Jan. 27, 1942. P. SCHUTZ ET AL 2,271,444

REFUSE BODY

Filed July 19, 1940 3 Sheets-Sheet 1

Fig. 1.

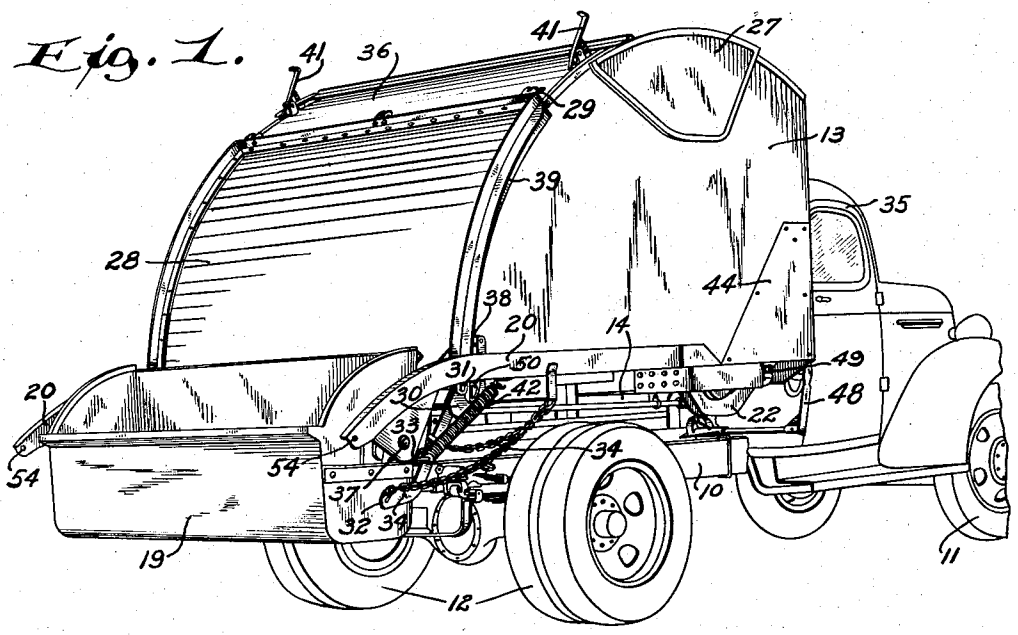
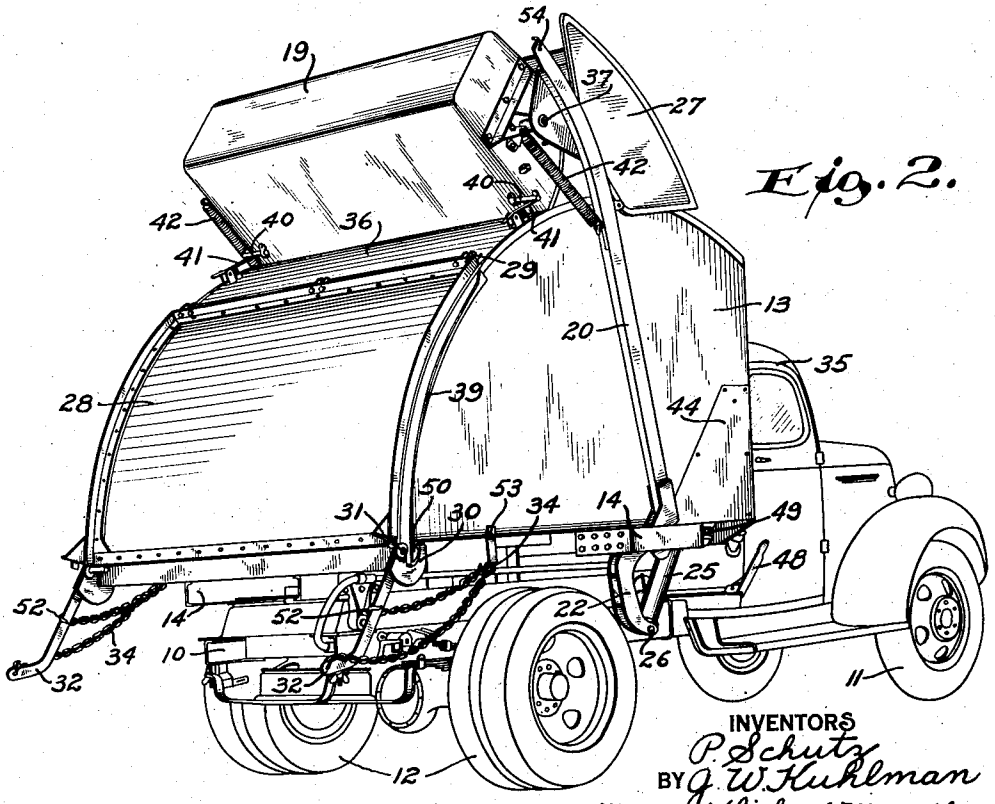


