advance of the first mentioned member and then advanced forwardly to sweep said refuse from the surface of the first mentioned member into the transfer passage.

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