Fig. 2.



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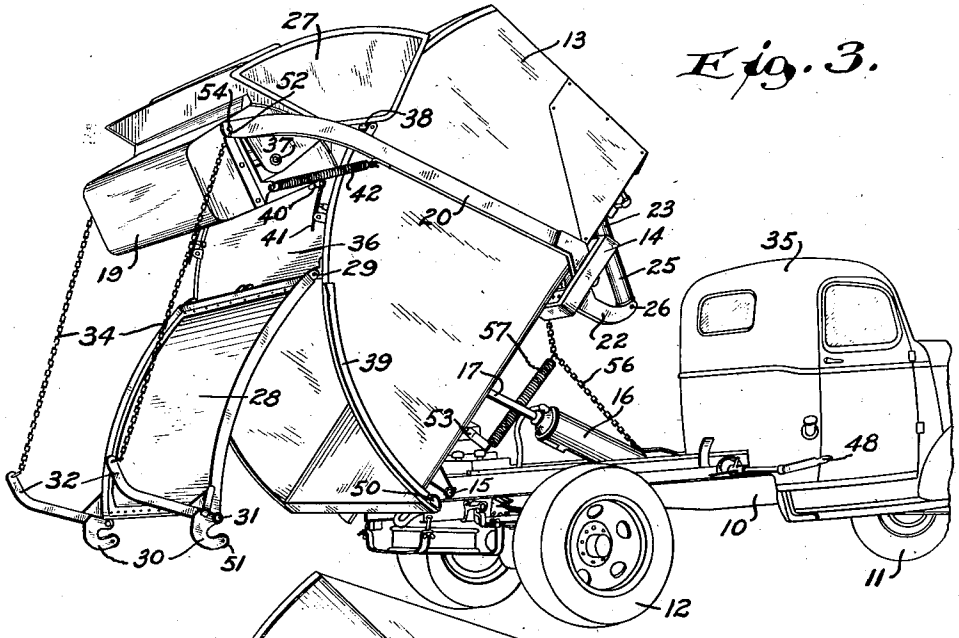


Fig. 3.

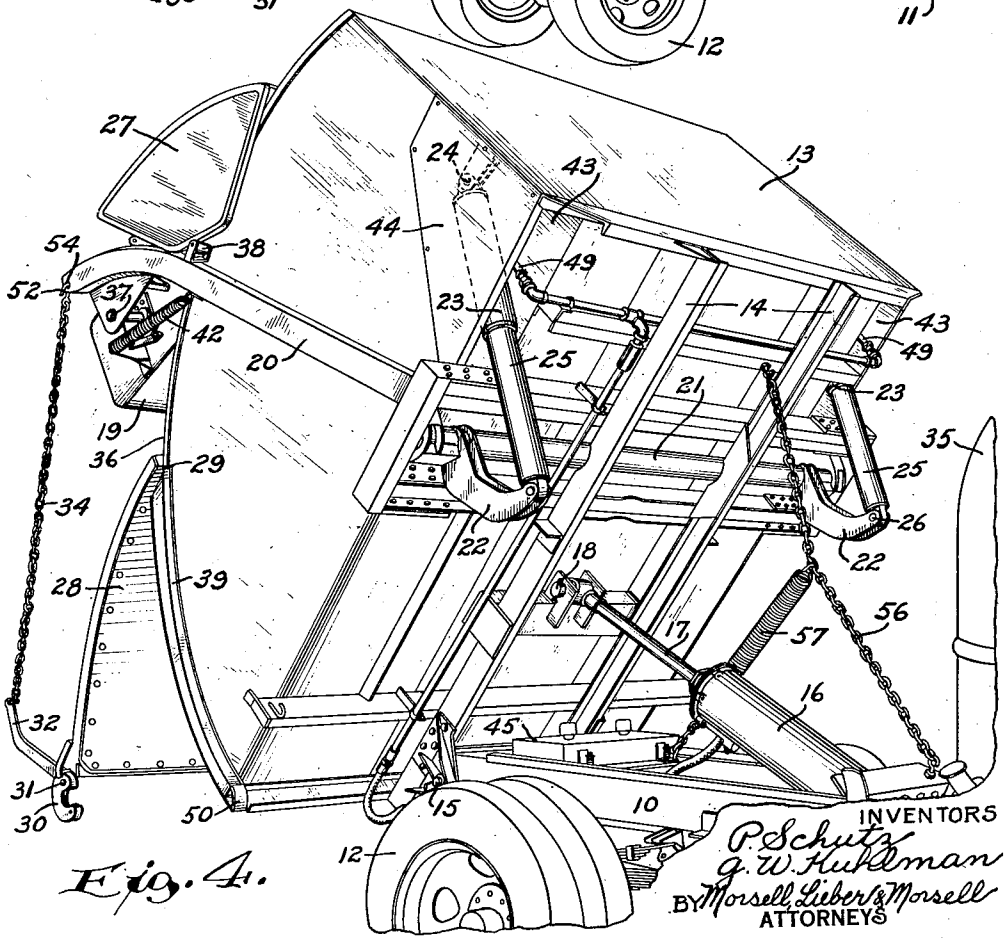


Fig. 4.

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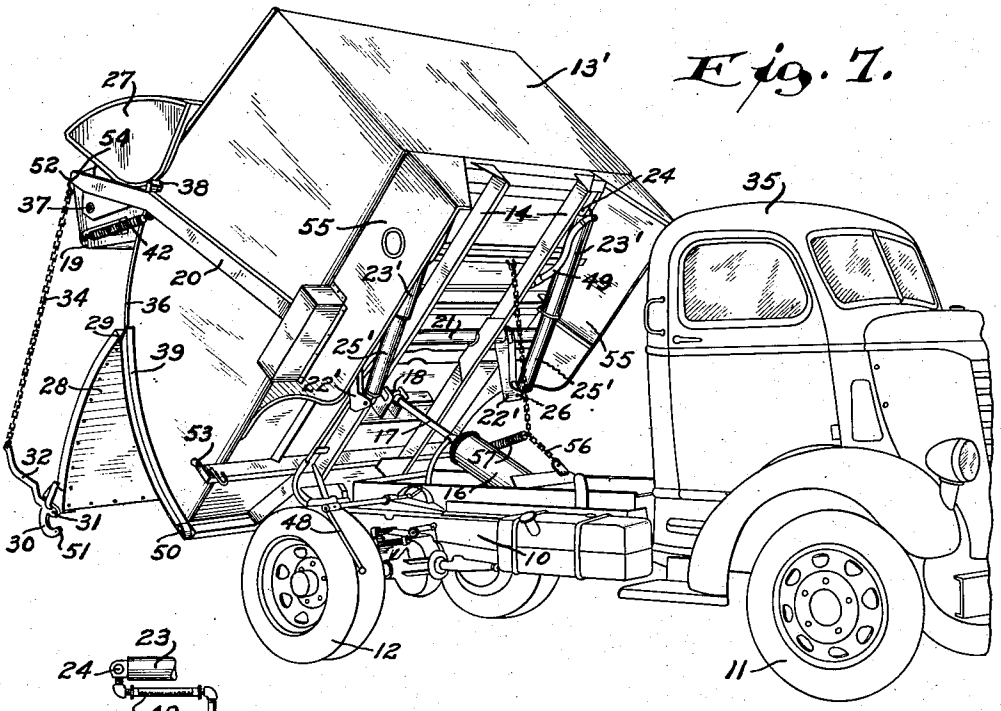


Fig. 7.

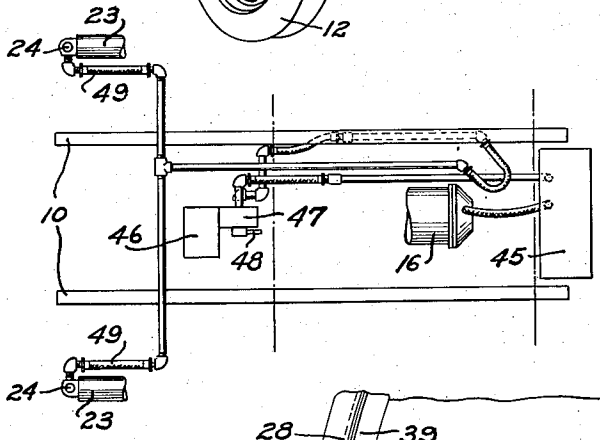


Fig. 6.

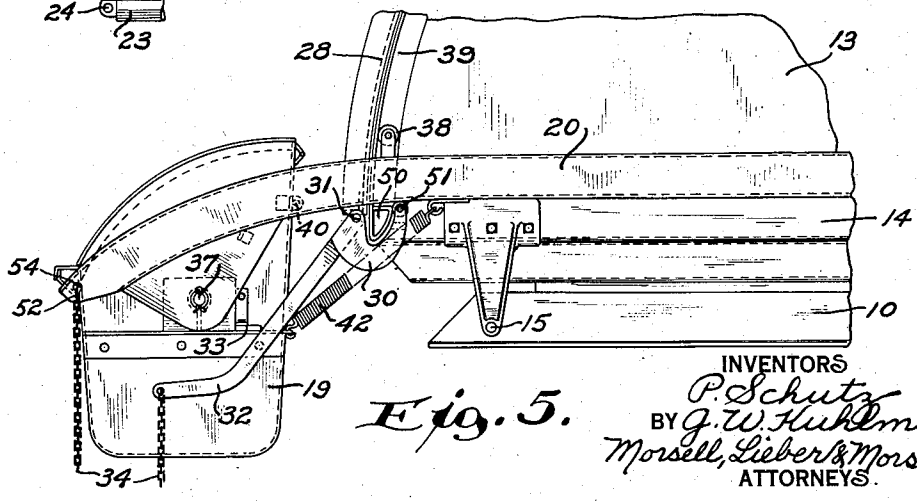


Fig. 5.

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UNITED STATES PATENT OFFICE

2,271,444

REFUSE BODY

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Application July 19, 1940, Serial No. 346,334

4 Claims. (Cl. 214—67)

Our invention relates in general to improvements in the art of refuse collection and transportation, and relates more specifically to improvements in the construction and operation of transportable refuse collecting bodies having means for facilitating the loading and unloading thereof.

An object of our present invention is to provide various improvements in the details of construction and operation of bulk material carrier bodies, whereby such devices may be conveniently loaded or unloaded with miscellaneous refuse and other diverse materials.

Considerable activity has recently been evinced by municipalities and governmental agencies, with respect to various types of mechanized units for facilitating the collection and transportation of garbage and other refuse. While some of these prior units are relatively flexible and semi-automatic in operation, most of them are also rather cumbersome and complicated in structure, and are difficult and quite dangerous to manipulate. Most of these carrier bodies are provided with some means for receiving the fresh charges of material at or near the ground level and for dumping these charges into the top of the body, and are moreover bodily tiltable and provided with a swingable end gate for releasing the load when the body is being dumped. In some of the prior structures of this type, the loading buckets are adapted to be elevated mechanically while the body is tiltable with the aid of a hydraulic hoist or jack, and it has even been proposed to utilize the same hydraulic means which tilts the body for loading bucket elevating purposes. These prior devices are not however properly safeguarded against possible undesirable opening or escape of material past the end gate; and in cases where the body tilting hoist is employed for other purposes, the use of the relatively large and powerful jack for such other minor purposes is not economical and introduces too much complication in the assemblage.

It is therefore a more specific object of the present invention to provide an improved refuse body assemblage which is extremely simple, compact and durable in construction, and which is moreover flexible, safe and efficient in operation.

Another specific object of our invention is to provide a new and useful mechanized garbage body loading, transporting and unloading unit of the hydraulically actuated type, which is relatively inexpensive to produce and to maintain.

A further specific object of our present invention is to provide an improved mechanically loadable and tiltable carrier body for bulk materials, wherein the loading and dumping mechanisms are independently operable by means of hydraulic jacks best suited for their specific purposes.

Still another additional specific object of our to provide improved mechanism for operating the end gate of a dump body, and for locking such gates in closed position during normal loading and transportation of the bodies.

An additional specific object of this invention is to provide an improved garbage collection body or the like having maximum carrying capacity; which can be quickly, safely and conveniently loaded and unloaded; and which will most effectively confine the load at all times.

Still another additional specific object of our invention is to provide an improved general utility loading and hauling unit, which may be readily mounted upon a truck to present a neat and attractive appearance, which can be easily maintained in clean and sanitary condition, and all parts of which are readily accessible for inspection.

These and other specific objects and advantages will be apparent from the following detailed description.

A clear conception of the several features constituting our present invention, and of the mode of constructing and of operating several types of refuse body assemblages built in accordance with the improvement, may be had by referring to the drawings accompanying and forming a part of this specification wherein like reference characters designate the same or similar parts in the various views.

Fig. 1 is a rear and side perspective view of one of the improved refuse bodies mounted on a truck, and with the loading bucket lowered and the rear end gate locked;

Fig. 2 is a similar view of the same assemblage, but showing the loading bucket in extreme elevated and dumping position;

Fig. 3 is another similar perspective view showing the body tilted and the end gate being held open by the elevated loading bucket;

Fig. 4 is a somewhat enlarged front and side perspective view of the assemblage, with the parts positioned as in Fig. 3;

Fig. 5 is an enlarged fragmentary side view of the loading bucket, rear end gate, and rear lower portion of the body, showing the rear end gate locking mechanism in active position;

Fig. 6 is a diagrammatic plan view of the hydraulic distribution system; and

Fig. 7 is a front and side perspective view of a slightly modified type of the improved refuse body, showing the same in dumping position.

While the invention has been shown and described herein as being specifically embodied in a particular type of refuse body tiltably mounted upon the rear of an ordinary motor driven truck, and having a particular style of loading bucket associated therewith, it is not our desire or intent to thereby unnecessarily restrict the scope or utility of the present improvement.

Referring to Figs. 1 to 6 inclusive of the drawings, the improved refuse body and truck assemblage shown therein, comprises in general, a relatively standard transporting truck having a chassis 10 mounted on front and rear wheels 11, 12 respectively; a load carrying body 13 rigidly secured to a sub-frame 14 which is tiltably connected to the rear end of the chassis 10 above the wheels 12 by means of a transverse pivot 15; a main hydraulic hoist or jack having a cylinder 16 secured by trunnions to the chassis 10, and a piston 17 slidable within the cylinder 16 and connected by a pivot pin 18 to the sub-frame 14, for tilting the body 13 about the pivot 15; a loading bucket 19 tiltably supported by side arms 20 secured to a transverse pivot shaft 21 journalled in the sub-frame 14, and having lever arms 22 rigidly attached thereto at opposite sides of the chassis 10; a pair of auxiliary hydraulic jacks or rams each having a cylinder 23 swingably suspended from the body 13 by a pivot 24, and also having a piston 25 movable in its cylinder 23 and connected to the swinging end of the adjacent lever arm 22 by means of a pivot pin 26; a top closure or cover 27 swingably suspended from the body 13 and being operable by the movement of the loading bucket 19; and a rear end gate 28 swingably suspended from the body 13 by means of a pivot 29 and having latching hooks 30 suspended from the lower swinging end thereof by means of a pivot shaft 31, each hook 30 having an integral actuating lever 32 engageable by an abutment 33 carried by the adjacent side of the bucket 19 for urging the hook into latching position, and a chain 34 adapted to connect the end of each lever 32 with the extreme swinging end of the adjacent arm 20.

The load carrying body 13 may be formed of sheet metal and extends from the rear of the truck cab 35 to a point somewhat beyond the rear end of the chassis 10, and also extends outwardly beyond the rear wheels 12 so as to provide for maximum loading capacity. The front wall of the body 13 is normally disposed approximately vertical, and the body bottom is normally located parallel to the chassis beams, while the upright side walls of the body 13 are curved along their top and rear edges and are rigidly interconnected at the top by a curved transverse plate 36 in which the upper loading opening is formed and which terminates at the rear discharge opening. The loading bucket 19 is swingably suspended from the long side arms 20 by means of end pivots 37, and the arms 20 which are swingable about the axis of the shaft 21 are provided with guide rollers 38 cooperating with rails 39 secured to the curved rear edges of the body side walls, in order to insure parallel swinging of these arms 20, see Fig. 5. The cover 27 which normally closes the upper loading opening of the body 13 as in Fig. 1, is adapted to be lifted or opened as in Fig. 2, when the bucket 19 is elevated to its highest position, and the loading bucket is provided with alined pins 40 secured thereto remote from their suspension pivots 37 and which are cooperable with latches 41 carried by the body 13 to swing the bucket 13 to load discharge position as shown in Fig. 2, in opposition to the action of a set of tension springs 42.

In the embodiment of the invention shown in Figs. 1 to 4 inclusive, the auxiliary hydraulic rams comprising the cylinders 23 and pistons 25, are normally disposed approximately upright, and are confined within pockets 43 at the front of the body 13 and which are normally closed by removable side plates 44. When these auxiliary rams are contracted as when the bucket 19 is in lowermost position, the pistons 25 are within the cylinders 23 and the latter are suspended wholly within the pockets 43, but when these rams are expanded to elevate the bucket 19, the pitsons 25 move outwardly beyond the pocket confines and swing the levers 22 to thereby oscillate the shaft 21 and swing the arms 20 and the bucket 19 upwardly. The auxiliary jacks or rams are carried by and are tiltable with the body 13, and by providing two relatively small auxiliary rams which coact with the body 13 and with the shaft 21 near the arms 20, parallel swinging of these arms 20 and of the bucket 19 will be assured with minimum expenditure of power. The relatively large main hydraulic hoist or jack comprising the cylinder 16 and piston 17, is of relatively well known construction, and coacts with the chassis 10 and body supporting frame 14 centrally of the body 13.

All of the hydraulic jacks may be supplied with liquid such as oil under pressure from a supply reservoir 45 by means of a common pump 46 shown diagrammatically in Fig. 6 and adapted to be driven by the propelling motor of the transporting truck, in a well known manner. The pump 46 may have its discharge side provided with a control valve 47 operable by a handle 48 in such manner that liquid under pressure may be delivered from the pump either to the main jack cylinder 16, or to the auxiliary ram cylinders 23, but not to all cylinders 16, 23 simultaneously. The control should be such, that when liquid under pressure is being delivered by the pump to the ram cylinder 23, no liquid is being delivered to the jack cylinder 16, but when liquid has been admitted to the bucket elevating rams, the pressure supply may be cut off and the pressure may be held in the cylinders 23, while liquid under pressure is being delivered to the cylinder 16 to dump the body 13 with the bucket 19 in elevated position, as in Figs. 3 and 4. The liquid may be transmitted to and from the ram cylinders 23 through flexible connections 49 shown in Fig. 6, and no liquid can be discharged from the ram cylinders 23 while the body 13 is tilted, and the bucket 19 must be elevated before the body 13 can actually be tilted for load dumping purposes. The extent to which the body 13 may be tilted, may be limited by means of a chain 56 and spring 57, and the latter assists gravity in returning the body 13.

When the body 13 is lowered to load receiving position, the end gate 28 should be tightly sealed, and the latch hooks 30 are provided for this purpose. As previously indicated, the rear end gate is swingably suspended from pivots 29, and the lower end of the body 13 is provided with oppositely directed end lugs 58 with which the hooks 30 are cooperable as shown in Figs.

2 and 5. Each hook 30 may be provided with a roller 51, and the lugs 50 may be provided with cam surfaces with which these rollers 51 are cooperable to force the end gate 29 tightly against the curved edges of the body side walls near the rails 39. While the latch hooks 30 may be released from the cam lugs 50 manually, they may also be released and the end gate 28 may be lifted automatically, with the aid of the chains 34. These chains 34 are provided with end hooks 52, and when not in use, the chains 34 may be suspended from brackets 53 secured to the lower portion of the body 13, as shown in Figs. 1 and 2. When it becomes desirable to open the end gate 28, the chains 34 may be released from the brackets 53 and the end hooks 52 may be inserted in holes 34 formed in the extreme ends of the loading bucket carrier arms 20. Then, as the bucket 19 is elevated to its uppermost position as in Figs. 3 and 4, the chains 34 will function to automatically release the hooks 30 and to elevate the end gate 28 so that the load may be subsequently freely delivered from the body 13. Upon return of the body 13 to normal or lowered position, and when the bucket 19 is lowered, the latch hooks 30 will be automatically returned to locking position by the lugs 33 engaging the lever arms 32.

The embodiment of the invention specifically illustrated in Fig. 7 is similar in most respects to that herein-above described, but the body 13', and the disposition of the auxiliary rams for raising the loading bucket 19 are somewhat different. The modified body 13' is again mounted upon a sub-frame 14 and is tiltable by means of a main jack carried by the chassis 10, but this body 13' has depending side aprons 55 within which the auxiliary hydraulic rams are located. The ram cylinders 23' are pivotally suspended from the sub-frame 14, and the pistons 25' of these rams cooperate with the modified levers 22' in such manner that the auxiliary jacks are disposed more nearly horizontal when not in action. The auxiliary rams or jacks of the modification are also carried by the body 13' and are operable the same as those associated with the body 13 and previously described, and the extent of tilting of the body 13' may again be limited by means of a chain 56 and spring 57 coacting therewith and with the chassis 10.

During normal use of the improved refuse loading and transporting assemblage, the body 13 will be in the position indicated in Fig. 1 whenever it is loaded and being transported, and whenever it is empty and about to be loaded. The loading bucket 19 is then in lowermost position ready to receive material which may be deposited therein by attendants standing on the ground rearwardly of the truck. When the bucket 19 has been supplied with material, this accumulated material may be dumped from the bucket into the upper opening of the body 13 by manipulating the control lever 48 so as to actuate the auxiliary hydraulic rams carried by the body 13. As the pistons 25 of these rams move downwardly, they swing the lever arms 20 and the bucket 19 upwardly, and as the bucket reaches its uppermost position, the pins 40 thereof engage the hooks 41. This engagement causes the bucket 19 to tilt and to simultaneously lift the cover 27, so that the load will be dumped from the bucket 19 into the body 13 by gravity. The rams may thereafter be operated to again return the bucket 19 to the position shown in Fig. 1, from the position illustrated in Fig. 2, and subsequent batches of material may be introduced into the body 13 until the same is completely loaded.

The load may then be transported to any suitable destination and subsequently dumped. In order to dump the load, the bucket 19 should first be elevated as shown in Fig. 2, and the main hydraulic jack should be actuated to cause the piston rod 17 to tilt the body 13 to the position shown in Figs. 3 and 4. If it is desired to have the end gate 28 open automatically, the chains 34 should first be connected to the openings 54 of the arms 20, before the bucket 19 is elevated. The arms 20 will then automatically open the end gate 28 after releasing the latch hooks 30, as shown in Figs. 3 and 4, thereby permitting unobstructed delivery of the load from within the tilted body 13, by gravity. After the load has been dumped, the body 13 may again be brought to normal or horizontal position, whereupon the bucket 19 may be lowered to the position shown in Fig. 1. During this return of the bucket 19 to its lowermost position, the lugs 33 will cooperate with the hook actuating levers 32 to force the hooks 30 into latching or locking position as shown in Fig. 5, thereby preventing undesirable escape of material from within the body 13 during subsequent loading thereof.

From the foregoing detailed description it will be apparent that our present invention provides an improved refuse body assemblage which is extremely simple, compact and durable in construction; which is flexible, safe and efficient in operation; and which affords maximum capacity considering the space occupied. By providing independent hydraulic jacks or rams for tilting the load carrying bodies 13, 13', and for actuating the loading bucket 19, the body and the bucket may be actuated most effectively and with most efficient application of the power, thereby permitting such actuation with minimum force. The mounting of the auxiliary rams directly on the load carrying body, permits application of the force to the lifting bucket in a most effective manner, and this same set of rams may also be utilized to automatically open the end gate 28. Both sets of rams can be readily operated from a common source of pressure supply by merely providing a relatively simple regulating valve for controlling the flow of the liquid to and from the jacks. The provision of the latching hooks 30 and the chains 34 for effecting automatic operation of these hooks, and the further provision of means carried by the loading bucket 19 for automatically returning the hooks 30 to locking position, greatly facilitates manipulation of the refuse carrying assemblage, and insures tight closure of the body 13 during periods of loading thereof. The entire assemblage can be readily manipulated in a most effective manner by a single attendant without danger of injury, and each of the individual operations can be quickly and effectively accomplished. It is also noteworthy that the improved refuse body assemblage can be readily associated as a unit with standard trucks, and can be operated by the same prime mover which normally drives the truck. The improved refuse collecting and transporting assemblage has proven highly successful in actual commercial use, and the loading bucket actuating rams may be operated either with vertically or horizontally disposed axes as shown and described herein.

It should be understood that it is not desired to limit this invention to the exact details of construction or to the precise mode of operation, herein shown and described, for various modifications within the scope of the claims may occur to persons skilled in the art.

We claim:

1. In combination, a tiltable load confining body having a movable end gate, a loading bucket movably suspended from said body, a hook for locking said gate closed, said hook having a roller thereon cooperable with a cam surface on the body to effect sealing of said gate, and means carried by said bucket for moving said hook into latching position.

2. In combination, a tiltable load confining body having a movable end gate, a loading bucket movably suspended from said body, a hook for locking said gate closed, said hook having a roller thereon cooperable with a cam surface on the body to effect sealing of said gate, and means operable by the movement of said bucket for releasing said hook and for opening said gate.

3. In combination, a tiltable load confining body having a movable end gate, a loading bucket movably suspended from said body, a hook for locking said gate closed, said hook having a roller thereon cooperable with a cam surface on the body to effect sealing of said gate, means associated with said bucket for moving said hook into latching position when the bucket is lowered, and means operable by the upward movement of said bucket for releasing said hook and for opening said gate.

4. In combination, a tiltable load confining body having a movable end gate, a loading bucket movably suspended from said body, a hook for locking said gate closed, said hook having a roller thereon cooperable with a cam surface on the body to effect sealing of said gate, an abutment on said bucket cooperable with said hook to force the latter into latching position, and a releasable chain connecting said bucket and said hook for releasing the latter and for subsequently opening said gate.

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